

# ONLINE PROGRAMMES

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## MBA PAPER 4.21

### MANAGEMENT OF FUNDS

#### SYLLABUS

- UNIT 1** Meaning and importance of funds – Effective allocation of funds – Danger of misallocation of funds – Organising for funds management – Relationship with other function – Role of financial systems – Barometer of business conditions.
- UNIT 2** Capitalisation and assessment of funds for fixed assets – Capital structure – Pattern of capital structures – Cost of capital – Interest for capital – Yield – Debt service coverage – Acquisition for specific allocation.
- UNIT 3** Financial Analysis – Planning and control – Allocation of funds to most profitable opportunity – Development of profitable opportunity and evaluation.
- UNIT 4** Return on investment as a criterion for allocating funds – Advanced capital budgeting techniques – Methods of incorporating risks and uncertainty.
- UNIT 5** Project appraisal, feasibility study and reporting – Treatment of inflation in capital budgeting – Capital rationing and its impact on financial planning.
- UNIT 6** International financing and management of funds – Resources for investing abroad – Foreign currency management – Financing multinational organisations.

# Reference Books

1. Ugni Brigham, Funds Management.
2. Robert W Johnson, Financial Management.
3. Kuchai S.C, Financial Management.
4. Prasanna Chandra, Financial Management.

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# UNIT - I

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## 1. FUNDS MANAGEMENT: AN INTRODUCTION

# Funds Management: An Introduction

In this unit meaning and importance of fund, effective allocation of funds, dangers of misallocation of funds, organisation for fund management, relationship of funds management with other functional management, role of financial systems and barometer of business conditions are dealt with.

## **MEANING OF FUND**

There are several concepts of fund. Broad, narrow and via-media concepts of fund do exist. The broad concept of fund refers to total financial resources, owned and borrowed, at the command of an organisation. In this sense fund refers to the total capital employed in an organisation. One of the major functions of financial management is raising of capital. The capital thus raised is termed as fund.

The narrow concept of fund equates fund to the stock of money and near money, such as cash in hand, cash at bank, self-liquidating assets such as bills receivable, drafts, etc. The narrow concept of fund thus equates funds to liquid financial resources with an organisation at any particular point of time. The via-media concept of fund equates fund to either the stock of gross working capital, i.e., the value of current assets or the net working capital, i.e., the assets of current assets over current liabilities. The concept of fund thus varies with the context. In the context of liquidity it means cash and near cash assets (the so called narrow concept), in the context of working capital management it means either the stock of current assets or the excess of current assets over the current liabilities (the so called via-media concept) and in the context of capitalisation of an organisation fund means the total capital employed by an organisation (the so-called broad concept).

The scope of fund management includes the following activities:

- determination of total capital to be raised
- determination of the debt-equity ratio or the proportion of debt to equity capital and the mix of long term and short-term capital.
- determination of the level of fixed-charge funds like bonds, debentures, loans, etc.
- determination of the sources of borrowing - development banks, public or private, domestic or overseas
- determination of the securities/charges to be given
- determination of the cost of capital
- determination of the extent of lease financing to depend upon
- determination of the degree of sensitivity of earnings per share to earnings before interest and taxation

- determination of the method of raising capital-public issue or private placement; under-writing and brokerage, rights issue and the like
- the legal restrictions, in any, on the scale, form, timing and other aspects of raising capital
- liquidity management
- management of treasury operations
- dealing with bankers
- credit management, collection efforts and systems
- management of short-term borrowings and trade credits availed
- determination of debt – swap opportunities
- determination of opportunities for interest rate swap
- determination of scope for forward rate agreements
- management of short-term investments
- keeping informed of money market and capital market conditions.

### **IMPORTANCE OF FUND MANAGEMENT**

Fund management affects the liquidity (less short term debt means more liquidity), solvency (more equity means more solvency), profitability (low cost capital means more profitability), flexibility of capital structure (more equity means, more flexibility), control on business (more debt and less equity mean more concentration of control on the affairs of the business) and so on. That is, fund management influences the fortunes of the business greatly.

- Fund Management covers a very large spectrum of activities of a business. True, whatever a business does it has a financial implication. Hence its pervasiveness and significance. Finance knowledge is a must for all irrespective of position, place, portfolio and what not.
- Fund Management influences the profitability or return on investment of a business. Yes, the choice of source of capital and investment decisively affect the profitability of an undertaking.
- Fund Management affects the solvency position of a business. Solvency refers to ability to service debts (that is paying interest and repaying principal as these become due). Profitability and nature of debts - both concerns of financial management, govern the solvency aspect. Hence the significance of fund management.
- Fund Management affects the liquidity position of a business. Liquidity refers to ability to repay short term loans. Efficient cash management, cash flow management and management of relations with the bankers influence the level of liquidity. All these factors are aspects of fund management.
- Fund Management affects cost of capital. Able financial managers find and use less cost sources, which in turn contributes to profitability. In using fixed cost instruments of capital, the efficacy of sound financial management would be known

well. Variable cost instruments of capital are the order of the day. Finance savvy persons go for such instruments.

- Fund Management, if well steered can ward off difficulties such as restrictive covenants imposed by lenders of capital, inflexibility in capital structure, dilution of management control on the affairs of the business and so on. Failure to do so, has landed many firms in difficulties and financial mess.
- Efficient fund management enables a business to command capital resources flowing into the business. There is always capital available at attractive terms, if business finance is handled well. Even overseas capital can be easily mobilized, if sound fund management is ensured.
- Market value of the business can be increased through efficient and effective fund management. As share and stock are quoted at high prices, more funds, when needed, can be mobilized easily either through public and or rights offers or private placement.
- Efficient fund management is necessary for the survival, growth, expansion and diversification of a business.
- Fund Management significantly influences the business's credit rating, employee commitment, suppliers' confidence, customers' patronage and the like.
- Fund Management is an exercise on optimizing costs given revenues, or optimizing revenues given costs. This is vital to ensure purposeful resource allocation.
- Today Fund Management has global dimensions with opportunity to mop up resources and put up investments across borders. Global trend in finance is better learnt by all.

Fund management affects all vital aspects of business health namely, liquidity, solvency, risk, return, control, flexibility, etc.

## **EFFECTIVE ALLOCATION OF FUNDS**

Allocation of funds is concerned with the following specific activities:

- the total amount to be committed in assets
- the proportion of fixed to current assets
- the mix of fixed assets to be acquired
- the timing, sourcing and acquisition of fixed assets
- the evaluation of capital investments as to risk and return features
- the mix of current assets
- the management of each item of current assets to optimize liquidity and return
- the effecting of a healthy portfolio of assets

Actually the above aspects of allocation of function are concerned with much pregnant issues with which fund management is concerned. The first aspect deals with the size of the firm, the second and third deal with the level of risk the business is

willing to assume, the fourth with appraisal of investments as to their profitability, pay back period, etc., the fifth with actual execution of investment decisions, the sixth with the liquidity of the business, the seventh with structural and circulatory aspects of current assets and the eighth with the overall balancing of various investments held by the business taking into account competing and divergent claims.

Fund allocation is, concerned capital budgeting and current asset management. Capital budgeting deals with fixed assets management. Investment appraisal, capital rationing, and acquisition, maintenance, replacement and renewal of fixed assets. Inventory management, receivables management, marketable securities management, cash management and working capital administration come under current asset management. A good deal of planning, organisation, coordination and control is needed in every decision area.

### **DANGERS OF MIS-ALLOCATION**

Mis-allocation is the worst of all wrongs that management might commit, inadvertently or wantonly. Mis-allocation means faulty allocation. Wrong priority or choice is a grave form of mis-allocation. Over-allocation or under-allocation is another form of mis-allocation even though the choice or priority is valid.

Wrong-project choice is a total waste of all resources and efforts. This may even have a cascading effect on other rightful project on hand. This is what is called as cannibalism effect. Wrong-project does not contribute to organisational goals. May be some vested interests get the benefit. Funds allotted to wrong-project do not earn any return. But enlarges the risk to which the whole organisation is exposed. Profitability falls, liquidity dries up, solvency vanishes, mis-match in assets-liabilities creeps in and a whole of other miseries befall the organisation. Sometimes, even some further good moneys may be thrown on the already wasted resources. A full round of vicious-cycle thus is run emptying the coffers of the organisation. Eventually, the organisation goes sick. It is a social liability. All the stake-holders in the organisation, saving perhaps the few vested interests, if any, share nothing but misery.

Over-allocation or under-allocation, the other form of mis-allocation of fund has many dangers too. Over-allocation leads to wastage and idle capacity. To that extent return-on-investment declines. Further, over-allocation may mean that some other project is given under-allocation. Hence, over-allocation may leads to under-allocation with attendant ills of under-allocation. The ills of under-allocation are: time over-run, cost over-run, missed opportunities, long gestation period, increased competition because of delayed execution, etc. Businesses fail more because of mis-allocation of resources than due to any other cause.

Rectifying mis-allocation of fund is difficult. A quick 'U' - turn is good, but seldom practised. So, before a realisation of mis-allocation is made, lists of fund already stood committed without commensurate return. So, the solvency, liquidity, profitability, flexibility, etc of the organisation go to peril.

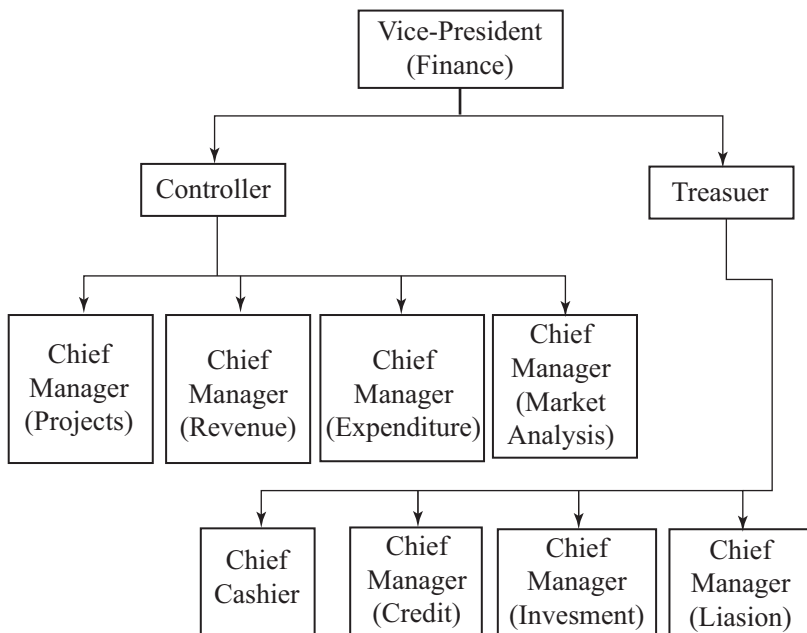


## ORGANISATION FOR FUNDS MANAGEMENT

Funds Management has twin functions - fund raising and fund allocation. The Finance Controller and the Treasurer are two important functionaries directly reporting individually to the Vice-President Finance.

The Finance Controller is responsible for policy making as to fund raising and fund allocation. The asset-management policy, the capital structure policy, asset-viability match policy, project appraisal and sanction and control, credit management policy, etc are the main responsibility of the finance controller.

The Finance Treasurer is to treasure the assets, finance and others. Cash management, insuring the assets, treasury operations, short term borrowings and investment, maintenance of charges on assets, banking relations etc are the responsibility of the Treasurer. The Finance Controller is assisted by Project Officers and management accountants, besides others. The Treasurer is assisted by cashier, market analysts, etc. The following figure gives an account of the organisation structure for fund management.



**Fig. 1.1 Organisation for fund management**

The organisation structure given above describes only the top structure of fund management. A good lot of 'staff' personnel such as Tax consultants, Environment consultants, Management/cost accounts, Chartered Accountants and others do contribute to the organisation in terms of timely advices.

## RELATIONSHIP WITH OTHER FUNCTIONS

Fund Management is related to all other functions in the organisation. Fund and projects, fund and production, fund and marketing; fund and R&D, fund and personnel, fund and community relations of an organisation are specific relationship arena that we have to discuss.

*Fund and project:* The projects to be selected, projects to be executed, projects to be exploited, projects prolonged, etc have an interface with funds management. The allocation of funds for specific projects is the crucial factor.

*Fund and production:* The quantity of production, the scheduling of production runs, etc depend on fund position.

*Fund and marketing:* Marketing activities like marketing research, new product development, product launching, marketing distribution and marketing promotion are tied with fund position in the organisation.

*Fund and personnel:* Personnel functions like recruitment, training, compensation, promotion, transfers, etc have a great deal of links with fund management.

*Fund and R&D:* Research and Development (R&D) activities very much depend on fund allocation. The fund allocation should not hamper the on-going R&D activities. Here the return is delayed and indefinite.

*Fund and community relations:* Community relations involve investment in social assets and in some cases the maintenance of such assets. Fund position must permit all these. Here the return is not direct and hence not measurable.

*Fund and stakeholder relations:* Shareholders, debenture holders, suppliers, customers, etc are stakeholders. Fund management must timely care of interests of the diverse stakeholders.

## ROLE OF FINANCIAL SYSTEM

A financial system may be defined as a set of institutions, instruments and markets which fosters savings and channels them to their most efficient use. The system consists of individuals (savers), intermediaries, markets and users of savings. Economic activity and growth are greatly facilitated by the existence of a financial system.

### The importance of institutions

For realisation of full potential, economies need institutions that mobilize capital, route the same into productive projects and reward both savers and investors. Markets require institutions that impartially enforce contract and property rights. The state must create the right kind of institutional environment and must be strong enough to enforce institutional rights. Rules rather than discretion should form the basis for decision-making. Financial institutions must be vibrant, forward looking, transparent and honest.

## Functions of financial market

The primary function of the financial market is to facilitate the transfer of funds from surplus sectors (lenders) to deficit sectors (borrowers). Normally, households have excess of funds or savings which they lend to borrowers in the corporate and public sectors whose requirement of funds exceed their savings. A financial market consists of investors, dealers and brokers and does not refer to a physical location. The participants in the market are linked by formal trading rules and communication networks for trading in financial securities. The primary market involves public issue of securities through a prospectus. The investors are reached by direct mailing. On the other hand, the secondary market or stock exchange is an institution where existing securities are traded.

Financial markets trade in money and their price is the rate of return the buyer expects, the financial asset to yield. The value of financial assets change with the investors expectations on earnings or interest rates. Investors seek the highest return for a given level of risk (by paying the lowest price) and users of funds attempt to borrow at the lowest rate possible. The aggressive interaction of investors and users of funds in a properly functioning capital market ensures the flow of capital to the best user. Investors receive the highest return and the users obtain funds at the lowest cost.

## Instruments

Ownership securities consist of shares issued to the intending investors with the right to participate in the profit and management of the company. The capital raised in this way is called 'owned capital'. Equity shares and securities like the irredeemable preference shares are called ownership securities. Retained earnings also constitute owned capital.

## Creditor-ship securities

Creditor-ship securities consist of various types of debentures which are acknowledgements of corporate debts to the respective holders with a right to receive interest at specified rate at specified dates and refund of the principal sum at the expiry of the agreed term. Capital raised through creditor-ship securities is known as 'borrowed capital'. Debentures, bonds, notes, commercial papers etc. are instruments of debt or borrowed capital.

## Institution of indian financial system

Specialised term finance institutions have been established in the country after independence to meet the special financial needs of industrial enterprises. These institutions help mobilize scarce resources, such as capital, technology, entrepreneurial and managerial talents and channelise them into industrial activities in accordance with the national priorities. The following list gives an account of the term finance institutions in India.

List of all—India and State level financial institutions.

*All-India Institutions*

- Industrial Development Bank of India (1964)
- Industrial Finance Corporation of India (1948)
- Industrial Credit and Investment Corporation of India Ltd. (1955)
- Life Insurance Corporation of India (1956)
- Unit Trust of India (1964)
- General Insurance Corporation of India (1973)
- Industrial Reconstruction Bank of India (1985) (Now Industrial Investment Bank of India)
- Small Industries Development Bank of India (1990)
- National Bank of Agriculture and Rural Development (1982)
- Infrastructure Development Company Ltd. (1997)
- Ex-im Bank (1982)

*State Level Financial Institutions*

- State Financial Corporations
- State Industrial Development Corporations
- Technical Consultancy Organisations

## **BAROMETER OF BUSINESS CONDITIONS**

Barometers, unlike thermometers, help forecast the future. You know, thermometers tell the present. The financial system is a barometer of conditions of business in a country and that portrays the future prospects through current pricing. The financial system has several constituents which deficit the future.

- **Primary Market and Business Conditions:** The number of good new companies that are commissioned, the capital mobilised, the average size of public issues, the extent of subscription, etc talk well about the business conditions. More activities in the primary market exhibit positive business climate.
- **Secondary Market and Business Conditions:** The trend in secondary market, the movement in indices, the P-E ratios, the volume traded, etc tell about the overall business conditions.
- **Interest Rate and Business Conditions:** Interest rate, one of the very important parameters of financial activities is an indicator of business conditions. A low interest rate generally means subdued business conditions and vice-versa.
- **Exchange Rate:** An appreciating domestic currency, coupled with increased forex reserve tells lot of alien interests in the country's business. Appreciating domestic currency augurs growth in business confidence.
- **Savings Rate:** A high gross household domestic savings rate coupled with low gross investment rate by business sector indicates slackening business conditions. A low

gross domestic household savings rate followed by high gross investment rate by business sector indicates a upmoving business condition.

- Autonomous Foreign Capital Flow: Autonomous, as against negotiated, foreign capital flow into a country indicates high business confidence. In such situation, an accompanying high current account deficit indicates good business conditions.
- Depth and Width: Depth and width of the financial market indicates business conditions in general. Width refers to a wide diversity of product classes or sub-markets and depth refers to a range of products in each sub-market. So, higher depth and width in the financial market indicates better business conditions.
- Credit – offtake : Credit offtake level is one of the barometers of business condition. A higher off-take leading to a higher credit – deposit ratio of banks indicates better business conditions and vice versa.
- LOIs and IEMs : Number of Letter of Intents (LOIs) and Industrial Entrepreneur Memorandum (IEMs) reflect business confidence levels. Higher figures of LOIs and IEMs indicate strong business sentiments.
- Capital formation : Capital formation indicates business condition. A higher level of capital formulation indicates better business condition and vice versa.

## QUESTIONS

1. Bring out the meaning and significance of funds.
2. How is effective allocation of fund important. How is this ensured?
3. Present the dangers of misallocation of funds.
4. Describe the organisation structure of funds management division of an organisation.
5. How is funds division related to other functions?
6. Examine the role of financial system.
7. What are all the barometers of business conditions?

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# **UNIT - II**

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## **2. CAPITALISATION & COST OF CAPITAL**

# Capitalisation & Cost of Capital

In this lesson capitalisation, theories of capital structure, cost of capital, debt service coverage and acquisition for specific allocation are dealt with.

## CAPITALISATION

Capitalisation means the process of assessment of capital required and acquiring the capital needed for the business. The traditional view of capitalisation is the quantification of capital needed and mobilizing the same. The modern view of capitalisation is the financial plan for the business.

The financial plan of a company incorporates decisions regarding the amount of capital to be raised, the securities by the issue of which it is to be raised and the relative proportions of the various classes of securities to be issued and also the administration of the capital. Hence, it may be rightly remarked that capitalisation refers to the process of determining the plan or patterns of financing. It includes not merely the determination of the quantity (amount) of finance required for a company but also the decision about the quality of financing (which type of security is to be issued and to what extent).

## Theories of capitalisation

To determine the amount of capitalisation of newly promoted concern, two theories have been propounded: (i) the Earnings Theory and (ii) the Assets Theory.

*Earnings theory:* Under the earnings theory of capitalisation two factors are generally taken into account to determine capitalisation: (a) what the business is capable of earning, and (b) what is a fair rate of return for capital invested in the particular enterprise. This rate of return is also known as “multiplier” which is 100 per cent divided by the appropriate rate of return. For instance, if a business is capable of making net profits (net earnings) of Rs. 3,00,000 annually and 12% is a fair rate of return for that kind of business, the capitalisation based on earnings would be as follows:

$$\text{Capitalisation} = \text{Earnings} \times \text{Multiplier}$$

$$\text{Multiplier} = \frac{100 \text{ percent}}{\text{Rate of return}} = \frac{100}{12} = 8\frac{1}{3}$$

$$\begin{aligned} \text{Capitalisation} &= \text{Rs. } 3,00,000 \times 8\frac{1}{3} \\ &= \text{Rs. } 25,00,000. \end{aligned}$$

*Assets theory:* Under the asset theory, a company's capitalisation is worked out by aggregating the cost of fixed assets (i.e., investment in plant and machinery, land and buildings and the like), the amount of regular working capital (i.e., investment in cash, inventories, receivables, etc.) required to run the business, the cost of establishing the business and other costs such as promotion and organisation expenses and to cover possible initial losses.

The assets approach to capitalisation is very realistic. It is analytical and pro-active. It is direct. The quantum of capital needed depends on i) the size of the firm, ii) the technology to be adopted, iii) the degree of automation planned, iv) the market access to fixed assets needed, v) the place of business location, (vi) infrastructure existing and required to be built, vii) government subsidy, viii) the business confidence conditions, ix) the phase of economic cycle, x) market and price conditions, xi) availability of tax concessions on import and domestic purchases, xii) leasing opportunity available, etc.

### **Steps in capitalisation**

The first step in the capitalisation is the determination of the firm's long-term and short-term objectives. The firm's long-term objective is maximisation of owner's wealth. Planning is the executive function which involves the selection, from among alternatives, of enterprise objectives, policies, procedures and programmes. Only those short-term objectives which contribute to the ultimate achievement of a long-run objective are acceptable. It should be clearly understood that the objects of financial planning are three fold: provision of capital, minimisation of capital costs and thirdly balancing the costs and risks.

The second step in the capitalisation process is the formulation of financial policies. Financial policies act as guides to all actions which deal with procuring, administering and disbursing the funds of the business firms. These policies can be classified into seven broad categories as given below:

- policies that estimate the amount of capital required;
- policies to determine the control by the parties who provide the capital;
- policies to act as a guide in the use of debt and equity capital;
- policies to guide management in the selection of the sources of finance;
- policies to govern the determination and distribution of income;
- policies to govern the credit and collection activities of the enterprise; and
- policies to determine the amount of funds to be invested in fixed and working capital.

Simply stated, this second step of financial planning aims at answering the following questions which form the very basis of financial planning:

- What are the total capital needs of the firm?
- What will be the sources for funds to acquire assets?
- When will various financial requirements materialise?
- How long will the requirements continue?



The third and the last step in the capitalisation process is the formulation of financial procedures. Financial policies, as enumerated above, are broad guides which to be explained properly must be translated into detailed procedures. The principal reason why each procedure should be detailed is to assure the financial manager of consistency of action.

### Capitalisation and asset requirements

Capitalisation depends on assets requirements Fixed assets and current assets are broad two types of assets.

Fixed assets may be classified as either tangible or intangible. They may further be classified as assets with terminable lives and assets whose lives are of indefinite duration. The results in the following four groups of fixed assets: are

Tangible assets	With Terminable life Buildings; Equipment; Improvements to property; Certain natural resources;
Tangible assets	With Interminable life-land
Intangible assets	With Terminable life Patents; Leaseholds; Copyrights;
Intangible assets	With Interminable life Goodwill (may have terminable life)

*Tangible fixed assets:* The term “tangible fixed assets” is used to express these types of assets which have bodily substance, e.g., land, building, machinery, furniture, vehicles. These assets can further be divided into two parts:

- Machinery, Furniture, Vehicles. These assets have limited life and their costs are spread over the years of benefit.
- Land. This asset is, the only asset is, which has an unlimited term of existence. The cost of it is not allocated to the years of benefit.

*Intangible fixed assets:* The term “intangible fixed assets” is used to describe those assets which lack physical substance. Examples are patents, copyrights, trade marks, leaseholds, goodwill organisation costs. From the cost allocation point of view they are categories.

- Intangible having a limited term of existence, e.g., patents, copyright. The costs of these assets are spread over the years of their useful life.
- Intangibles not having a limited term of existence, e.g., trade marks, goodwill. The costs of these assets are not spread over the years of benefit. They are, of course, keeping in view the concept of conservation, written off (amortised) over some years arbitrarily decided.

Capital needed for the fixed assets must be long term. Current assets are stock, debtors, cash etc. needed for long-to-long operations. A part of current assets must be funded through long-term capital and balance through short-term capital.

### **Determinants**

The funds management must bear in mind various internal and external factors that affect initial investment in fixed capital requirement.

#### *Internal factors*

- *Nature of business:* Different industrial undertakings may have varying fixed capital requirements because of different nature of business and the technology of the industry in which a company operates. Concerns engaged in rendering personal services, merchandise, commerce and trade may need very little fixed investment. As against this, manufacturing industries, and public utilities have to commit substantially large amount of funds to acquire fixed assets. Here too fixed capital requirements in capital intensive industrial projects is much greater in relation to their labour intensive counterparts.
- *Size of business:* Where a business enterprise is being set up to carry on large scale operations naturally in its fixed capital requirements are likely to be high since most of their production processes are based on automatic machines and equipment. But in smaller concerns use of automatic machines are not so economical and useful because these machines are not employed to the optimal level.
- *Scope of business.* Sometimes enterprises are established to engage in only one phase of production or distribution activity. In a sharper contrast to this, there are many business firms which are formed to carry on production or distribution work in its entirety. Obviously, in the former case fixed capital requirements would be less relative to the latter case.
- *Extent of lease:* While planning fixed capital requirements an entrepreneur has to decide in advance as to how many assets would be acquired on lease hold basis and how many on free hold basis. If larger amount of fixed assets is to be acquired on lease basis, naturally less amount of funds will have to be committed in the enterprise.
- *Arrangement of subcontract:* In case an entrepreneur has thought out an arrangement of contracting out some processes of production to others or he has decided to engage in assembling the parts being manufactured by others, he will require only those assets that will help in carrying out the production in which the firm will be engaged. This would consequently minimise fixed capital requirements of the enterprise.
- *Acquisition of old equipments:* In certain Industrial areas where the rate of technological change in production method is slow or moderate, old equipment or plant available at prices that are far below those of new equipment or plant may be used satisfactorily. Their use can materially reduce the required investment in fixed assets.

- *Acquisition of accommodation on rent:* The extent to which needed plant or equipment is available on reasonable rental terms also determines the required investment in fixed assets. Many retailers and some manufacturing whose space needs are distinctive are able to meet their major building needs through rental.
- *Availability of fixed assets on concessional rates:* With the view to fostering balanced industrial growth and regional development of industries the government may provide land and other building materials at concessional rates. Plant and equipment may be made available on instalment purchase system. Such facilities are very likely to reduce the requirement of fixed assets.

### *External factors*

Since fixed asset investment is a long-term one where amount of risk is comparatively more, the projector should also consider the following external factors.

- *International conditions:* This factor is assuming prominent role in the decision making process particularly in large concerns carrying on business on international scale. For example, steel companies expecting war may decide to commit large funds to expand fixed assets before there is a shortage of material or before inflation becomes reality. An international crisis may lead some companies to postpone their expansion plans.
- *Secular trend in the economy:* An in-depth study of long-run trends in the economy must be undertaken while assessing requirements for fixed assets. If the future of the economy is anticipated to be bright, it gives green signal to business entrepreneur to carry out all sorts of expansions of the firms. In that case large amount of funds has to be committed right now in fixed assets so as to be ready to reap benefits when opportunity.
- *Population trends:* If the firm has a national market, national population trend must be evaluated while forecasting for fixed asset needs. In India, the population is increasing at a high rate. Automobile manufacturers find this a factor that encourages them to expand. The age composition of the population may be important for certain business like furniture industry and the optical industry.
- *Consumer's preferences:* Financial planning must be geared to acquiring fixed assets that will provide goods or services that consumers will accept.
- *Competition factors:* Competitive factors are a prime element in the decision making process on planning future fixed assets needs. If company 'A' shifts to automation, Company 'B' engaged in the same line of activity will follow the need of the innovator.
- *Shift in technology:* Shift in technology should be considered while estimating fixed asset requirement.

## **CAPITAL STRUCTURE**

According to Gerestenberg, "Capital structure of a company refers to the make-up of its capitalisation and it includes all long-term capital resources viz. loans, reserves,

shares and bonds. While drafting capital structure, care must be taken to see that it is flexible i.e., it should be able to incorporate any future changes, if necessary. It is often suggested that a capital structure should be such which can maximise the long run value per ordinary share in the market, for an individual company, there is necessity for attaining a proper balance among debt and equity sources in its capital structure.

### **Forms of capital structure**

1. *Equities only*: Under this form, the entire capital is raised from shareholders and there is only one class of shares known as Equities.

#### *Advantages*

- There are no fixed charges on the earnings.
- The management can deal with the earnings as per its wish.
- No compulsion for Directors to return the equity capital.
- Better public response as equity shares are ownership scrips.
- If additional capital is needed, it can be readily arranged for by issuing some more shares on rights basis.

#### *Disadvantages*

- Over-subscription and over-capitalisation may take place if only equity shares are issued.
- Too much increase in the value of shares may lead to speculation.
- Payment of dividend attracts dividend tax.

2. *Equities and preference shares*: Under this form, the capital structure of company consists of a mixture of equity and preference shares.

#### *Advantages*

- The market for the company's securities is widened.
- The capital structure no longer remains rigid, instead it becomes flexible.
- Use of preference shares enables the company to arrange for additional funds more easily.
- Trading on equity is possible.

#### *Disadvantages*

- The company's liability is increased since a fixed rate of preference dividend has to be paid regularly to preference share-holders.
- It usually costs more to finance with preference shares than with debentures.

3. *Equity preference shares and debentures*: In this form, the capital structure of a company is made up of equity shares, preference shares and debentures.

#### *Advantages*

- Financing with debentures is usually cheaper than financing with shares.
- It is advantageous for tax purposes because interest on debenture is treated as an expenditure unlike payment of dividend.
- The company gains by trading on equity.

### *Disadvantages*

- Payment of interest on debentures during depression may prove difficult for the company.
- Trading on equity may give rise to more losses.
- Every financial manager aims at developing a sound and most appropriate capital structure for the company. But can there be an optimum capital structure? There is diversity of opinion on this point.

Generally speaking a sound optimum capital structure is one, which

- maximises the worth or value of the concern;
- minimises the cost of funds;
- maximises the benefit to the shareholders, by giving best earning per share and maximum market price of the shares in the long run and;
- is fair to employees, creditors and others.

There is no methodology which can determine the precise optimum capital structure. In practice, an optimum capital structure can be determined only empirically. It is better to determine a range of proportion of debt and equity, which could be termed as an appropriate capital structure rather than a precise ratio.

### **Characteristics of sound capital structure**

Following are the essential characteristics of a sound capital structure:

1. *Simplicity*: A capital structure must be as simple as possible. At least in the beginning the concern shall resort to minimum number of securities as a source of finance, only then the investors will respond quickly. All the businessmen are not educated. Even educated entrepreneurs, because of the absence of right type of financial, educational background, may not be good at managing finance. A complicated capital structure may not be understood by all, on the contrary it may raise suspicious and create confusion.
2. *Profitability*: As already emphasised a sound capital structure shall be able to maximise the profit and minimise the cost of funds.
3. *Solvency*: Creditors and bankers are usually fair weather friends. They extend credit during prosperity of business. In difficult financial position they tend to withdraw the credit. Thus, the excessive use of credit, may threaten the solvency of the concern. In a sound capital structure debt shall only be a reasonable proportion of the total capital employed in the business.
4. *Flexibility*: A sound capital structure shall keep room for expansion or reduction of capital. Usually the increase in capital is not a problem for reduction of capital is very difficult. Equity capital is considered to be something sacred which cannot be reduced except in accordance with the provisions of Companies Act, 1956. Flexibility

can be introduced into capital structure by opting for redeemable preference shares or redeemable debentures as one of the securities to be issued for raising finance.

5. *Intensive use of funds*: A sound capital structure shall provide the concern with sufficient funds needed for operations. It shall not cause surplus or scarcity of capital, as both have adverse effect on the profitability. Fair capitalisation shall be a natural consequence of capital structure.
6. *Conservativeness*: The capital structure shall be conservative in the sense that the debt raising capacity of the country shall not be exceeded. Capital structure shall generate sufficient cash for future requirements but shall not lead to excessive cash with the company.
7. *Provision for meeting future contingencies*: A business is bound to have ups and downs. It is inevitable because of the trade cycles. In the period of depression, it will be difficult to raise funds. Such future contingencies shall be anticipated and capital structure shall make provision for such contingencies. Making provision for contingencies does not mean raising excessive capital when the market is favourable but keeping less risky securities reserved for future issues.
8. *Control*: The sound capital structure ensures that the control over the company remains in the hands of equity shareholders.
9. *Futuristic*: The capital structure must be futuristic. That is, it must in corporate elements that are capable of absorbing future challenges and changes. For example, if in future overseas capital can be tapped, provision for using the same as additional capital or swapping against existing capital, must be made available.
10. *Trading on equity*: Capital structure must help maximizes return to equity holders by using more of cheaper debt.
11. *Financial leverage*: Capital structure must be of the type which enhances earnings after tax simply for a small increment in earnings before interest and tax.
12. *Economy*: Having raised the capital, it has to be maintained. The total cost of maintaining the different securities issued shall be minimum. Subject to other constraints, the capital structure selected shall be the most economical.

The list of essentials is not exclusive. Depending upon the nature of business, company may consider some other attributes to be more important.

### Capital gearing

The term “capital gearing” is used to describe the relationship between the equity share capital (including all reserves and undistributed profits) and fixed interest bearing securities of a company. Fixed interest bearing securities are preference shares, debentures, public deposits, term loans etc. They sources are known as fixed cost securities or senior securities.



$$\text{Capital Gearing} = \frac{\text{Fixed Cost Securities}}{\text{Equity Capital}}$$

Gearing is said to be high if capital carrying fixed rate of interest/dividend is more than the equity capital. Similarly, gearing is low if capital carrying fixed rate of interest/dividend is less than the equity capital. When both the capitals are equal it is said to be evenly geared.

Equity capital > loan capital = Low gearing

Equity capital < loan capital = High gear

Equity capital = loan capital = Even gear

Whether or not high gear ratio is good for the enterprise will depend upon its profitability trend. Thus if the company can foresee a trend of continuous increase, relatively more and more profit will be available to equity shareholders as compared to preference shareholders and debenture holders. In such a case high gearing would be better.

Capital gearing may be 'planned' or may be 'historical', the latter describing a state of affairs where the capital structure has evolved over a period of time, but not necessarily in the most advantageous way. Capital gearing ratio is not only important to prospective investors but also to the company because it affects distribution policies, the building of reserves as well as a stable dividend policy. Hence, it must be properly planned.

The significance of the gear-ratio lies in the marked effects of variations in profit on ordinary share dividends when capital is high-gearred; the effects are much more marked than when capital is low-gearred, as the following table shows:

Capital Structure	Distribution of Profits		
	Rs.1,60,000	Rs.1,82,000	Rs.1,50,000
<b>A) High Geared</b>			
Rs. 6,00,000 Debentures (13%)	78,000	78,000	78,000
Rs. 5,00,000 Preference shares (12%)	60,000	60,000	60,000
Rs. 2,00,000 Equity Shares	22,000 (11%)	44,000 (22%)	12,000 (6%)
<b>B) Low Geared</b>			
Rs. 1,20,000 Debentures (13%)	15,600	15,600	15,600
Rs. 1,80,000 Preference shares (12%)	21,600	21,600	21,600
Rs. 10,00,000 Equity Shares	1,22,800 (12.3%)	1,44,800 (14.5%)	1,12,800 (11.3%)

The increases in distributable profits from Rs. 1,60,000 to Rs.1,82,000 raises the rates of possible dividend on the equity shares as follows:

High geared capital, from 11% to 22% an increase of 100%

Low geared capital, from 12.3% to 14.5% an increase of just over 18%

A decrease in profit, from Rs. 1,60,000 to Rs. 1,50,000 reduces the rate of dividend as follows:

High geared capital, from 11% to 6% - a decrease of 50%

Low geared capital, from 12.3% to 11.3% - a decrease of just over 6%

Movements in ordinary dividend rates are thus much wider when the capital is high-g geared than when it is low-g geared; and the ordinary shares with high geared capital are inclined to be speculative in consequence. In times of prosperity the speculative investor will naturally tend to look for shares in companies with high geared capital, and in times of recession to switch to companies whose capital is low geared.

The policy of using debt capital including preference share capital in the capital structure is simply known as the policy of “Trading on Equity”. That is to ‘trade’ on the strength of the equity (shareholders). Trading on equity may be of two types: (i) Trading on thick equity meaning low geared capital structure and (ii) Trading on thin equity meaning high geared capital structure.

### **REQUIREMENTS OR CONDITIONS FOR TRADING ON EQUITY**

The following are the important requirements for the successful operation of this policy:

1. *ROI > Cost of debt*: To practice trading on equity the overall note of earnings on assets, ie., the ROI must be greater than cost of debt.
2. *Stable earnings*: The permanent borrowing should be undertaken only when a reasonable stability of income makes the required payment of interest to the debenture-holders fairly certain. A company whose earnings are reasonably stable may be justified in trading on equity. But if the earnings are subjected to violent fluctuations borrowings should be resorted to on a limited scale.
3. *Large investment in fixed assets*: Large amounts of fixed property constitute a valuable adjunct for borrowing money, since they give the lender a feeling of security and an assurance that the company will not vanish overnight. Generally, stable earnings and large fixed assets accompany each other. The public utility services provide such unique combination. Hence, they are in a position to benefit from this policy.
4. *Well defined and established field of enterprise*: Third requirement for satisfactory trading on the equity is that the field of enterprise be well defined and established. The new and untried ventures should be invariably financed with the equity shares.
5. *Cost of borrowings*: The next condition on the policy is the cost of borrowings. As the proportion of funds borrowed from debentures increases, increased rate of interest need to be paid.



6. *Custom or usage*: The next important restriction on this policy is of a practical character. It is the custom or usage of the industry concerned which builds up the general standards beyond which neither issuing company nor the purchasing institutions would like to go. “Although custom will neither gain universal observance nor guarantee certain safety, it nevertheless plays an extremely useful part in the world of finance”.

### **Determinants of capital structure**

There are several factors, which influence the capital structure. These are: cost of capital of different sources of capital, the tax advantage of different debt sources of capital, the restrictive conditions as to debt capital, debt capacity of a business, the financial leverage, securitability of assets, preference for trading of equity, stability of earnings, gestation period of projects, financial risk perception, variety of debt instruments available, experience in using debt capital, investor preferences, tax rates on capital gain and interest income, capital market conditions, management philosophy and so on. A short description of these determinants is taken up now.

- *Cost of capital*: Cost of capital of different sources of capital influences capital structure. A company would be interested in less overall cost of capital and that a source that is less expensive will be used more than the one that is costlier. Generally debt capital is said to be less expensive, hence the tendency to use more debt capital. But, of late, equity capital has become cheaper due to free pricing of capital issues. Hence, now, more equity capital is used by companies. Among debt capital, bank loans are viewed more expensive than market borrowings and that more debt capital is raised through the capital market than from bank loans. Again, between domestic capital market and overseas capital market, the latter is found less expensive and that the same is used, if low permits the same.
- *Tax*: Tax advantage of debt capital is a factor in favour of using more debt capital. The interest paid on debt capital is deducted while computing taxable income. So, tax saving to the extent of interest paid times tax rate is enjoyed by the company, reducing the effective cost of debt. This advantage lures companies to use more debt capital. Further, now dividend tax is levied. This has become a shot in the arm for debt capital.
- *Conditions*: Restrictive covenants such as restriction on business expansion, on raising additional capital, on declaration of dividend, nominee Directors on the board, convertibility clause, etc. go with debt financing, especially borrowings from term lending financial institutions. These restrictive conditions are the implicit cost of debt capital normally not considered, but should be considered in deciding the mix of capital.
- *Debt capacity*: Debt capacity of a business needs consideration. How much debt capital a business can bear, that is, comfortably service is a factor to be reckoned. Debt service coverage ratio is calculated using the formula

$$\text{DSCR} = \frac{\text{Annual Cash flow}}{\text{Interest (Annual Principal Instalments)/(1-TR)}}$$

Where TR = Tax rate on corporate profit.

DSCR should be at least 3 for comfortable debt servicing. Businesses that do not generate sufficient cash flow should think of alternative sources.

Interest coverage ratio is another measure of debt capacity of a firm. The formula for ICR is  $\text{ICR} = \text{EBIT}/I$ , where EBIT - is earning before interest tax and I - is interest on debt capital. The ICR should be in the range of 4 or more for better debt servicing capacity.

- *Norms*: Debt equity norm in the industry / region is another factor. Normally a 2:1 debt equity ratio is in vogue with dilution in favour of more debt for small scale business, capital intensive projects, projects undertaken by weaker sections, etc.
- *Leverage*: Leverage effect has to be looked into. Financial leverage refers to the rate of change in Earnings per Share (EPS) for a given change in Earnings Before Interest and Tax (EBIT). A more than proportionate positive change in EPS for a given change in EBIT might tempt management to use further debt capital initially to enhance EPS and later go for additional equity capital at a premium.
- *Asset securitability*: Securitability of assets is a determining factor for using debt capital. Firms which have assets that are readily accepted as security can raise debt capital. Land at prime locations, modern buildings, machinery in good condition, etc. are accepted as security, undertakings owning these assets can go for more debt financing.
- *Trading on equity*: Trading on equity is a technique by which low cost debt is used extensively to enhance earnings for equity share holders. If the management is interested in this it would use more debt capital. ROI must be greater than cost of debt to reap benefit of trading on equity. Suppose a firm's investment is Rs. 100 crs and its overall ROI is 18% and it pays 10% on debt capital. Suppose a debt equity of 1:1. Then available earnings for equity capital will be Rs. 18 crs – Rs. 5 crs = Rs. 13 crs. The rate of earning on equity is 26%. If a debt-equity ratio of 3:1 is adopted the earnings available for effect will be Rs. 18 crs – Rs. 7.5 crs = Rs. 10.5 crs. The rate of earnings on equity will be 42%, i.e., Rs. 10.5 crs / Rs. 25 crs = 0.42 or 42%. Thus by rising debt component, return on equity is enhanced. This is called trading on equity. If the management has high preference for this, it will go for more debt and vice versa.
- *Gestation period*: Gestation Period refers the period between commencement of project construction and first commercial operation of the project. Longer the gestation period, more equity financing is advised as there will not be need for servicing of capital in the initial times. Reliance Petroleum Limited used triple convertible debentures equivalent to equity, to fund its integrated petroleum project in Jamnagar, Gujarat, in the 1990s.

- *Financial risk*: Financial risk perception is an influencing factor of capital structure. Financial risk refers to the chances of bankruptcy proceedings against the firm for non-repayment of debt or failure to service debt for a period. If the risk is higher, less debt capital is good.
- *Variety of debt instruments*: Variety of debt instruments available is another factor. While ordinary bonds may be unsuitable for long gestation period project, zero coupon bonds are a good substitute. Convertible bonds are again superior to ordinary bonds in terms of stability. Now variety is available as against the recent past. And this influences the choice in favour of more debt.
- *Experience in debt use*: Experience in using debt capital is another factor. Debt needs to be handled expediently. Periodic servicing, roll over, swap early retirement and the like need to be adopted when needed. Not all are good at dealing with debt. Hence experience in using debt capital is important.
- *Investor preference*: Investor preferences for securities for investment need to be kept in mind. At times people want debt securities, while at other times equity is preferred. The risk averse prefer debt instruments, while the risk seekers go for equity investments.
- *Capital market conditions*: Capital market conditions are another factor. When capital market is booming, firms can take the market route to raise capital. In the depressed situation, firms depend on bank finance, and other debt finance.
- *Cost of floating*: Cost of floating can also influence capital structure. Cost of floating is high in India, the same is less in International market. Some Indian firms raised capital by floating GDRs (Global Depository Receipts), an equity capital form, involving lower, 3.5%, floating cost as against the domestic situation of, as high as, over 8% floating cost.
- *Tax on diff. income*: Rate of tax on capital gain and current income may influence form of capital. People in the higher tax bracket prefer capital gain as against current income. Hence preference for equity instruments is evinced by them. So, firms may opt for equity capital.
- *Philosophy of management*: Management philosophy comes next. Some managements are not interested in debt financing at all. Colgate-Palmolive Ltd. is an all-equity firm by choice. Some companies depend extensively on debt capital. Management orientation is one of the deciding factors.
- *Legal stipulation*: Legal stipulation as to debt ceiling is another factor influencing capital structure. Earlier a debt equity norm of 2:1 was generally insisted on by the controller of capital issues. Though no longer this legal stipulation exists with the repealing of the Capital Issue Control Act, it has become a rule of thumb. Banks and financiers look at the debt equity ratio before committing further debt investment in a firm.
- *Pricing method*: Free-pricing of public capital issues, now in vogue in the country has made companies using more equity financing than debt financing.

## COST OF CAPITAL

Capital, like all resources, involves a cost. Business organizations when mobilizing capital incur cost and later when serving the capital incur servicing cost. The former, known as floatation cost, is one-time and includes underwriting and brokerage commission, cost of printing and vetting of prospectus, financial advertisement costs, etc. Floatation cost accounts for 3% to 8% of issue size, it is said. Higher the issue size less is the floatation cost varied. In boom sentiments the cost is lower and vice versa. The servicing cost is recurring and includes dividend, interest etc. paid periodically. While interest rates are fixed and payment of interest is compulsory, dividend rates are varying and dividend payment is not a legal binding on the management. Yet, companies per dividend less share price shall fall. Cost of capital is computed considering the above factors. The components of cost of capital consist of risk-free rate premium for financial risk, premium for business risk and the like.

### Concepts of cost of capital

There are several concepts of cost of capital. Cost of capital is the minimum return expected by investors in financial investments. The minimum return expected by debenture holders is the cost of debt, by the shareholders is the cost of equity and so on. The firm must provide this minimum return in order to enthuse the public to subscribe to the debentures or shares, as the case may be. Cost of capital is the minimum return that should be earned by a business (so as to be in a position to satisfy the providers of capital). If 16% return is expected by investors in bonds of a company, the company must earn at least 1% on the funds mobilised through issue of bonds. Hence minimum return expected by investors and minimum return to be earned by a company both mean one and the same.

Cost of capital may refer to *specific cost or combined cost* of capital. Specific cost of capital refers to cost of each component of capital, like share capital, debt, etc. combined cost of capital is the overall cost of all funds employed by a business.

*Actual and imputed cost* concepts need to be looked into. Actual cost of capital refers to the out of pocket cost of capital. In the case of debentures payment of interest is an actual expenditure. So cost of debenture is generally actual as to shares in the initial years dividend payment may not be there. But a capital appreciation might be there in the stock market due to potentials of the scrip. So, equity capital in this context has an imputed cost.

Cost of capital may be of the *opportunity cost* type. The retained earnings belong to shareholders but are not capitalized. Yet, they involve a cost, an opportunity cost which means what the shareholders could have earned had these been distributed as dividend or capitalized by means of bonus share issue.

Cost of capital may be *marginal cost and average cost*. Marginal cost is the cost of additional capital that may be raised, whereas average cost is the combined cost of total capital employed.

Cost of capital can be *pre-tax or post-tax cost*. Debenture interest is deducted while computing income for tax purposes. So, debentures' post-tax cost is lower than pre-tax cost. Accordingly, overall cost of capital also can be classified into pre-tax and post-tax overall cost of capital. But equity or preference dividend is taxed. So, the post tax cost of equity or preference share capital is more than pre-tax cost of the same.

Cost of capital may be *explicit or implicit cost*. Explicit cost of capital is similar to out-of-pocket cost. It is an accounting cost. Implicit cost is hidden and it may not involve actual payment and hence may not be directly accounted for. More debt leads to restrictive covenants. These restrictive covenants lead to implicit costs.

Cost of capital may be classified into *past and future costs*. Post cost is irrelevant for decision making, while future cost is relevant. For funds raised already the floatation cost is a past cost, whereas future interest/dividend commitments are future cost.

### **Computation of cost of capital or yield**

The cost of capital to the firm using the capital is actually the yield to those investing. So, cost of capital and yield are two sides of the same coin, but not exactly the same, because of tax and other different factors. Now computation specific and overall cost of capital is attempted.

#### *Cost of debt ( $K_d$ or $K_b$ ) or yield*

Debt capital is a predominant method of corporate financing. Debt may be short-term or long-term debt. Short term debt takes over several forms like bank loan, bank cash credit and bank overdraft, trade credit, bill discounting, etc. The rate of interest applicable to bank loan, cash credit, overdraft and bill discounting is the pre-tax cost of those credit forms. The post tax cost of these forms of financing is obtained by multiplying pre-tax cost of capital by  $(1 - \text{Tax rate})$ .

#### *Cost of trade credit*

Regarding trade credit, the supplier may prescribe a payment term such as, 5/30, net 60 days which means, a cash discount of 5% if payment is made within 30 days, else full payment by the 60th day. It means on a transaction of Rs. 100, Rs. 95 payment is enough if payment is made by 30th day, otherwise Rs. 100 be paid by the 60th day. That is, failing to pay Rs. 95 by 30th day, entails payment of Rs. 100 by 60th day, or Rs. 5 interest for 30 days, on a sum of Rs. 95. So, interest rate comes to;  $100 \times 5 \times 360 / 95 \times 30 = 63\%$ . Failing to take advantage of cash discount results in heavy interest cost to the buyer.

#### *Cost of debenture or interest yield*

Debentures are debt instruments. These are issued by companies with interest rate coupon depending on the market rate of interest and the credit rating of the issuing company.

- Suppose irredeemable debentures of Rs. 100 with a coupon of 14% are issued by a company at a net issue price of Rs. 98. The company pays 40% tax. The pre tax and post tax cost of debentures can be computed.

$$K_d (\text{Pre-tax}) = \frac{\text{Coupon Interest}}{\text{Net price}} \times 100 = 14/98 \times 100 = 14.3 \%$$

$$\begin{aligned} K_d (\text{Post-tax}) &= K_d (\text{Pre-tax}) \times (1 - \text{Taxrate}) \\ &= 14.3\% (1 - .4) \\ &= 8.58\% \end{aligned}$$

- For redeemable debentures the cost of debt is computed differently. Let the net issue price be Rs. 98 and redemption price after 8 years be Rs. 102. The coupon rate is 17% p.a. Then the cost of debt will be:

$$\begin{aligned} K_d (\text{Pre - Post}) &= \frac{(\text{Annual Coupon Interest}) + (\text{Redemption Premium} / \text{No. of years to redemption})}{(\text{Issue Price} + \text{Redemption Price}) / 2} \times 100 \\ &= \frac{\text{RS.}17 + (102 - 98) / 8}{(98 + 100) / 2} \times 100 = \frac{\text{Rs.}17.5}{100} \times 100 = 17.5\% \end{aligned}$$

Actually, the above is an approximation of:

$$\text{Rs.}98 = \frac{\text{Rs.}17}{(1+r)} + \frac{\text{Rs.}17}{(1+r)^2} + \dots + \frac{\text{Rs.}17}{(1+r)^8} + \frac{\text{Rs.}100}{(1+r)^8}$$

Where 'r' is the pre-tax cost of debt. This is the present value model. The general form is:

$$P = \frac{I_1}{(1+r)} + \frac{I_2}{(1+r)^2} + \frac{I_3}{(1+r)^3} + \dots + \frac{I_n}{(1+r)^n} + \frac{A}{(1+r)^n}$$

$$\begin{aligned} K_d (\text{Post-tax}) &= K_d (\text{Pre-tax}) (1 - \text{Tax rate}) \\ &= 17.5\% (1 - 40\%) = 17.5\% (0.6) \\ &= 10.5\% \end{aligned}$$

- Where interest payments are made semiannually or quarterly, the effective cost will be slightly higher. Assuming a semi-annual interest payment and using the present value model, the pre-tax cost of debt is the value of 'r' in the formula.

$$\text{Rs.}98 = \frac{\text{Rs.}8.5}{(1+r/2)} + \frac{\text{Rs.}8.5}{(1+r/2)^2} + \dots + \frac{\text{Rs.}8.5}{(1+r/2)^{16}} + \frac{\text{Rs.}102}{(1+r/2)^{16}}$$



The general form here, is:

$$P = \frac{I}{(1+r/2)} + \frac{I_2}{(1+r/2)^2} + \frac{I_3}{(1+r/2)^3} + \dots + \frac{I_{2n}}{(1+r/2)^{2n}} + \frac{A}{(1+r/2)}$$

Cost of debt that we have seen is the explicit or out of pocket cost. There may be an implicit cost due to restrictive covenants imposed, bankruptcy cost in the event of forced winding up and so on. Explicit cost varies with credit standing and market factors. With higher credit rating, larger issue size and booming market sentiment, explicit cost decreases and vice versa.

#### Cost of term loans

The pre-tax cost of term loans is the contractual interest rate. The post-tax cost is pre-tax rate multiplied by (1-tax rate).

#### Cost of preference shares (KPS) or dividend yield

- In the case of *irredeemable preference shares*, the cost of capital is given by

$$K_{ps} = \frac{\text{Coupon dividend}}{\text{Issue Net Price}} \times 100$$

Say Rs. 200 face value preference shares carry a dividend rate of 15% p.a. Issue expenses amounted to 3%. Then the  $K_{ps}$  is:

$$= \frac{\text{Rs.30}}{(\text{R.s } 200 - 3\%)} \times 100 = \frac{30}{194} \times 100 = 15.4\%$$

No tax benefit is available to the company on preference dividend paid. Hence 15.4% is the effective cost. If dividend tax is levied on the company by the Govt., the post-tax cost of preference share capital rises up. Say a 10% dividend tax is charged. Then post tax  $K_{ps}$  – Pre tax  $K_{ps}$  (1 + Rate of dividend tax) =

$$15.4\% (1 + 10\%) = 15.4 (1.1) = 16.94\%.$$

- If the preference shares are *redeemable preference shares*, adopting the present valuation model, cost of preference share can be computed by solving for 'r' in the usual equation:

$$P = \frac{D_1}{(1+r/2)} + \frac{D_2}{(1+r/2)^2} + \frac{D_3}{(1+r/2)^3} + \dots + \frac{D_n}{(1+r/2)^n} + \frac{A}{(1+r/2)}$$

Where, P = net issue price,  $D_1, D_2, \dots, D_n$  are dividends for 1 through  $n^{\text{th}}$  years, A = redemption price, n = number of years to maturity and r = discount rate (ie., the cost of capital). An approximation for the above model is

$$K_{ps} = \frac{D + \frac{\text{Redemption Premium}}{\text{No. of years to maturity}}}{(\text{Issue price} + \text{Redemption price})/2} \times 100$$

Let us take an example. Issue Price (P) = Rs. 96. Coupon dividend is 17%. Redemption at a premium of 2% after 6 years. Then

$$K_{ps} = \frac{\text{Rs. } 17 + (102 - 96)/6}{(\text{Rs. } 96 + 102)/2} \times \frac{17 + 1}{99} \times 100 = 18.18\%$$

### Cost of equity ( $K_e$ ) or dividend yield

There are several cost models relating to equity capital. These are dividend approach and dividend plus growth approach and earnings approach. These are explained below.

- *D/P Approach - Dividend Yield Approach*

Dividend Approach (D/P), assumes a constant dividend per share (DPS) continually for an indefinite period. Then  $K_e = D/P$ , where 'D' is the fixed DPS and 'P' is current price. A company's equity share gives Rs. 5 dividend p.a. for an infinite time to come and its price is Rs. 50 at present. Then  $K_e = (D/P) \times 100 = (5/50) \times 100 = 10\%$ . Constant dividend model is not realistic. Hence the above method lacks practical significance.

- *D/P + g Approach i.e., Dividend yield + growth approach*

Dividend plus growth (D/P + g) approach assumes a constantly growing dividend, at 'g' rate p.a. Here,  $K_e = (D_1/P) + g$ , where  $D_1$  is the dividend expected one year from now, P is the current price and 'g' is the annual growth in dividend expected to continue infinitely.

Let's take a case. A company has declared Rs. 1.00, Rs. 1.10 and Rs. 1.21 for the past three years. The current market price is Rs. 12. The cost of equity is:  $K_e = (D_1/P) + g$ . A look at the annual dividends of the past indicates a 10% growth in dividend. So, 'g' = 10%  $D_1 = \text{Dividend one year hence} = \text{Rs. } 1.21 + 10\% = \text{Rs. } 1.21 + .121 = \text{Rs. } 1.331$ . So,

$$K_e = \frac{\text{Rs. } 1.331}{12} \times 100 + 10\% = 11.1\% + 10\% = 21.1\%$$

### Cost of convertible debentures ( $K_{cd}$ )

Cost of convertible debentures is to be calculated adopting present value model. Present value of interest payable upto conversion and present value of shares that may be allotted on conversion should be equated to issue price of the convertible debenture. The discount rate that equates the two is the cost of convertible debenture.

A company has issued convertible debentures carrying a coupon rate of 12% p.a. at a net issue price of Rs. 90 (ie., at 10% discount). After three years each convertible debenture



is to be converted into an equity share. The equity dividends for the last three years were Rs. 5, Rs. 5.50 and Rs. 6.05 and the current market price is Rs. 80.

To find the cost of convertible debenture we must know the value of shares that will be given at the end of the 3rd year in lieu of the debenture. That is equal to: Expected dividend 4 years hence. And this is equal to  $D_4/K - g$ .  $K = (D_1/P) + g$ .

$D_1$  = dividend per share one year hence = Last year dividend + growth for 1 year. Growth,  $g = 10\%$  p.a. (you can easily know this by a glance over the past DPS, viz., Rs. 5, Rs. 5.5 and Rs. 6.05. So,  $D_1 = \text{Rs. } 6.05 + 10\% = \text{Rs. } 6.66$ .  $K_c = \text{Rs. } (6.66/\text{Rs. } 80) \times 100 + 10\% = 8.3\% + 10\% = 18.3\%$ . Expected dividend 4 years hence = Rs. 6.05  $(1 + g)^4 = \text{Rs. } 6.05 \times (1.1)^4 = \text{Rs. } 8.87$ . Value of the share at the time of conversion =  $8.87 / (18.3\% - 10\%) = \text{Rs. } 8.37 / 8.3\% = \text{Rs. } 107$ .

Now, we can use the present value model to get the cost of convertible debentures. As per the model, current net issue price is the present value of future cash earnings in the form of interest for 3 years and value of the share receivable at the end of 3rd year from now. That is:

$$\begin{aligned} \text{Rs. } 90 &= \frac{I_1}{(1+r)} + \frac{I_2}{(1+r)^2} + \frac{I_3}{(1+r)^3} + \frac{107}{(1+r)^3} && \text{or,} \\ \text{Rs. } 90 &= \frac{12}{(1+r)} + \frac{12}{(1+r)^2} + \frac{12}{(1+r)^3} + \frac{107}{(1+r)^3} \end{aligned}$$

where 'r' = cost of convertible debenture. We can get the value of 't' by trial and error method. It may be arrived at through the approximation formula as well.

$$\begin{aligned} K_{CD} &= \frac{I + (\text{Premium} / \text{No. of Years})}{\text{Average of issue and redemption prices}} \times 100 = \frac{12 + (107 - 90)}{(90 + 107)} \times 100 \\ &= \frac{12 + 5.67}{98.5} \times 100 = \frac{17.67}{98.5} \times 100 = 18\% \end{aligned}$$

### Cost of retained earnings ( $K_r$ )

Retained earnings are accumulated profits and free reserves belonging to equity shareholders. Though it has no explicit cost, opportunity cost is involved. It is not cost free, though it may appear to be so. The business must earn at least what the shareholders can earn on this sum if it is distributed as dividend. Say a company has Rs. 10,00,000 retained earnings. Assume it declares the whole sum as dividend. The shareholders receive dividends Rs. 10,00,000. But, they are assessed to take on the dividends, post-tax dividend is reduced. Let us assume the marginal rate of taxation of the shareholders is 30%. So, 30% of Rs. 10,00,000 is paid as tax. So only a sum of Rs. 7,00,000 is left with the shareholders. Let us assume they invest in various financial assets earning an overall return of 18% p.a. Cost of investment amounted

to 3%. That is, of the Rs. 7,00,000, 3% is spent on incidentals to investment and that only, Rs. 6,79,000 are invested earning 18%. The return would be Rs. 1,22,220. That is shareholders make an earning of Rs. 1,22,220 on the dividend of Rs. 10,00,000 received. If the company does not pay dividend, it must at least earn Rs. 1,22,220 on the Rs. 10,00,000 retained earnings, equal to what the shareholders can earn. This is the breakeven or parity return. The rate comes to 12.222%. So,  $K_r = 12.222\%$ .

It can be calculated adopting the formula:  $K_r = K_e (1-TR)(1-FC)$ , where,  $K_e$  = cost of equity, or minimum return expected by equity investors, TR = marginal tax rate of shareholders and FC = floatation cost,  $K_r = 18\% (1-30\%)(1-3\%) = 18\% (.7)(.97) = 12.222\%$ .

### Weighted average cost ( $K_a$ )

When different sources of capital are employed, overall or weighted average cost of capital can be calculated. This gives an idea about the average return that the firm must earn on its investment.

To compute the weighted average cost of capital two factors are needed. These are: weight of individual source of capital to total capital and the cost of individual sources of capital. The latter has been dealt at so far. The former is a simple concept. But there are several alternatives of weights. Book weights, market weights and marginal weights are the alternative forms of weights.

Book weights method uses book weight of individual sources of capital. Book weight = book value of source divided by total book value of all sources capital employed. Book weights are definite and historical but devoid of realism as current market values are not reflected. Hence  $K_o$  computed on this basis may lead to deflated  $K_o$  and investment decisions based on such  $K_o$  may prove to be fatally wrong.

Market weights method uses market value based weights of individual sources of capital. Market weight = market value of a source of capital employed divided by total market value of all sources of capital employed. Market weights are realistic, but subject to fluctuation. So, market weight based  $K_o$  is also fluctuating. Sometimes market values may not be known. Hence the difficulty.

Formula:  $K_o = \sum W_t K_t$ , where  $W_t$  and  $K_t$  are respectively the weight and specific cost of  $t^{\text{th}}$  source of capital.

An example may be taken up now to further discuss  $K_o$ .

Source of Capital	Cost	Book Value Rs.	Market Value Rs.
Equity share capital	18%	8,00,000	28,50,000
Retained earnings	15%	10,00,000	---
Pref. Share capital	14%	4,00,000	4,50,000
debentures	12%	28,00,000	27,00,000
	(Tax rate 50%)	50,00,000	60,00,000

The book weight and market weight based  $K_0$  values are computed below:

Source	$K_0$ – Book Weight (K)(Wt)	$K_0$ – Market Weight (K)(Wt)
Eq. Share capital	$18\% \times 8/50 = 2.88\%$	$18 \times 285/600 = 8.55\%$
Retained earnings	$15\% \times 10/50 = 3.00\%$	---
Pref. Share capital	$14\% \times 28/50 = 1.12\%$	$14\% \times 45/600 = 1.05\%$
Debentures	$6\% \times 28/50 = 3.36\%$	$6 \times 270/600 = 2.70\%$
(Post-tax $K_d = 6\%$ at 50% tax rate)	$K_0$ 10.36%	$K_0$ 12.30%

Marginal weight method becomes relevant when additional capital is raised from more than one source. If only one source is used to raise additional capital, specific cost of that source is the overall cost of marginal capital raised. In other situations using marginal weights, the marginal overall cost of capital is calculated. Acceptance or rejection of new investment proposals is done by comparing marginal rate of return of the new investment with the marginal cost of additional capital funding the investment. The marginal ROI should at least be equal to marginal  $K_0$ .

### Uses of cost of capital

To know whether capital has been mobilised cost effectively, cost of capital data are useful. Cost of capital of firms of like nature can be compared and efficiency or inefficiency in capital mobilisation can be spotted. Cost of capital is used as the acceptance - rejection criterion of investment proposals. If the return on investment is higher than the cost of capital, the proposal is to be accepted and vice versa. Cost of capital is the minimum target return that a firm must earn to remain in business. Cost of capital should be closely monitored and moderated, if need be by altering the capital structure, if possible.

### DEBT-SERVICE COVERAGE RATIO

When a business goes for debt capital, it must compute the debt-service required and the debt service coverage ratio. Debt service means servicing the borrowed funds by promptly paying interest and repaying that portion of principal that falls due along with interest payment.

Debt-service coverage ratio is computed by relating the debt service requirement and annual cash flow generated.

$$\text{Debt-service coverage ratio} = \frac{\text{Profit Before Interest and tax and depreciation}}{\text{Interest} + \frac{\text{Principal Due}}{1 - \text{Tax Rate}}}$$

Interest coverage ratio is another ratio computed. This is given by:

$$\frac{\text{PBIT\&D}}{\text{Integer}}$$

A debt-service coverage ratio of 3 and an interest coverage ratio of 4 are considered safe levels of dependence of debt fund.

### ACQUISITION FOR SPECIFIC ALLOCATION

Funds acquired by a business may be meant for generalised use (ie., distributed over several divisions, projects or applications) or for a particular project or division. In the latter case the marginal cost of funds must be at least equal to marginal rate of return on the capital project. The cost of capital must be less than the rate of return on capital (ROI) to justify such specific allocation. In the computation of rate of return, both costs and benefits must be valued at market prices so that the ROI is neither under-valued nor over-valued.

A concern is considering an investment proposal requiring an investment of Rs. 50,00,000 and promising an ROI of 14% Debt capital to the tune of Rs. 30,00,000 is available at 18% (The tax rate is 45%). Balance of capital is to be financed through retained earnings.  $K_e = 25\%$  Marginal tax rate of share holders is 20%. Floatation cost is 2%. Can the project be taken up?

Marginal cost of capital = Marginal Wt. cost debt + Marginal Wt. Cost of retained profit

$$\text{Cost of debt} = 18\%(1-45\%) = 9.9\%$$

$$\begin{aligned} \text{Cost of } K &= K_e (1-20\%)(1-2\%) \\ &= 25\%(0.8)(0.98) = 19.6\% \end{aligned}$$

$$\begin{aligned} \text{Overall marginal cost} &= \sum \text{marginal cost} \times \text{marginal weight} \\ &= 9.9\% \times 0.6 + 19.6\% \times 0.4 \\ &= 5.94\% + 7.84\% = 13.78\% \end{aligned}$$

The project's ROI at 14% is greater than the marginal cost of capital at 13.72%. Hence the project may be accepted. As long as marginal ROI > MCC, that project can be taken up.

### QUESTIONS

1. Explain the different concepts of cost of capital.
2. Present the opportunity cost of capital for retained earnings and for trade credit with cash discount option.
3. A firm has issued, 5 year Rs. 500 debentures at a net price of Rs. 460. The debentures carry a coupon of 12% p.a. and redeemable at 5% premium. Tax rate is 40%. Find the pre-tax and post-tax cost of debentures.
4. A firm has floated preference shares redeemable at par after 7 years, face value Rs. 1000, coupon dividend 10% and issue expenses 3%. Find the cost of the shares.
5. XYZ Ltd. has a paid up capital of Rs. 6 crs of equity shares of Rs. 10 each. Its shares due currently quoting at Rs. 45. The company has declared dividend as follows for past 5 years.

Year	1	2	3	4	5
Dividend (Rs. crs)	9	10.5	15	18	21

Find the cost of equity as per D + g approach.

6. Given  $K_e = 18\%$ , Floatation cost 3% and tax bracket of shareholders of a firm at 25%. Find the cost of retained earnings.
7. A firm employs the following capital funds of costs mentioned against each. Find the weighted cost as per book and market weights.

Capital	Cost (%)	(Rs. crs)	
		Book value	Market value
Equity share	18	8	12
Preference share	15	3	2
Debentures	14	4	4

8. ABC Ltd. is setting up a project with a capital outlay of Rs. 60 lakhs and it has the following alternatives in financing the project.

Alternative I = 100% Equity finance

Alternative II = Debt + Equity 2:1

The  $K_d$  is 18% p.a. and corporate tax rate is 40%. Calculate the EBIT at which both the alternatives provide the same EPS.

9. ABC Ltd. is a 100% equity firm with a  $K_e$  of 21%, XYZ Ltd. is similar to ABC, except in capital mix, has a debt - equity ratio of 2:1 and its  $K_d$  is 14%. Find the  $K_e$  of XYZ Ltd. as per MM Hypothesis and find the overall average cost of capital. [Hint:  $K_{e,L} = K_{e,u} + (K_{e,u} - K_d)D/E$ ]

The  $K_e$  and  $K_d$  at different levels of D/E ratio are as follows:

D/E	$K_e$ (%)	$K_d$ (%)
0.0	21	0
0.4	21	12
0.8	22	12
1.2	22	14
1.6	24	16
2.0	24	16
2.4	28	20

Find the optimum capital structure.

10. What is capitalisation? Explain its significance and basis.
11. Explain the assets cost approach to capitalisation.
12. Write notes on yield and debt service coverage ratios.
13. Explain the merits and demerits of different patterns of global structure.
14. Marginal cost of capital < Marginal rate of return. Comment.

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# UNIT - III

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## 3. FINANCIAL ANALYSIS

# Financial Analysis

In this unit, financial analysis, planning and control, allocation of funds to most profitable opportunity and development of profitable opportunity and evaluation thereof are dealt with.

## FINANCIAL ANALYSIS

Financial analysis refers to the process of determining the significant operating and financial features of an undertaking. Analysis means dissection of the whole into components. Financial analysis, therefore means dissection of the summary financial data into their components and subcomponents. For instance the financial health of an undertaking can be seen from its profitability, solvency, leverage, and turnover and fund flow. Again profitability can be analysed into gross profit, operating, net, pre-tax, post-tax, or equity profitability. Similarly solvency can be analysed into long-term and short-term solvency positions. Leverages can be analysed into operating and financial leverages. Turnover can be analysed into fixed assets turnover, working capital turnover, which in turn into cash turnover, debtors turnover, creditors turnover and stock turnover, which in turn into raw materials turnover, work in-progress turnover and finished goods turnover. Fund flow and cash flow aspects are also there. All the above are aspects of financial analysis. We do these analyses in order to know the financial soundness of a business more intimately/thoroughly. For the above analysis certain techniques are used. These are known as techniques of financial analysis.

### What are the techniques available?

Quite a number of techniques are available. These are: i) Comparative financial statements, ii) Common-place statements, iii) trend percentage/ratios, iv) ratio analysis, v) funds flow analysis, vi) cash flow analysis, vii) leverage analysis, viii) budgetary analysis, ix) marginal costing and cost volume profit analysis, x) standard costing and variance analysis, xi) return analysis and xii) risk analysis. A brief idea of these different analyses is attempted here.

#### *Comparative financial statements*

Comparative financial statements refer to the financial statements (Profit and loss account, balance sheet, etc) of a business which are prepared in such a way as to provide a time perspective to the different elements contained in such statements. Comparative income statements and comparative balance sheets are the analytic forms available. These statements show:

- actual data in absolute money values for the periods under consideration.
- increase or decreases in various items in money values.
- increases or decreases in various items in terms of percentages.

By going through the above patterns of data one can judge the financial health of the business. Comparison between two periods, between two firms and the like can be affected and the charge/difference can be known.

### *Common-size financial statements*

Common-size financial statements give the component items in terms of percentage to a common base. In the case of income statements sales or net sales value is the common basis and in the case of balance sheets, total of assets or capital and liabilities is the base. All the component items are expressed in percent terms to their respective base. Consider the following commonsize income statements of two concerns A & B.

Items	Commonsize Statements			
	A	B	A	B
Sales	50 lakhs	100 lakhs	100%	100%
Cost of goods sold	20 lakhs	50 lakhs	40%	50%
Gross profit	30 lakhs	50 lakhs	60%	50%
Operating expenses	10 lakhs	15 lakhs	20%	15%
Operating profit	20 lakhs	35 lakhs	40%	35%

More meaningful analysis of the relative positions of the companies is made when common-size statements are prepared. Companies of different sizes can be effectively and easily compared. The structural health of operations (thro' income statements) and assets and liabilities (thro' balance sheet) can be studied. Any number of comparisons can be effected, unlike the case with the previous technique, where only two sets of entities are to be compared.

### *Trend percentage ratios*

Comparison of past performance over a period of time with a base period is known as trend analysis. Taking the base period value as 100 or as 1, the values of other periods are expressed as percent/times to the base period. Trend values are computed for important operational and financial items only. Trend analysis is a helpful tool as large value absolute figures are reduced to simple and easily readable form. By looking into the trend values one can discern the change (increase or decrease) that has resulted itemwise. And inter-item and inтраitem comparisons can be made to see the direction and intensity of change and its impact. The base period should be a period of normal business. During the period covered consistent accounting policies should have been adopted. Price level adjustments should be effected before trend data are analysed. Trend data need to be seen in the light of absolute data so that changes that are significant are noted carefully.

### *Ratio analysis*

Ratio analysis is yet another technique of financial analysis. Financial data when expressed, one in terms of the other, we get the ratio. The value of current assets is twice the value of current liability, or the current ratio is 2. Here current assets are



expressed in terms of current liability. Similar to the above more ratios can be thought of for comparable accounting data.

Ratios are classified differently. Balance sheet ratios (taking Balance sheet data only), income statement ratios (taking income statement data only), and combined ratios (taking one figure each from the two statements) are one way of classification. Current Ratio, liquidity ratio, capital gearing ratio, debt-equity ratio, etc., are balance sheet ratios. Gross profit ratio, operating ratio, net profit ratio etc are income statement ratios. Return on Investment (ROI), working capital turnover ratio, assets turnover ratio and other turnover ratio are combined ratios. Ratios can also be classified as solvency ratios, leverage ratios, profitability ratios, liquidity ratios, and turnover ratios. You may call the above as functional classification of ratios.

When using ratios to interpret financial standing, certain factors have to be kept in mind. Individual ratios should be interpreted in the light of industry norms or past figures. A group of ratios may be used to judge a particular aspect of a business rather than one or a few ratio(s). Standard formulae may be adjusted to facilitate comparison. Using historical data based ratios, forecasts may be made. Due consideration for qualitative factors is needed to draw final conclusions.

#### *Fund flow analysis*

Between two time periods, changes do happen in the finances of a business. To analyse those changes flow analysis is made. One such analysis is called fund flow analysis. The term fund is used to mean working capital (or that which is related to current assets and/or current liabilities). Accordingly “fund accounts” and “non-fund accounts” are delineated. Current assets and current liabilities thus become “fund accounts” and the rest are “non-fund accounts”. In fund flow analysis, from what sources funds are obtained and to what purposes funds are spent are analysed. Decrease in working capital (from the previous to the subsequent period), increase in share capital/share premium/debentures/pref. share capital, decrease in fixed assets (i.e., sale against cash) fund earned from operations, etc. are sources of funds. Increase in working capital, redemption of debentures/preference shares/loans, purchase of fixed assets for cash, funds lost in business, etc are applications. Through flow analysis, one can know why a business in spite of good profits earned is starved of liquidity and why a business in spite of losses incurred is feeling liquidity comfort. Further major sources of funding and utilisation of funds are known from fund flow analysis. Forecast fund flow statements help in planning financing and investment activities.

#### *Cash flow analysis*

In cash flow analysis, the emphasis is on tracking sources and applications of cash. Cash earned from operation, cash sales of securities/fixed assets, decrease in current assets and increase in current liabilities are sources of cash and cash lost in the business, cash purchase of fixed assets, cash payment to redeem long term debts/pref. shares, increase

in current assets; decrease in current liabilities, etc are treated as cash outflows. Cash flow statement can be prepared for forecast data and from that surplus/shortage of cash can be known in advance. Accordingly investment of surplus cash or arrangement to overcome cash deficiency can be effected.

### *Leverage analysis*

Leverage means getting an advantage. In financial management two types of leverages are used, viz operating leverage and financial leverage. Operating leverage means using fixed operating cost to enhance earnings before interest and taxes (EBIT) for a given change in the contribution, (C). The Degree of Operating Leverage (DOL) is given by: Rate of change in EBIT + Rate of change in 'C'.

$$\begin{aligned}
 &= \frac{\Delta \text{EBIT}}{\text{EBIT}} \bigg/ \frac{\Delta C}{C} \quad (\Delta - \text{means change}) \\
 &= \frac{\Delta \text{EBIT}}{\text{EBIT}} \times \frac{C}{\Delta C} \\
 &= C / \text{EBIT} \quad (\text{since, } (\Delta C - \Delta \text{EBIT}))
 \end{aligned}$$

Higher DOL means, for a small change in contribution a magnified change in EBIT would result and vice versa.

Financial leverage studies the rate of change in earning per share (EPS) to that of EBIT. Degree of Financial Leverage (DFL) is = EBIT / (EBIT - I). A higher DFL means, EPS changes more than proportionately for a given change in the EBIT.

Knowledge of the leverage effects helps in choice of technology (i.e. assets portfolio) and choice of capital sources (i.e. liabilities portfolio).

### *Budgetary analysis*

Financial Management largely depends on budgets and budgetary control. Budgets are financial/quantitative statements showing the forecast costs, benefits and net profits/losses expected over a future period of time. Budgetary control establishes the budget and examines causes for variation in the budgeted and actual courses and suggests corrective measures.

Several types of budgets are used in business. Sales budget, production budget, raw materials purchase budget, labour budget, overhead budget, capital expenditure budget and master budget are a few important budgets.

Techniques of budgeting are several. Zero base budgeting, incremental budgeting, fixed budgeting, flexible budgeting, programme budgeting, etc. are some techniques adopted. Zero base budgeting, programme budgeting and flexible budgeting are considered to be highly useful in planning, execution and control of business activities.

### *Marginal cost and cost-volume-profit analysis*

Business decisions as to buy or make, process further or sale, product-mix level of activity, temporary shut down of plant, profit planning through variations in the cost/

price/quantity factors, etc are ably made using marginal/incremental (decremental) cost analysis. In all these decision situations, the costs that vary with volume are the focal points. The concept of contribution, i.e., excess of selling price over variable cost, is used as a parameter in decision making. Courses that lead to increase in contribution or contribution vis-a-vis the limiting factors are preferred and the rest are reserved.

#### *Standard costing and variance analysis*

To exercise control over cost and expenditure the technique of standard costing and variance analysis is used. Cost standards are prescribed input-wise. Price levels are also fixed. Activity levels are determined in advance. The actual cost, actual quantity of input used, actual price paid, actual volume achieved and so on are worked out. A comparison of actuals with standard is made and variances are analysed into favourable and unfavourable, and causes therefore are found out. Then a disposition of variances is attempted. Cost control, cost reduction, cost awareness and consciousness are the results of standard costing and variance analysis.

#### *Return-cost analysis*

Return means the financial yield obtained from an investment. Financial management involves investment in working capital and fixed assets or projects. The returns on these investments need to be measured so that effective investment decisions could be made. These are several concepts of return, viz. current return, holding period return, post-tax/pre-tax return, ROI, Accounting Rate of Return, and so on. Appropriate return must be worked out and decisions made on reference to the minimum expected return. Discounted cash flow technique is also adopted in the case capital projects, this technique takes into account the time value of money.

Similarly costs of different sources of capital are worked out. There are several concepts of cost of capital. Decisions as to appropriate source and mixture of sources of capital are made based on the cost of capital, hence the need for cost analysis.

#### *Risk analysis*

Risk refers to fluctuations in return or the uncertainty associated with a benefit. Using standard deviation or variance of returns or the covariance of the returns of an investment and that of the market return, risk can be measured. High risk investments need to be avoided, unless matchingly high return is available. Hence the use of risk analysis.

As risk and return move in the same direction, a trade-off has to be effected. What is the level of risk you want to take? if you decide it, the return is specified. What is the return you want to earn? If you decide it, the risk is given. If you decide one, the other is given and you can't have any bargain over that. You decide one and take the other as given. If you reduce the level of risk, this is accompanied by a reduction in return too and vice-versa. So, every unit of return has a price i.e., the risk. You pay the price i.e., assume the extra risk, and get the extra return and vice versa. This risk-return exchange arithmetic is referred to as risk-return trade-off.

All fund decisions involve risk-return trade-off. Consider these. More liquidity means less risk of running out of cash. You keep more liquid cash. The result is more barren assets and hence less return. So, less-risk-less-return situation arises. More solvency means less risk, because you possibly use less debt capital. Less debt means more overall cost of capital, for you have used less of the low cost debt capital and more of high cost equity capital. More overall cost of capital means reduced return. So, again less-risk and less-return situation results.

## FINANCIAL PLANNING AND CONTROL

The purpose of financial analysis is helping financial planning and control. Financial planning and control cover the whole gamut of financial management, of which fund management is a sub-set. The scope of financial planning and control is depicted below in Table 3.1.

**Table 3.1 Scope of financial planning and control**

	Activities	Planning	Execution	Control
I Assets				
1.1	Total Investments			
1.2	Mix of Fixed-current assets			
1.3	Mix of Fixed assets			
1.4	Investments Projects			
1.5	Sourcing Fixed assets			
1.6	Acquiring Fixed assets			
1.7	Mix of Current assets			
1.8	Management of Inventory			
1.9	Management of Receivables			
1.10	Management of Cash			
1.11	Management of Liquidity			
1.12	Building up asset-portfolio			
II Capital				
2.1	Total Capitalisation			
2.2	Debt-equity Mix			
2.3	Long term-short term Mix			
2.4	Fixed-charge Free-charge Mix			
2.5	Sources of Capital			
2.6	Instrument of Fund			
2.7	Issue Flotation			
2.8	Lease Management			
2.9	Bank-Institution Relations			
2.10	Registration of Charges			

III Dividend				
3.1	Dividend Policy			
3.2	Size of Dividend			
3.3	Form of Dividend			
3.4	Periodicity of Dividend			
3.5	Regularity of Dividend Earnings			
3.6	Policy on Retention			
IV Market				
Management				
4.1	Market Value Management			
4.2	Value Additions			
4.3	Timing Finance Signals			
4.4	Hedging with Derivatives			
4.5	Speculations with Derivatives			
4.6	Risk Handling & Insurance			

All the different activities listed in table 3.1 and related and emerging activities fall within the purview of financial management. These need to be planned and controlled.

Planning involves deciding i) what is to be done? After deciding How is it to be done? ii) Where is it to be done? iii) How much of it is to be done? iv) When is it to be done? v) With what is it to be done? vi) With whom is it to be done?

Planning is deciding in advance and get blueprint for action. Planning does all analysis and on the basis of such analysis evaluation of alternative causes and on the basis of such evaluation, choice from among the alternative courses is made.

Control involves ensuring that the execution goes according to the planned course. Control enables preventing deviations from planned course and if deviations had taken place, correcting the same, if possible or at least preventing the recurrence of deviations.

Planning tells the destination, while control ensures that the destination is reached. Both planning and control must go together.

### **ALLOCATION OF FUNDS TO MOST PROFITABLE OPPORTUNITY**

Profit maximization is a stated goal of fund management. Profit is the excess of revenue over expenses. Profit maximisation is therefore maximizing revenue given the expenses, or minimising expenses given the revenue or a simultaneous maximization of revenue and minimization of expenses. Revenue maximization is possible through pricing and scale strategies. By increasing the selling price one may achieve revenue maximization, assuming demand does not fall by a commensurate scale. By increasing quantity sold by exploiting the price-elasticity of the demand factor, revenue can be maximized.

Expenses minimization depends on variability of costs with volume, cost consciousness and market conditions for inputs. So, a mix of factors is called for profit maximization.

This objective is a favoured one for the following reasons:

1<sup>st</sup> profit is a measure of success in business. Higher the profit greater is the degree of success. 2<sup>nd</sup> profit is a measure of performance. Performance efficiency is indicated by the quantum of profit. 3<sup>rd</sup> profit making is essential for the growth and survival of any undertaking. Only profit making business can think of tomorrow and beyond. It can only think of renewal and replacement of its equipment and can go for modernization and diversification. Profit is an engine doing away the odds threatening the survival of the business. 4<sup>th</sup> profit making is the basic purpose of business. It is accepted by society. A losing concern is a social burden. The sick business undertakings cause a heavy burden to all concerned, we know. So, profit criterion brings to the light operational inefficiency. You cannot conceal your inefficiency, if profit is made the criterion of efficiency. 5<sup>th</sup> profit making is not a sin. Profit motive is a socially desirable goal, as long as your means are good.

Profit as an absolute figure conveys less and conceals more. Profit must be related to either sales, capacity utilisation, production or capital invested. Profit when expressed in relation to the above size or scale factors it acquires greater meaning. When so expressed, the relative profit is known as profitability. Profit per rupee sales, profit per unit production, profit per rupee investment, etc., are more specific. Hence, the superiority of this approach to the profit maximization approach.

So given the different opportunities for investment, the most profitable opportunities has to be picked up. If investment is at the same level for all alternatives, absolute profit maximisation is fine. If investment level varies, maximisation of profitability is needed. So, profitability is worked out with respect to different bases such as a unit of sales value unit of product, unit of net capital, unit of labour, unit of time, unit of capacity used, etc. If all these bases are equally important, arithmetic average of profitability is taken. If these bases differ in importance, weighted average of profitability is taken for each and every opportunity. Final choice of opportunity is made on the basis of most profitable criterion.

The profitability ratios are calculated by relating profits either to sales or investments. Profitability ratios based on sales are as follows:

### **Gross profit ratio (G.P.Ratio)**

Meaning: G.P.Ratio is the ratio of gross profit to net sales expressed as a percentage. It expresses the relationship between gross profit margin and sales. The basic components are gross profit and sales. Net Sales means total sales minus sales returns. Gross profit would be the difference between net sales and cost of goods sold. Cost of goods sold in the case of a trading concern would be equal to opening stock plus purchases and all direct expenses relating to purchases (i.e., all expenses charged to trading a/c) minus closing stock. In the case of manufacturing concerns, it would be equal to opening finished goods stock plus cost of production minus closing finished goods stock.

*Formula:*

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

### Illustration 3.1

From the following particulars, calculate G.P.Ratio.

Opening Stock	Rs.25,000
Purchases	80,000
Closing Stock	35,000
Purchase Returns	2,000
Sales	1,05,000
Sales Returns	5,000

### Solution

$$\begin{aligned} \text{Net Sales} &= \text{Sales} - \text{Sales Returns} \\ &= \text{Rs.1,05,000} - 5,000 = 1,00,000. \end{aligned}$$

$$\begin{aligned} \text{Cost of goods sold} &= \text{Opening Stock} + \text{Purchases less returns} - \text{Closing Stock} \\ &= \text{Rs.25,000} + 80,000 - 2,000 - 35,000 \\ &= \text{Rs.68,000}. \end{aligned}$$

$$\begin{aligned} \text{Gross Profit} &= \text{Net Sales} - \text{cost of goods sold} \\ &= \text{Rs. 1,00,000} - 68,000 = \text{Rs. 32,000}. \end{aligned}$$

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

$$\text{Gross Profit} = \frac{\text{Rs.32,000}}{\text{Rs.1,00,000}} \times 100 = 32\%$$

**Significance:** G.P.Ratio may indicate as to what extent the selling prices of goods per unit may be reduced without incurring losses on operations. It is useful to ascertain whether the average of the mark up on the goods sold is maintained. There is no standard G-P Ratio for evaluation. Trend observed may be used for the analysis. However, the gross profit earned should be sufficient to recover all operating expenses and to build up reserves after paying all fixed interest charges and dividends.

#### *Factors that influence the gross profit ratio*

It should be observed that an increase in G.P.ratio might be due to the following factors:

- Increase in the selling price of goods sold without any corresponding increase in the cost of goods sold.



- Decrease in cost of goods sold without corresponding decrease in selling price.
- Under-valuation of opening stock or over-valuation of closing stock.

On the other hand, the decrease in the G.P.Ratio may be due to the following factors:

- Decrease in the selling price of goods sold without corresponding decrease in cost of goods sold.
- Increase in cost of goods sold without any increase in selling price.
- Unfavourable purchasing or mark-up policies.
- Inability of management to improve sales volume, or omission of sales.
- Over-valuation of opening stock or under-valuation of closing stock.

Hence, an analysis of GP margin should be carried out in the light information relating to purchasing, make-ups and markdowns, credit and collections as well as merchandising policies. However, these items of information may not be easily available to the external analyst.

#### *Net profit ratio (N.P.Ratio)*

This is the ratio of net income or profit after taxes to net sales. Net profit as used here, is the balance of Profit and Loss Account, which is arrived at after considering all non-operating income such as interest on investments, dividends received, etc., and all non-operating expenses like loss on sale of investments, provision for contingent liabilities, etc.

*Formula:*

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

This is used as a measure of overall profitability and is useful to the owners. It is both an index of efficiency as well as profitability when used along with GP Ratio and Operating Ratio.

#### *Operating ratio (O.R.Ratio)*

This is the ratio of operating cost to net sales. The term 'operating cost' refers to cost of goods sold plus operating expenses. This is closely related to the ratio of operating profit to net sales. For example, if the operating ratio is 80%, then the operating profit ratio would be 20% (i.e., 1 – operating ratio).

Components: The main items are operating cost and net sales. Operating expenses normally include the following items:

- Office and administrative expenses;
- Selling and distribution expenses.



Financial charges such as interest, provision for taxation, etc., are generally excluded from operating expenses.

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

An alternative form of this ratio may be expressed as follows:

$$\text{Operating Profit Ratio} = \frac{\text{Operating Profit (i.e Net Sales – Operating Cost)}}{\text{Net Sales}} \times 100$$

Computation of any one of these two would be adequate, since the other one can be found out by deducting the first one from 100.

### Illustration 3.2

Compute the Operating Ratio from the following particulars:

Total Sales	Rs.2,65,000
Sales Returns	15,000
Gross Profit Ratio	30%
Administrative expenses	15,000
Selling & Distribution expenses	10,000

### Solution

Cost of goods sold = Net Sales – Gross Profit

Net Sales = Total Sales – Returns = Rs.2,65,000 – 15,000 = Rs. 2,50,000

Gross Profit = Net Sales x GP Ratio = Rs.2,50,000 × 30% = Rs.75,000

Cost of goods sold = Rs.2,50,000 – 75,000 = Rs.1,75,000

Operating Cost = Cost of goods sold + Operating expenses  
= Rs.1,75,000 + 15,000 + 10,000 = Rs.2,00,000

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

$$\text{Operating Ratio} = \frac{\text{Rs.2,00,000}}{\text{Rs.2,50,000}} \times 100 = 80\%$$

Excellent Trading Co., Ltd., proposes to increase the production of the company. They are willing to purchase a new machine. There are three types in the market. The following are the details regarding them.

	Type P Rs.	Type Q Rs.	Type R Rs
Cost of machine	17,500	12,500	9,000
Estimated savings in scrap	400	750	250
Wages per operative	250	300	250
Cost of indirect materials	--	--	--
Expected savings in indirect material	100	--	250
Additional cost of maintenance	--	800	--
Operatives not required (Number)	11	20	9
Estimated life of machine	10 years	6 years	5 years
Taxation at 50% of the profit			

You are required to advise the management which type of the machine should be purchased.

**Solution** Profitability Statement

	Type P Rs.	Type Q Rs.	Type R Rs.
Machine cost	17,500	12,500	9,000
Life of machine	10 years	6 years	5 years
1 Savings (per year) in costs:.			
Wages	2,750	6,000	2,250
Scrap	400	750	250
Indirect materials	100	--	250
	<u>3,250</u>	<u>6,750</u>	<u>2,750</u>
2. Additional expenditure:			
Indirect material	--	400	--
Supervision	--	800	--
Maintenance	750	550	500
	<u>750</u>	<u>1,750</u>	<u>500</u>
3. Operating profit (1 – 2)	2,500	5,000	2,250
4. Net savings after tax of 50% (profit after tax)	1,250	2,500	1,125

The company is advised to purchase Machine Type Q as that gives higher return.

**Illustration 3.3**

Kissan Products Ltd., has to install a machine for production of a part. Two machines - Machine X and Y are being considered. Their particulars are as follows.

	<b>Machine X</b>	<b>Machine Y</b>
	<b>Rs.</b>	<b>Rs.</b>
Cost	10,000	20,000
Annual capacity (units)	2,000	5,000
Economic life (years)	10	10
Terminal value	300	300
Production cost per unit (other than depreciation)	5.00	4.50
Part of existing overheads p.a. (supervision, rent, etc.)	1,000	1,000

Interest is 9% p.a. The part is available in the market at Rs. 9 per unit and can be sold at a net price of Rs. 8.50. The company requires 3,000 units. Show which of the machines will be most economical?

**Solution**

	<b>Machine X</b>	<b>Machine Y</b>
	<b>Rs.</b>	<b>Rs.</b>
Total Annual costs:	6,000	15,000
Materials	10,000	22,500
Production costs	1,000	2,000
Depreciation	17,000	39,500
Cost of production		
Add interest at 9%		
@ Rs.5,000 (average investment)	450	
@ Rs.10,000 (average investment)		900
	17,450	40,400
Add 1,000 units to be purchased at Rs.9	9,000	
	26,450	
Less 2,000 units to be sold at Rs.8.50		17,000
Net cost of 3,000 units	26,450	23,400

Machine Y is more economical since by its use 3,000 units can be obtained at a lower cost than by use of Machine X.

It is assumed that 2,000 surplus can be disposed easily. If the disposal is not easy e.g. only 1,000 units can be sold in the market, the cost of 3,000 units (4,000 produced less 1,000 sold at Rs. 8.50), will be Rs. 23,400 against Rs. 26,450 on Machine X.

## **DEVELOPMENT OF PROFITABLE OPPORTUNITY AND EVALUATION**

An efficient organisation is one that develops many profitable opportunity for investment. The organisation must scout for such opportunities, groom them, evaluate them and select the ones found most profitable.

### **Search for business opportunities**

Search or investigation of business opportunities has to be seriously pursued. The search or investigation involves ascertaining what goals and services are needed by a particular community or segments of society, whether one can supply them at a price and volume that will give the person a profitable return for the cost, time and capital invested.

### **New product/service as business opportunity**

New product/service holds immense potential to fulfil entrepreneurial ambitions. Can you put an old product to new use? Can you satisfy new needs created by changes in age-segments? Can you think of new products/services that people need with raising standard of living? Can you think of becoming a source of supply for existing business for their input needs? Can you find ways to remove the dredgery of people who toil hard and sweat their blood out? Can you think of better ways to do jobs avoided by housewives? Can you find trouble free operation systems? Can you think of businesses now neglected by businesses?

Can you help people spend less and yet get the same value? Can they save time and energy? Can you offer greater security and safety and comfort? Can you help them to be healthier and happier? Can you give them prestige through your excellence?

Every now and then we come across new products hitting the market. These are the innovative business opportunities developed by entrepreneurs or businesses.

### **Existing product/service as business opportunity**

You may not hit upon a new business idea. Then can you enter into the business already run by several people.

What reasons do you have that you can make a dent in the business? Is there increased volume? Is the market's expansion rate is higher than the expansion rate of supply? Is it a stable market? Do you consider yourself superior? If answer to these questions is "Yes" you can enter into the business. Do existing businesses flout and exploit? Do you have evidences that people are dissatisfied with these businesses? Do stock out situation exist often? Aren't customers loyal to a particular business? Are there high incidences of customer-complaints? Is the rate of service slow and declining? If the answer to these questions is "Yes", you can enter into the business and by removing the hardship faced by consumer, you can become an entrepreneur.

### **Market search of business opportunities**

Business gives profit only when it sells what the customer is willing to pay, at the price the customer can afford, at the time when the customer needs, at the place of

customer's convenience, at quantities the customer has budgeted to buy. So, everything depends on consumers need, mood, deed, nod, word, world and also ward. Therefore, the business's plan must centre around the consumer. The consumer is the king and you have to dance to his tunes. Hence the need for market analysis. Market search will unfathom hidden opportunities.

### **Sources of business opportunities**

There are several sources to scout for business ideas. These are: the market, the prospective consumers, the developments in other nations, project profiles available, government organisations, trade fairs, etc.

Each one of these sources are analysed below.

#### *Market—a source of business opportunities*

The existing market is itself a source of business opportunity. The size of the market, the demand-supply gap in the market, the drawbacks of the present state of affairs in the market etc need to be studied. And business ideas to fill gaps can be worked up.

#### *Prospective consumers*

Who are you prospective consumers? Their income, savings, expectations, spending habit, their needs, moods, words, world and nods, their avocations, their leisure, their hobbies, their education, etc will help prospecting new business ideas. What do they possess? What do they aspire for? What is their brand loyalty? What is their store loyalty coefficient? Are they early adopters or late adopters? Are they forward looking or custom-bound? Your prospective consumers thus hold the leverage of your business.

#### *Development in other countries*

Another source of business idea is development in other countries. Economic, social, cultural, educational, technological, environmental, energy consumption and conservation, political business capital market and other developments in alien countries can open up new business opportunities. Technological developments in developed nations have changed business opportunities in those nations as well as in the rest of the world. Environmental awareness and standards prescribed might create new business opportunity. Today the world is becoming a small village, due to fast propagation of developments happening in one part of the globe to other parts. In the process new business opportunities get developed across the globe.

#### *Study of project profiles*

To a new entrepreneur one important source of project ideas is project profiles already prepared by professionals, banks, development finance institutions and so on. In India project profiles are available with various institutions and professional individuals. The Technology Consultancy Organisations (TCOs) like ITCOT (there are in all 18 TCOs), Small Industries Service Institute, Small Industries Development Organisation, private bodies and consultants have been developing project profiles for almost all potential

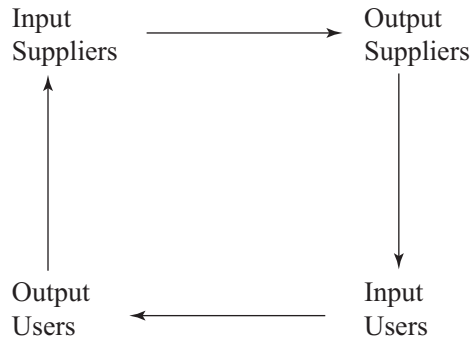
product/service lines. Priced volumes of these project profiles are available. Study, analysis and understanding of these project profiles will help the intending entrepreneurs to spot bright business ideas. Vernacular trade magazines also now-a-days give project profiles as a regular column.

### *Government organisations*

Government organisations abound with huge budgets these days. They can be good source of business ideas. Government organisations out source many of their day-to-day requirements. Govt. offices are mostly infogoods (paper, board, bills, computers, computer peripherals, etc) buyers. Govt. owned enterprises are outsourcing many of their inputs. Govt. organisations also have annual budgets for public welfare oriented programmes. Take for example noon-meal scheme. By becoming suppliers of inputs needed for these government works, schemes, offices and organisations successful businesses can be established.

### *Trade fairs*

Trade fairs are places where raw material/equipment suppliers, users of these items, i.e., producers of finished goods, dealers in finished goods and consumers converge.



In their convergence, new business deals are struck, new opportunities are created, new alliances are formed and so on. Thus trade fairs serve as sources of business ideas.

### *Grooming business opportunities*

The scouting process will throw open a vast set of alternative business opportunities. All these cannot be taken up as such. These need grooming. Grooming is a development phase of business opportunities which involves shaping the opportunities to suit the organisation's goal.

### *Evaluation*

Evaluation involves indepth feasibility analysis. Evaluation shall cover technical, economic, market and financial feasibilities, break-even return on investment, payback period, sensitivity, risk-return, liquidity-solvency, and related aspects.

Capital projects need to be thoroughly evaluated as to costs and benefits.

The costs of capital projects include the initial investment at the inception of the project. Initial investment made in land, building, machinery, plant, equipment, furniture, fixtures, etc. generally, gives the installed capacity. Investment in these fixed assets is one time. Further a one-time investment in working capital is needed in the beginning, which is fully salvaged at the end of the life of the project.

Against this fund committed returns in the form of net cash earnings are expected. Net cash earnings = sales - variable cost - Fixed cost (including depreciation, Tax + Depreciation). These are computed as follows. Let 'P' stand for price per unit, 'V' for variable cost per unit, 'Q' for quantity produced & sold, 'F' stand to total fixed expenses exclusive of Depreciation, 'D' stand to depreciation on fixed assets, 'I' for interest on borrowed capital and 'T' for tax rate).

$$\text{Then cash earnings} = [(P-V)Q - F - D-I](1-T) + D$$

These cash earnings have to be estimated through out the economic life of the investment. That is, all the variables in the equation have to be forecast well over a period of years.

Now that, we have the benefits from the investment estimated, the same may be compared with costs of the capital project and 'netted' to find out whether costs exceed benefits or benefits exceed costs. This process of estimation of costs and benefits and comparison of the same is called appraisal. Payback period, accounting rate of return, net present value, internal rate of return, decision tree technique, sensitivity analysis, simulation analysis and capital asset pricing model (CAPM) are certain methods of appraisal.

#### *Requisites for appraisal of capital projects*

The computation of profit after tax and cash flow are much relevant in evaluation of projects. Hence this is presented here as a prelude to better understanding the whole process.

Say in fixed assets at time zero, you are investing Rs. 20 lakhs. You have estimated the following for the next 4 years.

Year	Expected Sales (units) (Q)	Expected Selling price (P) Rs.	Tax rate (T)	Expected variable cost per unit (V) Rs.	Fixed expenses (excluding depreciation) (F) Rs.
1	30,000	200	30%	100	12,00,000
2	30,000	250	30%	120	13,00,000
3	20,000	300	40%	150	14,00,000
4	21,000	300	40%	200	15,00,000

With this information we can estimate profit after tax for the business. For that, apart the given variable expenses and fixed expenses, depreciation of the fixed assets has to be

considered. The annual value of depreciation is given by the cost of fixed assets divided by number of years of life. In our case the figure comes to Rs. 20,00,000/4 = Rs. 5 lakhs.

The calculations are given in three stages, viz., computation of profit before tax (PBT), profit after tax (PAT) and cash flow.

The profit before tax (PBT) for a period is given by: (selling price per unit - variable cost per unit) x (No. of units sold) - Fixed expenses - Depreciation. So, for the 1<sup>st</sup> year  $PBT = (200-100)(30000) - 1,20,000 - 5,00,000 = 30,00,000 - 17,00,000 = 13,00,000$ . Table 4.1 gives the working and results.

Table 4.1

Year	(P - V) Rs.	*	(Q)	-	F Rs.	-	Dep	=	PBT Rs.
1	(200-100)	*	(30,000)	-	12,00,000	-	5,00,000	=	13,00,000
2	(250-120)	*	(30,000)	-	13,00,000	-	5,00,000	=	21,00,000
3	(300-150)	*	(20,000)	-	14,00,000	-	5,00,000	=	11,00,000
4	(300-200)	*	(21,000)	-	15,00,000	-	5,00,000	=	1,00,000

Profit after tax (PAT) for the different years is obtained by subtracting tax from the PBT.

Profit after tax = PAT = PBT (1-Tax Rate). So, for the first year  $PAT = 13,00,000 (1-30\%) = 13,00,000 (0.7) = 9,10,000$ . Similarly for the other years the profit figures can be obtained in table 4.2

Table 4.2

Year	PBT Rs.	Tax rate	Tax = (PAT) x (Tax Rate)	(PAT = PBT - Tax) or PBT (1 - TR)
1	13,00,000	30%	3,90,000	9,10,000
2	21,00,000	30%	6,30,000	14,70,000
3	11,00,000	40%	4,40,000	6,60,000
4	1,00,000	40%	40,000	60,000
Total	13,00,000		15,00,000	31,00,000

Cashflow from business is equal to PAT plus depreciation. Table gives cash flow from business.

Table 4.3

Year	PAT Rs.	+	DEP Rs.	=	Cash Flow Rs.	Cumulative Cash Flow Rs.
1	9,10,000	+	5,00,000	=	14,10,000	14,10,000
1	14,17,000	+	5,00,000	=	19,70,000	33,80,000
1	6,60,000	+	5,00,000	=	11,60,000	45,40,000
1	60,000	+	5,00,000	=	5,60,000	51,00,000



## Techniques of evaluation

### 1. Payback period (PBP) method

Pay back period refers to the number of years one has to wait to go back the capital invested in fixed assets in the beginning. For this we have to get the cash flow from business.

We have invested Rs. 20,00,000 at time zero. After one year a sum of Rs. 14,00,000 is returned. By next year a sum of Rs. 19,70,000 is returned. But we have to get back only Rs. 5,90,000 (i.e., 20,00,000 - 14,10,000). So, in the second we have to wait only for part of the year to get back Rs. 5,90,000. The part of the year =  $5,90,000/19,70,000 = 0.30$ . That is, pay back period is 1.30 years or 1 year, 3 months and 19 days.

In general pay-back period is given by 'n' in the equation.

$$\sum_{t=1}^n CF_t - I = 0$$

where 't' = 1 to n, I = initial investment,  $CF_t$  = cash flow at time 't' and t = time measured in years.

Normally, business as want projects that have lease pay back period, because the invested money is got back very soon. As future is risky, earlier one gets back the money invested the better for him. Some businesses fix a maximum limit on pay back period. This is the cut-off pay-back period, serving as the decision criterion. Accordingly a pay back period ceiling of 3 years means, only projects with payback period equal to or less than 3 years will be accepted.

#### Merits of payback period

- It is cash flow based which is a definite concept
- Liquidity aspect is taken care of well
- Risky projects are avoided by going for low gestation period projects
- It is simple, *common sense oriented*.

#### Demerits of payback period

- Time value of money is not considered as earnings of all years are simply added together.
- Explicit consideration for risk is not involved.
- Post-payback period profitability is ignored totally.

### 2. Accounting rate of return (ARR) method

Here the accounting rate of return (ARR) is calculated. It is also called as average rate of return. To compute ARR average annual profit is calculated first. From the PBT for different years (as in table) average annual PBT can be calculated.

The average annual PBT = Total PBT / No. of years

$$\text{AAPBT} = 46,00,000/4$$

$$= 11,50,000$$

$$\text{ARR} = \text{AAPBT} / \text{Investment} = 11,50,000 / 20,00,000 = 57.4\%$$

The denominator can be average investment, i.e., (original value plus terminal value)/2. Here it is 10 lakhs. Then the ARR will be Rs. 11,50,000/Rs. 10,00,000 = 1.148 or 114.8%.

ARR can also be computed on the basis of PAT. The formula is: Average Annual PAT/Original Investment.

$$\text{Average Annual PAT} = \text{Total PAT} / \text{No. of years}$$

$$= 31,00,000/4 = 7,75,000$$

$$\text{So, ARR} = 7,75,000 / 20,00,000 = 0.3875 \text{ or } 38.75\%$$

The denominator can be the average investment, instead of original investment, then ARR is = Rs. 7,75,000 / Rs. 10,00,000 = 0.775 or 77.5%.

### *Merits of ARR*

- It is simple, common sense oriented
- Profits of all years taken into account

### *Demerits of ARR*

- Time value of money is not considered
- Risk involved in the project is not considered
- Annual average profits might be same for different projects but accrual of profits might differ having significant implications on risk and liquidity.
- The ARR has several variants and that it lacks uniform understanding.

A minimum ARR is fixed as the benchmark rate or cut-off rate. The estimated ARR for an investment must be equal to or more than this benchmark or cut off rate so that the investment or project is chosen.

### **3. Net present value (NPV) method**

Net present value is computed given the original investment, annual cash flows (PAT + Depreciation) and required rate of return which is equal to the cost of capital. Given these, NPV is calculated as follows

$$\text{NPV} = -I + \sum_{t=1}^n \frac{\text{CF}_t}{(1+k)^t}$$

Where,

I = Original or initial investment

CF<sub>t</sub> = annual cash flows

K = cost of capital and

t = time measured in years

For the problem we have done under the pay back period method we can get the NPV, taking  $k =$  say 10% or 0.1. Then the

$$\begin{aligned} \text{NPV} &= -I + \text{CF}_1 / (1+k)^1 + \text{CF}_2 / (1+k)^2 + \text{CF}_3 / (1+k)^3 + \text{CF}_4 / (1+k)^4 \\ &= (-20,00,000 + 14,10,000/1.1 + 19,70,000/1.1^2 + 11,60,000/1.1^3 + 5,60,000/1.1^4) \\ &= (-20,00,000 + 14,10,000 \times 0.909 + 19,70,000 \times 0.826 + 11,60,000 \times 0.751 + \\ &\quad 5,60,000 \times 0.683) \\ &= -20,00,000 + 12,81,828 + 16,28,099 \times 0.826 + 8,71,525 + 3,79,042 \\ &= -20,00,000 + 41,60,484 = \text{Rs. } 21,60,482. \end{aligned}$$

If it is required that  $k = 10\%$ ,  $11\%$ ,  $12\%$  and  $13\%$  respectively for year 1 through year 4. the formula is written as follows

$$\begin{aligned} \text{NPV} &= -I + \sum \text{CF}_t / (1+k)^t \\ \text{NPV} &= -I + \text{CF}_1 / (1+k)^1 + \text{CF}_2 / (1+k)^2 + \text{CF}_3 / (1+k)^3 + \text{CF}_4 / (1+k)^4 \end{aligned}$$

In the above example

$$\begin{aligned} &= (-20,00,000 + 14,10,000/1.1 + 19,70,000/1.1^2 + 11,60,000/1.12^3 + \\ &\quad 5,60,000/1.13^4) \\ &= (-20,00,000 + 14,10,000 \times 0.909 + 19,70,000 \times 0.817 + 11,60,000 \times \\ &\quad 0.712 + 5,60,000 \times 0.635) \\ &= -20,00,000 + 12,81,828 + 16,28,099 \times 0.826 + 8,71,525 + 3,79,042 \\ &= -20,00,000 + 40,49,482 = \text{Rs. } 20,49,482. \end{aligned}$$

If the  $\text{NPV} = 0$  or greater than zero, the project can be taken. In case there are several mutually exclusive projects with  $\text{NPV} > 0$ , we will select the one with highest NPV. In the case of mutually inclusive projects you first take up the one with highest NPV, next the project with next highest NPV, and so on as long as your fund for investments lasts. The factor “ $k$ ” need not be same for all projects. It can be high for projects whose cash flows suffer greater fluctuations due to risk, and lower for projects with lower fluctuation.

#### **4. Internal rate of return (IRR) method**

Internal Rate of Return (IRR) is the value of “ $k$ ” in the equation,

$$-I + \sum \text{CF}_t / (1+k)^t.$$

In other words, IRR is that value of “ $k$ ” for which aggregated discounted value of cash flows from the project is equal to original investment in the project. When manually computed, “ $k$ ” i.e., IRR is got through trial and error and if need be, adopting a sort of interpolation. Suppose for a particular value of  $k$ ,  $-I + \sum \text{CF}_t / (1+k)^t > 0$ , we have to use a higher ‘ $k$ ’ in our next trial and if the value is  $< 0$ , a lower ‘ $k$ ’ has to employed next time. Then you can interpolate  $k$ . The value of ‘ $k$ ’ thus got is the IRR. For the project in question (dealt under NPV), the IRR is worked out as follows:

If we take,  $k = 50\%$ , then  $\sum CF_t / (1+k)^t$  comes to 22,69,877, i.e.,  $[14,10,000/1.5 + 19,70,000/1.5^2 + 11,60,000/1.5^3 + 5,60,000/1.5^4]$ . This is higher than the 'I' by 2,69,877. so, 'k' is enhanced to 60%. Then  $14,10,000/1.6 + 19,70,000/1.6^2 + 11,60,000/1.6^3 + 5,60,000/1.6^4$ , i.e.,  $\sum CF_t / (1+k)^t$  comes to 20,19,433. This is higher than 'I'. So, we have to still try at higher discount rate, say 61%. The PV comes to Rs. 19,97,083. Now, we can take the interpolated value as the IRR, which is between 60% and 61%.

$$\begin{aligned} \text{IRR} &= 60\% + [(20,19,433 - 20,00,000)/(20,19,423 - 19,97,083)] \times (61\% - 60\%) \\ &= 60\% + [(19,433/(22,350))] \times 1\% = 60\% + 0.869\% = 60.869\% \end{aligned}$$

If the computed IRR is equal to or greater than cost of capital, the project will be selected. Otherwise, it is rejected. For mutually exclusive projects, project with highest IRR, subject to it being equal to or greater than cost of capital, will be chosen. For mutually inclusive projects, you start taking up first the project with highest IRR, next, the next highest IRR project and so on subject to (i) the IRR is greater than or equal to cost of capital and (ii) you have investible fund.

## QUESTIONS

1. Explain the different methods of financial analysis
2. Bring out the significance and tools of financial analysis
3. How is allocation of fund to most profitable opportunity ensured?
4. How do you develop profitable business opportunities for a business
5. Explain the methods of evaluation of profitability of business projects.

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# **UNIT - IV**

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## **4. ADVANCED CAPITAL BUDGETING TECHNIQUES**

# Advanced Capital Budgeting Techniques

In this unit capital projects, significance of capital budgeting, appraisal techniques of capital projects under conditions of risk and uncertainty are dealt with.

## **INTRODUCTION**

Capital budgeting is budgeting for capital projects. The exercise involves ascertaining / estimating cash inflows and outflows, matching the cash inflows with the outflows appropriately and evaluation of desirability of the project.

## **CAPITAL PROJECTS**

Business concerns invest in capital projects of different nature. These capital projects involve investment in physical assets land, building, plant, machinery, etc. to manufacturer a product or process certain raw products into fine ones as against financial investments which involve investment in financial assets like shares, bonds or mutual funds. Capital projects necessarily involve processing/manufacturing/service works. These require investments with a longer time horizon. The initial investment is heavy in fixed assets and investment in permanent working capital is also heavy. The benefits from the projects last for few to many years.

Capital projects may be new ones, expansion of existing ones, diversification of existing ones, renovation or rehabilitation of infirm ones, R&D activities, or captive service projects. An enterprise may put up a new subsidiary, increase stake in existing subsidiary or acquire a running firm, all these are considered capital projects.

Capital projects involve huge outlay and last for years. Hence these are riskier than investments in financial investments. So, careful analysis is needed. Decisions once taken cannot be reversed in respect of capital projects. So, “listen before leaping” and “think before jumping” are the caveats needed. Thorough evaluation of costs and benefits is needed.

## **SIGNIFICANCE OF CAPITAL BUDGETING**

Every business has to commit funds in fixed assets and permanent working capital. The type of fixed assets that a firm owns influences i) the pattern of its cost (i.e. high or low fixed cost per unit given a certain volume of production), ii) the minimum price the firm has to charge per unit of product, iii) the break-even position of the company, iv) the operating leverage of the business and so on. These are very vital issues shaping the profitability and risk complexion of business. Hence the significance of capital budgeting.

Capital budgeting is significant because it deals with right kind of evaluation of projects. A project must be scientifically evaluated, so that no undue favour or dis-favour is shown to a project. A good project must not be rejected and a bad project must not be selected. Hence the significance of capital budgeting.

Capital investment proposals involve i) longer gestation period, ii) huge capital outlay, iii) technological considerations needing technological forecasting, iv) environmental issues too, which require the extension of the scope of evaluation to go beyond economic costs and benefits, v) irreversible decision once get committed, vi) considerable peep into the future which is normally very difficult, vii) measuring of and dealing with project risks which is a daunting task in deed and so on. All these made capital budgeting a significant task.

Capital budgeting involves capital rationing. That is the available funds must be allocated to competing projects in the order of project potentials. Usually, the indivisibility of project poses the problem of capital rationing because required funds and available funds may not be the same. A slightly high return projects involving higher outlay may have to be skipped to choose one with slightly lower return but requiring less outlay. This type of trade-off has to be skillfully made.

The building blocks of capital budgeting exercise are mostly estimate of price and variable cost per unit output, quantity of output that can be sold, the tax rate, the cost of capital, the useful life of project, etc. over a period of years. A clear system forecasting is needed. Hence the significance of capital budgeting.

What should be discount rate? Should it be the pre-tax overall cost of capital? Or the post-tax overall cost of capital? Or marginal overall cost of additional capital raised for a project in particular. The choice is very crucial making capital budgeting exercises significant one.

Finally, which is the appropriate method of evaluation of projects. There is a dozen or more methods. The choice of method is important. And different methods might rank projects differently leading to a confused picture of project desirability ranks. A clear thinking is needed so that confusion is not descending on the choice of projects. Hence the significance of capital budgeting.

### **RETURN ON INVESTMENT (ROI) AS A CRITERION FOR FUND ALLOCATION**

The prime object of making investments in any business is to obtain satisfactory return on capital invested. Hence, the return on capital employed also called as is used as a measure of Return on Investment (ROI) success of a business in realizing this objective. It is an overall profitability ratio. It indicates the percentage of return on the capital employed in the business and it can be used to show the efficiency of the business as a whole. ROI relates operating profit to average capital employed. That is:

$$\text{Returns on Capital employed} = \frac{\text{Operating Profit}}{\text{Average Capital employed}} \times 100$$

**Components:** Capital employed and operating profits are the main items. Capital employed may be defined in a number of ways. However, two widely accepted concepts are ‘gross capital employed’ and ‘net capital employed’. Gross capital employed usually means the total assets used in the business, while net capital employed refers to total assets minus current liabilities. On the other hand, it refers to the total of paid of capital, capital reserves, revenue reserves (including Profit and Loss a/c balance), debentures and long –term loans. Operating profit is profit before interest and tax.

#### *Computation of Capital Employed*

It may be computed from the asset side as well as from the liabilities side.

Gross Capital employed = Fixed Assets + Investments + Current Assets

Net Capital employed = Fixed Assets + Investments + Working Capital  
(Current Assets minus Current Liabilities)

- *Fixed assets:* Land and buildings, Plant and Machinery, Furniture and Fittings, and motor Vehicles, etc, net of depreciation.
- *Investments made in business*
- *Current assets:* Inventories, Book Debts less provision for bad and doubtful debts, Bills Receivable, Bank, and Cash, etc.
- *Current liabilities:* Sundry Creditors, Bills Payable, Bank Overdraft, Outstanding expenses, etc.

Alternatively capital employed may be if it is calculated from the liabilities side.

*Share capital:* Equity and Preference Share Capital (issued and paid up capital)

*Reserve and surplus:* Capital Reserve, General Reserves, P&L A/C balance

Debentures

Other Long-term loans

#### *Precautions to be taken while computing capital employed*

- The valuation of fixed assets may be done at their replacement cost. The current market prices may be ascertained either by reference to reliable published index numbers, or on valuation of experts. At the same time the provision for depreciation should also be readjusted.
- All the assets should be excluded from the computations. However, standby plant and equipment required for normal working may be included.
- All intangible assets like goodwill, patents and trademarks unless they have potential sales value and all fictitious assets like preliminary expenses, discount on issue of shares, etc., should be excluded.



- All investments made outside the business should be excluded.
- All current assets should be properly valued. Any excess bank balance, which is more than the normal requirements, should not be considered.

Some people suggest that average capital employed should be used in order to give effect to the capital investment throughout the year. It is argued that the profits earned remain in the business throughout the year and are distributed by way of dividends only at the end of the year. Average capital employed may be calculated by two methods. Under the first method, only the simple arithmetic mean of the total capital employed at the beginning and at the end of the year is found out. Under the second method, it is calculated by adding half of the profits after tax and interest to the opening capital employed. When net capital employed has been calculated either from the asset side or liabilities side of year end balance sheet, half of the profits earned during the year may be deducted from the figure so computed in order to arrive at 'average capital employed'.

Operating profit used for the computation of return on capital employed should be the profits earned by such capital. Hence, the net profit should be adjusted, if necessary, for obtaining the true operating profit with the following items:

- Any abnormal and non-recurring losses or gains.
- Income from investments made outside the business.
- Depreciation based on the replacement cost of the asset.
- Interest on long-term loans and debentures should be added back.
- Profits before the payment of income tax.

#### Illustration 4.1

From the following financial statements, calculate Return on Capital employed.

Profit and Loss Account for the year ended 31-12-2002

To cost of goods sold	Rs. 1,50,000	By Sales	Rs. 2,50,000
To Interest on debentures	5,000	By Income from investment	5,000
To provision for Taxation	50,000		
To Net Profit c/d	50,000		
	2,55,000		2,55,000

#### Balance Sheet as on 31-12-2002

Liabilities	Rs.	Assets	Rs
Share Capital :		Fixed Assets	2,25,000
Preference	50,000	Investments in Govt. Bonds	50,000
Equity	1,00,000	Current Assets	75,000

Reserves	50,000		
P & L A/C	50,000		
10% Debentures	50,000		
Provision for Taxation	50,000		
	3,50,000		3,50,000

**Solution**

$$\text{Return on Capital employed} = \frac{\text{Operating Profit}}{\text{Average Capital employed}} \times 100$$

Operating profit = Net Profit before interest and tax minus income from investments

$$= \text{Rs. } 50,000 + 5,000 + 50,000 - 5,000 = \text{Rs. } 1,00,000$$

(To the net profit figure Rs. 50000, interest and tax provisions made are added and income from investment in Govt. bonds is subtracted)

Capital employed = Fixed Assets + Current Assets – Provision for Taxation

$$= \text{Rs. } 2,25,000 + 75,000 - 50,000 = \text{Rs. } 2,50,000$$

or

$$= \text{Share Capital} + \text{Reserves} + \text{P \& L a/c} + \text{Debentures}$$

$$= \text{Rs. } 1,50,000 + 50,000 + 50,000 + 50,000$$

$$= \text{Rs. } 2,50,000$$

Average Capital employed = Capital employed –  $\frac{1}{2}$  (Profits earned during the year)

$$= \text{Rs. } 2,50,000 - 50,000 = \text{Rs. } 2,00,000$$

$$\text{Return on Average Capital employed} = \frac{\text{Rs. } 1,00,000}{\text{Rs. } 2,00,000} \times 100 = 50\%$$

or

$$\text{Return on Closing Capital employed} = \frac{\text{Rs. } 1,00,000}{\text{Rs. } 2,50,000} \times 100 = 40\%$$

*Significance:* Return on Capital employed is considered to be the best measure of profitability in order to assess the overall performance of the business satisfactorily. It is commonly used as a basis for various managerial decisions since it relates to the benefits obtained in the form of income with the sacrifice made in the form of capital invested.

A starting point in budgeting and management planning is the determination of a minimum rate of return on capital invested. All business decisions should result in a reasonable (minimum) return. Investments, which generate rates lower than this minimum rate of return, are rejected. However, it is very difficult to set a standard

rate of return on capital employed as a number of factors such as business risk, the type of industry, inflation, changes in economic conditions, etc., may influence such a rate. Different views prevail with regard to standard rate. Bank rate, discount rates of gilt-edged securities or some opportunity cost rate are some of the suggested rates as the norm for this ratio. However, it is left to the discretion of managements to set some rate against which they are to compare the actual result with a view to measuring their efficiency, or the overall performance of the business. This ratio could be supplemented with a number of ratios depending upon the purpose for which it is computed.

*Advantages of the concept of “return on capital employed”*

- It is the only measure, which can be said to show satisfactorily the benefits being obtained for the sacrifice involved, the latter being represented by capital invested.
- It allows external comparisons to be made. The progress of one company or companies may be compared with that of other companies.
- It is an effective tool for making an internal comparison in respect of different divisions or departments of a company. It may be used as an instrument of control by comparing the relative profitability of different products.
- It enables the management to make efficient capital budgeting decisions. It can become an integral part of the budgetary control system.
- It gives ideas for analysis and decisions to bring about effective changes in the financial policies. For example, there should be no borrowing when the rate of interest is higher than the rate of return.
- If management ensures that an adequate return on capital invested is earned, then many direct benefits such as regular and satisfactory dividends to shareholders, adequate strength to face competition, etc., may accrue to the business concern.

*Return on owners fund (ROOF)*

ROOF is the ratio of net profit to shareholders’ investment. This ratio established the profitability from the shareholders’ point of view. This is a slightly different ROI we so far dealt with.

$$\text{ROOF} = \text{Return on Shareholders' Funds} = \frac{\text{Net Profit after interest and tax}}{\text{Shareholders' Funds}} \times 100$$

*Components:* The term ‘Net Profit’ as used here, means ‘Net Income’ available for distribution as dividends to shareholders, i.e., income after payment of interest and tax, including net non-operating income (non-operating income minus non-operating expenses). Shareholders’ funds include both preference and equity share capital and all reserves and surplus belonging to shareholders.

*Significance:* This ratio is another effective measure of the profitability of a business. It is one of the most important relationships in financial statement analysis. It is an index to know whether the main objective of the business, i.e., realization of satisfactory

net income, has been achieved. It is useful for inter-industry comparisons. But if the comparisons are made between two companies belonging to two different industries, the value of this ratio would be very much limited since the margins and operating costs among industries may vary widely.

### *Return on equity (ROE)*

This ratio relates the net profits finally available to equity shareholders to the amount of capital invested by them. Alternatively, this ratio could be derived dividing the profits available to equity shareholders by the share capital held by them.

$$\text{Return on Equity} = \frac{\text{Net Profit after interest, Tax and Preference Dividend}}{\text{Equity}} \times 100$$

Components: As the profits used for the calculation are the final profits available to equity shareholders as dividends, the preference dividend and taxes are deducted in order to arrive at such profits. Equity includes equity share capital and reserves and surplus.

### **Illustration 4.2**

Calculate the EPS or Return on Equity Capital for the following information:

Equity Share Capital (RS. 10 each)	Rs. 10,00,000
9% Preference Share Capital (RS. 100 each)	Rs. 5,00,000
Taxation rate:	50%
Net Profit before tax:	Rs. 4,00,000

$$\text{Return on Equity Capital} = \frac{\text{Net Profit after Tax and Preference Dividend}}{\text{Equity Share Capital}} \times 100$$

$$\begin{aligned} \text{Average dividend} &= 9\% \text{ of Rs. } 5,00,000 = \text{Rs. } 45,000 \\ &= \frac{4,00,000 - (\text{Rs. } 2,00,000 + 45,000)}{\text{Rs. } 10,00,000} \times 100 \\ &= \frac{\text{Rs. } 1,55,000}{10,00,000} \times 100 = \text{Rs. } 15.50 \% \end{aligned}$$

$$\text{Earnings per Share (EPS)} = \frac{\text{Net Profit after Tax and Preference Dividend}}{\text{No. of Equity Share}}$$

$$\text{EPS} = \frac{\text{Rs. } 1,55,000}{1,00,000} = \text{Rs. } 1.55 \text{ per share}$$

*Significance:* This ratio indicates what percentage of profits earned and enjoyed by equity shareholders. Return on equity capital or EPS helps to determine the market price of equity share of the company. By comparing the ratios of other companies, it will indicate whether the capital is effectively used or not.

#### *Return on total resources or total assets*

This ratio relates the net profit after tax and interest to the total productive assets used. This ratio is computed to find out the productivity of the total assets.

$$\text{Return on Total Assets} = \frac{\text{Net Profit after Tax and interest}}{\text{Total Assets - Fictitious Assets}} \times 100$$

## **ADVANCED METHODS OF CAPITAL BUDGETING**

There are certain advanced techniques of capital budgeting like decision free analysis, CAPM, simulation analysis, sensitivity analysis, etc. These are dealt below now.

### **Decision tree approach**

Decision tree approach is a versatile tool used for decision making under conditions of risk. The features of this approach are: (i) it takes into account the results of all expected outcomes, (ii) it is suitable where decisions are to be made in sequential parts - that is, if this has happened already, what will happen next and what decision has to follow, (iii) every possible outcome is weighed using joint probability model and expected outcome worked out, (iv) a tree-form pictorial presentation of all possible outcomes is developed here and hence the term decision-tree is used. An example will make understanding easier.

An entrepreneur is interested in a project, say introduction of a fashion product for which a 2 year market span is foreseen, after which the product turns fade and that within the two years all money invested must be realised back in full. The project costs Rs. 4,00,000 at the time of inception.

During 1<sup>st</sup> year, three possible market outcomes are foreseen. Low penetration, moderate penetration and high penetration are the three outcomes, whose probability values, respectively, are 0.3, (i.e., 30% chance), 0.4 and 0.3 and the cash flows after tax under the three possible outcomes are respectively estimated to be Rs. 1,60,000, Rs. 2,20,000 and Rs. 3,00,000.

The level of penetration during the 2<sup>nd</sup> year is influenced by level of penetration in the first year. The probability values of different penetration levels in the 2<sup>nd</sup> year given the level of penetration in the 1<sup>st</sup> year and respective cash flows are estimated as follows.

Level of penetration in year 2	If low penetration in first year		If moderate penetration in first year		If high penetration in first year	
	Cash flow year 2		Cash flow year 2		Cash flow year 2	
	Amount	Prob.	Amount	Prob.	Amount	Prob.
Low	80,000	0.2	2,60,000	0.3	3,20,000	0.1
Moderate	2,00,000	0.6	3,00,000	0.4	4,00,000	0.8
High	3,00,000	0.2	2320,000	0.3	4,80,000	0.1

How do you read the above table? It is very simple. If low penetration resulted in 1<sup>st</sup> year, low presentation in 2<sup>nd</sup> year with probability of 0.2 and cash flow of Rs. 80,000, moderate penetration in 2<sup>nd</sup> year with probability of 0.6 and cash flow of Rs. 2,00,000 and high penetration in 2<sup>nd</sup> year with probability of 0.2 and cash flow of Rs. 3,00,000 are possible. Similarly you can follow for other cases.

Combining 1<sup>st</sup> and 2<sup>nd</sup> year penetration levels together, 9 outcomes are possible. These are:

S. No.	1st Year penetration	2nd Year penetration	1st Year cash flow	1st Year probability (P1)	2nd Year cash flow	2nd Year probability (P1)	Joint probability (P1 x P2)
1	Low	Low	160000	.3	80000	.2	0.06
2	Low	Moderate	160000	.3	200000	.6	0.18
3	Low	High	160000	.3	300000	.2	0.06
4	Moderate	Low	220000	.4	260000	.3	0.12
5	Moderate	Moderate	220000	.4	300000	.4	0.16
6	Moderate	High	220000	.4	320000	.3	0.12
7	High	Low	300000	.3	320000	.1	0.03
8	High	Moderate	300000	.3	400000	.8	0.24
9	High	High	300000	.3	480000	.1	0.03
							1.00

At this stage, we may go for present value evaluation of these set of outcomes. And this is done below. For this we require a discounting rate. Let us take a 10% discount rate. Then the present value of Re. 1 receivable at 1<sup>st</sup> year end is 0.909 (i.e.  $1/1.1$ ) and at 2<sup>nd</sup> year end is Rs. 0.826 [i.e.,  $1/(1.1)^2$ ]. Now the present values of the 9 cash flow streams can be worked out. These values, the NPV relevant to each stream (i.e., the aggregate of the present value of the two cash flows of each stream minus the original investment Rs. 4,00,000), joint probability (i.e., product of probabilities of the cash flows of each stream) and expected value of NPV (i.e., joint probability times NPV of each stream) are given below in table.

Table 4.5

S. No.	PV of 1 <sup>st</sup> Year flow	PV of 2 <sup>nd</sup> Year flow	PV of both year flow	NPV of each stream	Joint Prob.	Expected NPV
1	145440	50080	195520	-204480	0.06	- 12269
2	145440	165200	310640	-89360	0.18	- 16085
3	145440	247800	393240	-6760	0.06	- 403
4	199980	214760	414740	14740	0.12	1709
5	199980	247800	447780	47780	0.16	7645
6	199980	264320	464300	64300	0.12	7716
7	272700	264320	537120	137130	0.03	4111
8	272700	330400	603100	203100	0.24	48744
9	272700	346920	619620	219620	0.03	6889
				Total	1.00	47395

The expected NPV of the project is negative at Rs. 12269 if low penetration prevailed both in the 1<sup>st</sup> and 2<sup>nd</sup> year and this has a probability of 6 out of 100 or .06. The expected NPV is negative at Rs. 16085, if low penetration in 1<sup>st</sup> year and moderate penetration in 2<sup>nd</sup> year prevailed and the probability of this happening is 18%. S.No.8 tells are NPV of Rs. 48744 with probability of 24% is possible when high penetration in first year and moderate penetration in the 2 year result. *The expected NPV of the project is the aggregate of the expected NPVs of the different streams = Rs. 47395. Since, it is positive, the project may be taken up.*

### Capital asset pricing model (CAPM)

Capital Asset Pricing Model (CAPM) is one of the premier methods of evaluation of capital investment proposals. CAPM gives a mechanism by which the required rate of return for a diversified portfolio of projects can be calculated given the risk. According to CAPM the required rate of return comprised of two parts: first, a risk-free rate of return and second a risk premium for the amount of systematic risk of the portfolio. The formula is:

$$\text{Required rate of return} = R_f + (R_m - R_f)B_i, \text{ when}$$

$R_f$  – risk free rate return

$R_m$  – return on market portfolio

$B_i$  – Beta or risk coefficient of the evaluated portfolio given market portfolio beta =1

CAPM, therefore, gives a risk-return relationship for portfolio of assets.

We have to calculate the required rate of return for the capital project given its beta coefficient, risk free return and market return. Then get the estimated return for the project. If the estimated return for the project is greater than or equal to the required rate of return accept the project. Otherwise reject the project.

The risk-free return is the rate of return obtainable on risk free investments, like investment in government bonds.

The market rate of return is the grand average rate of return obtainable in the market representative portfolio. A surrogate for this can be return of representative market indices like NASDAG, DOW JONES INDUSTRIAL, S&P 500, BSE SENSEX (India), and the like.

Beta of the project is covariance between returns of the project and the chosen market portfolio dividend by variance of the return on the market portfolio. The returns referred to here can be historical or future expected or both. So, given the returns (expected or actual) of the market portfolio over a period of time and those of the capital project over the same time horizon as above, beta of the project can be calculated. The formula is:

$$\text{Beta} = \frac{\Sigma(R_m - MR_m)(R_i - MR_i)}{\Sigma(R_m - MR_m)^2}$$

When  $R_m$  = returns on market portfolio over times

$MR_m$  = mean returns on market portfolio

$R_i$  = returns on the capital project over times

$MR_i$  = mean return on the capital project

Suppose the following are the  $R_m$  and  $R_i$  for 5 years given in rows (i) and (ii) below. Beta is computed based on the above formula as given in the rest of the rows below in table 4.6.

**Table 4.6**

	1	2	3	4	5	Total
i) $R_m$	14	16	10	22	-2	60
ii) $R_i$	15	18	15	28	-6	70
iii) $R_m - MR_m$	+2	+4	-2	+10	-14	0
iv) $R_i - MR_i$	1	4	1	14	-20	0
v) = (iii) (iv)	2	16	-2	140	280	436
vi) $(R_m - MR_m)^2$	4	15	4	100	196	320

$$MR_m = 60/5 = 12 \text{ and}$$

$$MR_i = 70/5 = 14$$

$$\beta = \text{Beta} = \frac{\Sigma(R_m - MR_m)(R_i - MR_i)}{\Sigma(R_m - MR_m)^2} \\ = 436 / 320 = 1.365$$

$$\text{Let } R = 8\%$$

$$\begin{aligned} \text{Required rate of return} &= R_f + (R_m - MR_m) \beta \\ &= 8\% + (12 - 8\%) 1.3625 \\ &= 8\% + 5.45\% = 13.45\% \end{aligned}$$

The mean  $R_i = 14\%$ . So, the actual or expected return is greater than the required return. This project can be accepted.



CAPM assumes perfect capital market, free flow of information, homogeneous risk-return expectations of investors, that diversification thoroughly reduces the unsystematic risk, existence of representative market portfolio and so on.

### Simulation analysis

When uncertainty haunts in the estimation of variables in a capital budgeting exercise, simulation technique may be used with respect to a few of the variables, taking the other variables at their best estimates.

We know that P, V, F, Q, T, K, I, D and N are the important variables. (P - Price per unit of output, V - Variable cost per unit of output, F - Fixed cost of operation, Q - Quantity of output, T - Tax rate, K - Discount rate or cost of capital, I - Original investments, D - Annual depreciation and N - Number of years of the project's life).

Suppose in a project, P, V, F, Q, N and I are fairly predictable but 'K' and 'T' are playing truant. In such cases, the K and T will be dealt through simulation while others take given values.

Suppose that P = Rs. 300/unit, V = Rs. 150/unit, F = Rs. 15,00,000/p.a., Q=20,000/p.a., N=3 years and I=Rs. 18,00,000. Then annual profit before tax =  $[(P-V)Q] - F - D = [(300-150) \times 20000] - 15,00,000 - 6,00,000 = \text{Rs. } 9,00,000/\text{p.a.}$

The profit after tax and hence cash flow cannot be computed as tax rate, T is not predictable. Further as 'k' is not predictable, present value cannot be computed as well. So, we use simulation here.

Simulation process gives a probability distribution to each of the traunt playing variables. Let the probability distribution for 'T' and 'K' be as follows:

T		K	
Probability	Value	Probability	Value
0.20	30%	0.30	10%
0.50	35%	0.50	11%
0.30	40%	0.20	12%

Next, we construct cumulative probability and assign random number ranges, as follows separately for T and K. Two digit random number ranges are used. We start with 00 and end with 99, thus using 100 random numbers. For the different values of the variable in question, as many number of random numbers as are equal by the probability values of respective values are used. Thus, for variable T, 20% of random numbers aggregated for its first value 30% and 50% of random number for its next value 35% and 30% of random numbers for its next value 40% are used.

**Table 4.7 Cumulative probability and random number range**

Value	Probability	Cumulative Probability	Random no. range	Value	Probability	Cumulative Probability	Random no. range
30%	0.20	0.20	00-19	10%	0.30	0.30	00-29
35%	0.50	0.70	20-69	1%	0.50	0.80	30-79
40%	0.30	1.00	70-99	12%	0.20	1.00	80-99

For the first value of the unpredictable variable, we assign random number 00 to 19. For the second value was assign random numbers 20-69 and for the third value 70-99 are assigned. Similarly for the variable 'K' random numbers are assigned. These are given in the above Table.4.7.

Simulation process now involves reading from random number table, random number pairs (one for 'T' and another for 'K'). The values of 'T' and 'K' corresponding to the random numbers read are taken from the above table 4.7. Suppose the random numbers read are: 48 and 80. Then 'T' is 35% as the random number 48 falls in the random number range 20-69 corresponding to 35% and 'K' is 12% as the read random number 80 falls in the random number range 80-99 corresponding to 12%. Now taking the T = 35% and K = 12%, the NPV of the project can be worked out. We know that the project gives a PBT of Rs. 9,00,000/p.a for 3 years. So, the PAT = 9,00,000 - Tax @ 35% = Rs. 9,00,000 - 3,15,000 = Rs. 5,85,000 p.a. To this we have to add depreciation Rs. 6,00,000 (i.e. Rs. 18,00,000/3 years) to get the cash flow. So, the cash flow = 5,85,000 + 6,00,000 = Rs. 11,85,000 p.a.

$$\begin{aligned}
 \text{NPV} &= \frac{n}{\sum_{T=1}^n} \text{CF}_t / (1+k)^t - I \\
 &= (11,85,000/1.12 + 11,85,000/1.12^2 + 11,85,000/1.12^3) - 18,00,000 \\
 &= 11,85,000 \times 2.4018 - 18,00,000 \\
 &= 28,56,798 - 18,00,000 = \text{Rs. } 10,56,798
 \end{aligned}$$

We have just taken one pair of random numbers from the random number table and calculated the NPV is Rs. 10,56,798.

This process must be repeated at least 20 times, reading 20 pairs of random numbers and getting the NPV for values of T and K corresponding to each pair of random numbers read. Suppose the next pair of random numbers is 28 and 49. Corresponding 'T' = 35% and 'K' = 11%. Then the PAT = PBT - T = 9,00,000 - 3,15,000 = 5,85,000. The cash flow = 5,85,000 + 6,00,000 = Rs. 11,85,000.

$$\text{NPV} = \frac{n}{\sum_{T=1}^n} \text{CF}_t / (1+k)^t - I$$

$$\begin{aligned}
&= (11,85,000/1.11 + 11,85,000/1.11^2 + 11,85,000/1.11^3) - 18,00,000 \\
&= 10,67,598 + 9.61,773 + 8,66,462) - 18,00,000 \\
&= 28,95,803 - 18,00,000 = \text{Rs. } 10,95,803
\end{aligned}$$

Similarly the NPV for other simulations may be obtained. Thus computed NPVs may be averaged and if the same is positive the project may be selected.

### Sensitivity analysis

Sensitivity analysis attempts to study the level of sensitivity of project worth, say the NPV, for changes in a key influencing factor, keeping influence of all other influencing factors at constant level.

Sensitivity analysis presumes uncertainty of the values of all or some of the influencing factors. For such factors, the range of their values and most likely values are given. Other factors take constant values.

We know that NPV of a project is influenced by P, V, Q, F, I, N, D, T and K. Let F, I, N, D and K are constant at Rs. 15,00,000, Rs. 18,00,000, 3 years, Rs. 6,00,000 and 15% P, V, Q and T are hence the uncertain variables. Let their range of values and most likely values be as follows:

$$\begin{aligned}
&\text{P: Rs. } 200 - \text{Rs. } 350; \text{ Most Likely value Rs. } 300 \\
&\text{V: Rs. } 100 - \text{Rs. } 250; \text{ Most Likely value Rs. } 150 \\
&\text{Q: } 15000 - 22000; \text{ Most Likely value } 20,000 \\
&\text{T: } 30\% - 40\%; \text{ Most Likely value } 35\%
\end{aligned}$$

Suppose we want to study the sensitivity of NPV with respect to 'T', then other uncertain variables, namely, P, V and Q will be assigned their most likely values. Needless to say, the variables taking constant values will take their fixed values. The variable 'T' will be taking different values within the range of its values. For each such values of T, the NPV will be worked out and sensitivity of the NPV to that factor is analysed.

Accordingly, for our purpose: I = Rs. 18,00,000, N = 3 years, D = Rs. 6,00,000, F = Rs. 15,00,000, k = 15%. P, V and Q at their most likely values: Rs. 300, Rs. 150 and 20,000 units. 'T' shall take different values within its range, say 30%, 32.5%, 35%, 37.5% and 40%. For each of these 5 values of T, NPV will be worked out and sensitivity of NPV analysed.

First let T be 30%. The annual cash flow is:

$$\begin{aligned}
&= [(P - V)Q - F - D](1 - T) + D \\
&= [(300-150)20000 - 15,00,000 - 6,00,000] (1-30\%) + 6,00,000 \\
&= [30,00,000 - 21,00,000](0.70) + 6,00,000 \\
&= 9,00,000 (0.70) + 6,00,000 \\
&= \text{Rs. } 12,30,000 \text{ p.a.} \\
\text{NPV} &= (12,30,000/1.5 + 12,30,000/1.15^2 + 12,30,000/1.15^3) - 18,00,000 \\
&= 28,08,369 - 18,00,000 = \text{Rs. } 10,08,369
\end{aligned}$$

Let T be 32.5%. The annual cash flow is :

$$\begin{aligned}
 &= [(P - V)Q - F - D](1 - T) + D \\
 &= [(300-150)20000 - 15,00,000 - 6,00,000] (1-32.5\%) + 6,00,000 \\
 &= [30,00,000 - 21,00,000](0.675) + 6,00,000 \\
 &= 9,00,000 (0.675) + 6,00,000 \\
 &= \text{Rs. } 12,07,500 \text{ p.a.}
 \end{aligned}$$

$$\begin{aligned}
 \text{NPV} &= (12,07,500/1.15 + 12,07,500/1.15^2 + 12,07,500/1.15^3) - 18,00,000 \\
 &= 27,56,994 - 18,00,000 = \text{Rs. } 9,56,994
 \end{aligned}$$

Let T be 35%. The annual cash flow is :

$$\begin{aligned}
 &= [(P - V)Q - F - D](1 - T) + D \\
 &= [(300-150)20000 - 15,00,000 - 6,00,000] (1-35\%) + 6,00,000 \\
 &= [30,00,000 - 21,00,000](0.65) + 6,00,000 \\
 &= 9,00,000 (0.65) + 6,00,000 \\
 &= \text{Rs. } 11,85,000 \text{ p.a.}
 \end{aligned}$$

$$\begin{aligned}
 \text{NPV} &= (11,85,000/1.15 + 11,85,000/1.15^2 + 11,85,000/1.15^3) - 18,00,000 \\
 &= 27,05,622 - 18,00,000 = \text{Rs. } 9,05,622
 \end{aligned}$$

Let T be 37.5%. The annual cash flow is :

$$\begin{aligned}
 &= [(P - V)Q - F - D](1 - T) + D \\
 &= [(300-150)20000 - 15,00,000 - 6,00,000] (1-37.5\%) + 6,00,000 \\
 &= [30,00,000 - 21,00,000](0.625) + 6,00,000 \\
 &= 9,00,000 (0.625) + 6,00,000 \\
 &= \text{Rs. } 11,62,500 \text{ p.a.}
 \end{aligned}$$

$$\begin{aligned}
 \text{NPV} &= (11,62,500/1.15 + 11,62,500/1.15^2 + 11,62,500/1.15^3) - 18,00,000 \\
 &= 26,54,249 - 18,00,000 = \text{Rs. } 8,54,249
 \end{aligned}$$

Let T be 40%. The annual cash flow is :

$$\begin{aligned}
 &= [(P - V)Q - F - D](1 - T) + D \\
 &= [(300-150)20000 - 15,00,000 - 6,00,000] (1-40\%) + 6,00,000 \\
 &= [30,00,000 - 21,00,000](0.6) + 6,00,000 \\
 &= 9,00,000 (0.6) + 6,00,000 \\
 &= \text{Rs. } 11,40,000 \text{ p.a.}
 \end{aligned}$$

$$\begin{aligned}
 \text{NPV} &= (11,40,000/1.15 + 11,40,000/1.15^2 + 11,40,000/1.15^3) - 18,00,000 \\
 &= 26,02,876 - 18,00,000 = \text{Rs. } 8,02,876
 \end{aligned}$$

You might have noted that as T rises NPV falls.

Rate of change in NPV for a given change in T.

When T rises to 32.5% (i.e., 0.325) from 30% (i.e., 0.3) NPV falls to Rs. 9,56,994 from Rs. 10,08,369.

$$\begin{aligned}\text{Rate of change} &= \frac{\Delta\text{NPV}/\text{NPV}}{\Delta\text{T}/\text{T}} \\ &= \frac{-513751008369}{0.025/0.3} = \frac{-0.0509}{0.0833} = -0.61\end{aligned}$$

When T rises to 35% (i.e., (0.35) from 32.5% (i.e., 0.325) NPV falls to Rs. 9,05,622 from Rs. 9,56,994.

$$\begin{aligned}\text{Rate of change} &= \frac{\Delta\text{NPV}/\text{NPV}}{\Delta\text{T}/\text{T}} \\ &= \frac{-51372/956994}{0.025/0.325} = \frac{-0.05368}{0.07692} = -0.698\end{aligned}$$

When T rises to 37.5% from 35% NPV falls to Rs. 8,54,249 from Rs. 9,05,622.

$$\begin{aligned}\text{Rate of change} &= \frac{\Delta\text{NPV}/\text{NPV}}{\Delta\text{T}/\text{T}} \\ &= \frac{-51373/905622}{0.025/0.35} = \frac{-0.0567}{0.0714} = -0.794\end{aligned}$$

When T rises to 40% from 37.5% NPV falls to Rs. 8,02,816 from Rs. 8,54,249.

$$\begin{aligned}\text{Rate of change} &= \frac{\Delta\text{NPV}/\text{NPV}}{\Delta\text{T}/\text{T}} \\ &= \frac{-51373/584249}{0.025/0.375} = \frac{-0.0601}{0.0667} = -0.9015\end{aligned}$$

The rate of fall in NPV is rising with the rise in tax rate. Hence, NPV is highly negatively sensitive with tax rate.

We can study the sensitivity of NPV to 'T' in the form of a graph, taking NPV on the y-axis and T on the x-axis also. The slope of the resulting curve tells the sensitivity of NPV to tax rate.

We can do the sensitivity analysis of NPV with respect to another uncertain variables, say 'P' keeping V, Q and T at their most likely values, other variables at their fixed values and changing the value of P within its given range of values. Similarly, we can do the sensitivity analysis of NPV with respect to V, keeping P, Q and T at their most likely values, other variables at their fixed values and changing the value of V within its given range of values. So, also we can replicate the sensitivity with respect to 'Q'.

Now of the 4 uncertain variables, namely, P, V, Q and T, with respect to which the NPV is most sensitive can be seen. Knowledge of the same will help monitoring the project with respect to those variables very ably. Hence the utility of sensitivity analysis.

## BASIC METHODS OF CAPITAL BUDGETING FOR ADVANCED PROBLEMS

Basic methods of capital budgeting include payback period, accounting rate of return, internal rate of return and not present value technique. Since you have knowledge of these and you have studied these in your 2<sup>nd</sup> year of study, straight away a couple of problems are taken.

### Illustration 4.4

A firm is currently using a machine purchased two years ago for Rs. 14,00,000. It has further 5 years of life. It is considering replacing of the machine with a new one which will cost Rs. 28,00,000. Cost of installation Rs. 2,00,000. Increase in working capital is Rs. 4,00,000. The profits before tax and depreciation are as follows for the two machines.

Year	1	2	3	4	5
Current					
Machine (Rs.)	6,00,000	6,00,000	6,00,000	6,00,000	6,00,000
Current					
Machine (Rs.)	10,00,000	12,00,000	14,00,000	18,00,000	20,00,000

The firm adopts fixed installment method of depreciation. Tax rate is 40% and capital gain tax is 10% on inflation un-adjusted capital gain.

Is it desirable to replace the current machine by the new one, taking the resale value of old machine at Rs. 16,00,000 at present and using, PBP, ARR, NPV and IRR? (For NPV method take 10% as discount rate, for ARR method cutoff rate is 15% and for PBP method cutoff period is 3.5 years).

### Solution

First we have to calculate the size of investment needed. This includes, purchase cost of new machine, cost of installation and working capital addition needed, reduced by net sale proceeds (after capital gain tax) of old machine.

The old machine's original cost	= Rs. 14,00,000
Depreciation for the past 2 years	
@ Rs. 2,00,000 [14,00,000 / life 7 years]	Rs. 4,00,000
	<hr/>
	Rs. 10,00,000
It is sold for	Rs. 16,00,000
	<hr/>
Total gain	Rs. 6,00,000

This gain has two components. capital gain and revenue gain. Capital gain = Rs. Sale Value - original cost = Rs. 16,00,000 - Rs. 14,00,000 = Rs. 2,00,000. Revenue gain = Total gain - capital gain = Rs. 6,00,000 - Rs. 4,00,000 = Rs. 2,00,000. Tax on revenue gain = Rs. 4,00,000 × 40% = Rs. 1,60,000. Tax on capital gain

$=2,00,000 \times 10\% = 20,000$ . Therefore, after tax adjustment, net sales proceeds of old machine = Rs. 16,00,000 - Rs. 20,000 - Rs. 1,60,000 = Rs. 14,20,000. Now we can compute net investment at time zero, i.e. at beginning as follows:

Cost of new machine	:	Rs. 28,00,000
Add installation cost	:	Rs. 2,00,000
Cost of machine	:	<u>Rs. 30,00,000</u>
Add. Addl. Working Capital	:	<u>Rs. 4,00,000</u>
		Rs. 34,00,000
Less net sale proceeds of old machine	:	<u>Rs. 14,20,000</u>
Net Investment	:	Rs. 19,80,000

Now we have to calculate change or investment in cash flow because of the firm going for replacement of old machine by new one. For this purpose, what is the cash flow from new machine and what would be the cash flow from old machine had the firm continued with that must be computed. The difference of former over the latter is the change in cash flow.

First let us take cash flow from new machine

Details	Year 1	Year 2	Year 3	Year 4	Year 5
PBT&D	10,00,00	12,00,000	14,00,000	18,00,000	20,00,000
Less depreciation (30,00,000 I 5)	<u>6,00,00</u>	<u>6,00,000</u>	<u>6,00,000</u>	<u>6,00,000</u>	<u>6,00,000</u>
PBT	4,00,000	6,00,000	8,00,000	12,00,000	14,00,000
Less Tax @ 40%	<u>1,60,000</u>	<u>2,40,000</u>	<u>3,20,000</u>	<u>4,80,000</u>	<u>8,40,000</u>
PAT	2,40,000	3,60,000	4,80,000	7,20,000	8,40,000
Add depreciation	6,00,000	6,00,000	6,00,000	6,00,000	6,00,000
Add working capital					
Recovery at years					<u>4,00,000</u>
(1) cash flow	<u>8,40,000</u>	<u>9,60,000</u>	<u>10,80,000</u>	<u>13,20,000</u>	<u>18,00,000</u>

Second, let us take cash flow from old machine

Details	Year 1	Year 2	Year 3	Year 4	Year 5
PBT&D	6,00,00	6,00,000	6,00,000	6,00,000	6,00,000
Less depreciation (14,00,000 I 7)	<u>2,00,00</u>	<u>2,00,000</u>	<u>2,00,000</u>	<u>2,00,000</u>	<u>2,00,000</u>
PBT	4,00,000	4,00,000	4,00,000	4,00,000	4,00,000
Less Tax @ 40%	<u>1,60,000</u>	<u>1,60,000</u>	<u>1,60,000</u>	<u>1,60,000</u>	<u>1,60,000</u>
PAT	2,40,000	2,40,000	2,40,000	2,40,000	2,40,000
Add depreciation	<u>200,000</u>	<u>2,00,000</u>	<u>2,00,000</u>	<u>2,00,000</u>	<u>2,00,000</u>

(2) cash flow	4,40,000	4,40,000	4,40,000	4,40,000	4,40,000
Increment cash Flow = (1) – (2)	4,00,000	5,20,000	6,40,000	8,80,000	14,00,000
Cumulative $\Delta$ cash flow	4,00,000	9,20,000	15,60,000	24,40,000	38,40,000

### Payback period (PBP) method evaluation

Fresh additional investment needs is Rs. 19,80,000. Upto 3 years from now, Rs. 15,60,000 cumulative cash flow is got. So, PBP is 3 years plus that fraction of 4<sup>th</sup> year to recover balance Rs. 4,20,000 (i.e., Rs. 19,80,000 - Rs. 15,60,000). The fraction of year =  $4,20,000/8,80,000 = 0.4772$  a year. So, pay back period = 3.4772 years or 3 years and 5.8 months. The project's PBP of 3.4772 years is less than the cut off period is 3.5 years. So, replacement is advisable.

### ARR method of evaluation

For ARR method, we have to get incremental PBT. This is computed as follows.

Details	Year 1	Year 2	Year 3	Year 4	Year 5
PBT: New machine	4,00,00	6,00,000	8,00,000	12,00,000	14,00,000
PBT: Old machine	4,00,000	4,00,000	4,00,000	4,00,000	4,00,000
$\Delta$ PBT	0	2,00,000	4,00,000	8,00,000	10,00,000

$$\text{Annual average } \Delta\text{PBT} = \sum \text{PBT}/5 = 24,00,000/5 = \text{Rs.}4,80,000$$

$$\text{Annual investment} = (\Delta\text{Investment} + \text{Working capital})/2$$

$$= (19,80,000 + 4,00,000)/2 = 11,90,000$$

$$\text{ARR} = (4,80,000 / 11,90,000) \times 100 = 40.34\%$$

*Note:* Working capital Rs. 4,00,000 introduced at the beginning is recoverable at the end of the last year and this is treated as salvage value.

### NPV method of evaluation (Discount rate 10%)

$$\begin{aligned} \text{NPV} &= \sum_{t=1}^n \text{CF}_t / (1+k)^t - I \\ &= (4,00,000/1.1 + 5,20,000/1.1^2 + 6,40,000/1.1^3 \\ &\quad + 8,80,000/1.1^4 + 14,00,000/1.1^5) - 19,80,000 \\ &= (3,63,636 + 4,29,752 + 4,80,841 + 6,01,051 + \\ &\quad 8,69,296) - 19,80,000 \\ &= 27,44,576 - 19,80,000 = \text{Rs. } 7,64,576 \end{aligned}$$

As  $\text{NPV} > 0$ , replacement is advised.



*IRR method of evaluation*

NPV at 10% discount rate is +ve. This itself shows that the  $IRR > 10\%$ . So, the replacement is advised. Any how, we can calculate IRR too. Let us take the assumed IRR as 20%. At 20%, the NPV is:  $20,51,826 - 19,80,000 = 71,826$ . So, IRR is still higher. Let using at 22% as assumed IRR. The  $NPV = 19,44,920 - 19,80,000 = -35,080$ . Since the NPV at 22% is negative and at 20% it is positive, IRR is  $> 20\%$  but  $< 22\%$ . We can interpolate as follows:

$$IRR = 20\% + (71826 / (71826 + 35080)) \times 2\% = 20\% + 1.34 = 21.34.$$

As the IRR at 21.34% is  $>$  cut-off IRR of 10% replacement is advised.

**Illustration 4.5**

A company brought a machine 2 years earlier at a cost of Rs. 60,000 and estimated its useful life as 12 years in all. Its current market price is Rs. 25,000. The management considers replacing this machine with a new one, life 10 years, price Rs. 1,00,000. The new machine can produce 15 units more per hour. The annual operating hours are 1000 both for new and old machines. Selling price per unit is Rs. 3. The new machine will involve addl. material cost Rs. 6,000 and labour Rs. 6,000 p.a. But savings in cost of consumable stores of Rs. 1000 and repairs by Rs. 1,000 p.a. will result. The corporate tax rate is 40%. Advice on the replacement assuming additional working capital of Rs. 10000 introduced now, can be redeemed at 10 years later, cost of capital as 10% and SLM of depreciation, using NPV method.

**Solution**

i) Computation cash outflow at present

Cash of new machine	: Rs. 1,00,000	
Add. Addl. Working capital	: Rs. 10,000	1,10,000
Less: Sales value of old machine	: Rs. 25,000	
Tax shield on loss of old machine (book value – market value) $\times$ tax rate [(50000 - 25000) $\times$ 40%]	: Rs. 10,000	35,000
		75,000

ii) Computation of Addl. Gross Income

$$\begin{aligned} \text{Addl. Production per annum} &= \text{Hours of operation} \times \text{Addl. Output per hour} \\ &= 1000 \times 15 = 15,000 \end{aligned}$$

$$\begin{aligned} \text{Addl. Gross income per annum} &= \text{Addl. Production p.a.} \times \text{unit price} \\ &= 15,000 \times \text{Rs.}3 = \text{Rs.} 45,000 \end{aligned}$$

From 1 year to 10th year, Rs. 45,000 addl. income is thus predicted.

## iii) Cash flow computation

Details	Year 1 to 9	Year 10
Addl. Gross income	45,000	45,000
Add: Savings in consumable stores & repairs	2,000	2,000
	47,000	47,000
Less: Addl. Material & Labour cost	12,000	12,000
PBD & T	35,000	35,000
Less: Addl. Depreciation (10000-5000)	5,000	5,000
PBT	30,000	30,000
Les Tax @ 40%	12,000	12,000
PAT	18,000	18,000
Addl. Depreciation	5,000	5,000
Add. Working capital recovery	--	10,000
Cash flow	23,000	33,000

$$NPV = \sum_{t=1}^9 \frac{CF_t}{(1+k)^t} + \frac{CF_{10}}{(1+k)^{10}} - I$$

Since uniform cash flow is found throughout 1st to 9th year, the NPV formulates can be slightly modified as:

$$\begin{aligned} NPV &= [ACF \sum_{t=1}^9 \frac{1}{(1+k)^t} + \frac{CF_{10}}{(1+k)^{10}}] - I \\ &= 23000 [1/1.1 + 1/1.1^2 + \dots + 1/1.1^9] + 33000 (1/1.1)^{10} - 75000 \\ &= (23000 \times 5.759) + (33000 \times 0.386) - 75000 \\ &= 145195 - 75000 = \text{Rs. } 70195. \end{aligned}$$

The replacement is advised.

**Illustration 4.6**

A company has 3 investment proposals. The expected PV of cash flows and the amount of investment needed are as below:

Project	Investment required	PV of cash flow
1	Rs. 2.00 lakhs	Rs. 2.90 lakhs
2	Rs. 1.15 lakhs	Rs. 1.85 lakhs
3	Rs. 2.70 lakhs	Rs. 4.00 lakhs

If projects 1 and 2 are jointly taken, there will be no economies or diseconomies. If projects 1 and 3 are undertaken, economies result in investment and combined investment will be Rs. 4.4 lakhs. If 2 and 3 are combined, the combined PV of cash

flow will be Rs. 6.2 lakhs. If all the 3 projects are combined, all the above economies will result but diseconomies in the form of additional investment of Rs. 1.25 lakhs will be needed. Find which projects be taken.

### Solution

Projects (1)	Invt.Needed (2)	PV of cash flows (3)	NPV 4 = (3) – (2)
1	2,00,000	2,90,000	90,000
2	1,15,000	1,85,000	70,000
3	2,70,000	4,00,000	1,30,000
1&2	3,15,000	4,75,000	1,60,000
1&3	4,40,000	6,90,000	2,50,000
2&3	3,85,000	6,20,000	2,35,000
1,2&3	6,80,000	9,10,000	2,30,000

Projects 1 & 3 will be chosen as NPV is higher.

## INCORPORATING RISK AND UNCERTAINTY IN CAPITAL PROJECT EVALUATION

**Meaning of ‘Risk’ and ‘Uncertainty’.** Risk with reference to capital (budgeting) investment decisions may be defined as the variability which is likely to occur in future between estimated return and actual return. Uncertainty is total lack of ability to pinpoint expected return.

Situations of pure risk, refer to contingencies which have to be protected against the normal insurance practice of pooling. For this to be so, risk situations are characterized by a considerable degree of past experience. Uncertainty on the other hand relates to situations in some sense unique and of which there is very little certain knowledge of some or all significant aspects.

### Technique of risk analysis

The techniques used to handle risk may be classified into the groups as follows:

- Conservative methods such as shorter payback period, risk-adjusted discount rate, and conservative forecasts or certainty equivalents etc., and
- Modern methods such as sensitivity analysis, probability analysis, decision-tree analysis etc.

#### Conservative methods

The conservative methods of risk handling are dealt with now.

1. *Shorter payback period:* According to this method, projects with shorter payback period are normally preferred to those with longer payback period. It would be more effective when it is combined with a “cut off period”. Cut off period denotes the risk tolerance level of the firms. For example, a firm has three projects. A, B and C

for consideration with different economic lives say 15, 16 and 8 years respectively and with payback periods of say 6, 7 and 5 years. Of these three, project C will be preferred, for its payback period is the shortest. Suppose, the cut off period is 4 years, then all the three projects will be rejected.

2. *Risk adjusted discount rate (RADR)*: Risk Adjusted Discount Rate is based on the same logic as the net present value method. Under this method, discount rate is adjusted in accordance with the degree of risk. That is, a risk discount factor (known as risk-premium rate) is determined and added to the discount factor (risk free rate) otherwise used for calculating net present value. For example, the rate of interest ( $r$ ) employed in the discounting is 10 per cent and the risk discount factor or degrees of risk ( $d$ ) are 2, 4 and 5 per cent for mildly risky, moderately risky and high risk (or speculative) projects respectively then the total rate of discount ( $D$ ) would respectively be 12 per cent, 14 per cent and 15 per cent.

That is  $RADR = \frac{1}{(8+r+d)}$ . The idea is the greater the risk the higher the discount rate.

That is, for the first year the total discount factor,  $D = \frac{1}{(1+r+d)}$  for the second year

$RADR = \frac{1}{(1+r+d)^2}$ ; and so on.

Normally, risk discount factor would vary from project to project depending upon the quantum of risk. It is estimated on the basis of judgement and intention on the part of management, which in turn are subject to risk attitude of management.

It may be noted that the higher the risk, the higher the risk adjusted discount rate, and the lower the discounted present value. The Risk Adjusted Discount Rate is composite of discount rate which combines both time and risk factors.

Risk Adjusted Discount Rate can be used with both N.P.V. and I.R.R. In the case of N.P.V. future cash flows should be discounted using Risk Adjusted Discount Rate and then N.P.V. may be ascertained. If the N.P.V. is positive, the project would qualify for acceptance. A negative N.P.V. would signify that the project should be rejected. If I.R.R. method is used, the I.R.R. would be computed and compared with the modified discount rate. If it exceeds modified discount rate, the proposal would be accepted, otherwise rejected.

#### *Merits of R.A.D.R. method*

- This technique is simple and easy to handle in practice.
- The discount rates can be adjusted for the varying degrees of risk in different years, simply by increasing or decreasing the risk factor ( $d$ ) in calculating the risk adjusted discount rate.

- This method of discounting is such that the higher the risk factor in the remote future is automatically accounted for. The risk adjusted discount rate is a composite rate which combines both the time and discount factors.

#### *Demerits of PADR method*

- The value of discount factor must necessarily remain subjective as it is primarily based on investor's attitude towards risk.
- A uniform risk discount factor used for discounting all future returns is unscientific as it implies the riskiness of investment remains same over the years whereas in practice is not so.

**Illustration.** The following details related to two projects X and Y.

	X Rs.	Y Rs.
Cost of outlay	20,000	20,000
Cost of inflows		
Year 1	8,000	10,000
Year 2	8,000	12,000
Year 3	4,000	6,000

Riskless rate of return is 5%. Project X is less risky as compared to Project Y. The management considers risk premium rates at 5% and 10% respectively appropriate for discounting the cash inflows. State which project is better?

Risk Adjusted Discount Rate will be:

$$\text{Project X : } 5 + 5 = 10\%$$

$$\text{Project Y : } 5 + 10 = 15\%$$

#### Calculation of N.P.V. AT R.A.D.R.

Year	Project X			Project y		
	Cash Inflows	P.V.F. at 10%	P.V.	Cash Inflows	P.V.F. at 10%	P.V.
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1	8,000	.909	7,272	10,000	.870	8,700
2	8,000	.826	6,608	12,000	.756	9,072
3	4,000	.751	3,004	6,000	.658	3,948
			16,884			21,720
	Less : Cost		20,000			20,000
	N.P.V.		- 3,116			+ 1,720

Since N.P.V. is positive in the case of Project Y, Y is superior to X.

3. *Certainty-equivalent coefficient approach*: This risk element in any decision is often characterized by the two Outcomes: the ‘potential gain’ at the one end and the ‘potential loss’ at the other. These are respectively called the focal gain and focal loss. In this connection, Shackle proposes the concept of “potential surprise” which is a unit of measurement indicating the decision-maker’s surprise at the occurrence of an event other than what he was expecting. He also introduces another concept – the “certainty equivalent” of risky investment. For an investment X with a given degree of risk, investor can always find another riskless investment  $X_1$  such that he is indifferent between X and  $X_1$ . The difference between X and  $X_1$  is implicitly the risk discount.

The riskiness of the project under this method is taken into account by adjusting the expected cash inflows and the discount rate. Thus the expected cash inflows are reduced to a conservative level by a risk-adjustment factor (also called correction factor). This factor is expressed in terms of Certainty – Equivalent Co-efficient which is the ratio of riskless cash flows to risky cash flows. Thus Certainty – Equivalent Co-efficient.

$$= \frac{\text{Riskless cash flows}}{\text{Risky cash flows}}$$

This co-efficient is calculated for cash flows of each year. The value of the co-efficient may vary between 0 and 1 and there is inverse relationship between the degree of risk and the value of co-efficient computed.

These adjusted cash inflows are used for calculating N.P.V. and the I.R.R. The discount rate to be used for calculating present values will be risk-free (i.e., the rate reflecting the time value of money). Using this criterion of the N.P.V. the project would be accepted, if the N.P.V. is positive, otherwise it would be rejected. The I.R.R. will be compared with risk free discount rate and if it is higher the project will be accepted, otherwise rejected.

### Illustration.

A company employs the certainty equivalent approach in the evaluation of risky investments. The capital budgeting department has processed the following information a new project:

Cost of initial investments: Rs. 1,00,000.

Cash inflows after tax:

Year	Amount Rs.	Certainty Equivalent Co-efficient
1	80,000	.8
2	70,000	.7
3	65,000	.6
4	60,000	.4
5	40,000	.3

The company's cost of equity capital is 18% its cost of debt is 9% and the riskless rate of interest in the market on government securities is 6%. Should the project be accepted?

### Solution

#### Calculation of N.P.V. of Adjusted Cash Inflows at Riskless Rate (6%)

Year	Cash Inflows	C.E.C	Adjusted Cash Inflows	P.V.F at 6%	P.V
(1)	(2)	(3)	(4)	(5)	(6)
1	80,000	.8	64,000	.943	60.352
2	70,000	.7	49,000	.890	43.610
3	65,000	.6	39,000	.840	32.760
4	60,000	.4	24,000	.792	19.008
5	40,000	.3	12,000	.747	8.964
					1,64,694
			Less : Cost		1,00,000
					N.P.V. + 64,694

Hence, project should be accepted.

4. *The finite-horizon method:* This method is similar to payback method applied under the condition of certainty. In this method, a terminal data is fixed. In the decision making, only the expected returns or gain prior to the terminal data are considered. The gains or benefit expected beyond the terminal data are ignored the gains are simply treated as non-existent. The logic behind this approach is that the developments during the period under consideration might render the gains beyond terminal date of no consequence. For example, a hydel project might go out of use when, say, after 50 years of its installation, the atomic or solar energy becomes available in abundance and at lower cost.

#### Modern methods of risk incorporation

These methods are already dealt under 4.4.

#### Risk analysis in the case of single project

Project risk refers to fluctuation in its payback period, ARR, IRR, NPV or so. Higher the fluctuation, higher is the risk and vice versa. Let us take NPV based risk.

If NPV from year to year fluctuate, there is risk. This can be measured through standard deviation of the NPV figures. Suppose the expected NPV of a project is Rs. 18 lakhs, and std. deviation of Rs. 6 lakhs. The coefficient of variation C V is given by std. deviation divided by NPV.

$$C,V = \text{Rs. } 6,00,000 / \text{Rs. } 18,00,000 = 0.33$$

### Risk return analysis for multi projects

When multiple projects are considered together, what is the overall risk of all projects put together? Is it the aggregate average of std. deviation of NPV of all projects? No, it is not. Then What? Now another variable has to be brought to the scene. That is the correlation coefficient between NPVs of pairs of projects. When two projects are considered together, the variation in the combined NPV is influenced by the extent of correlation between NPVs of the projects in question. A high correlation results in high risk and vice versa. So, the risk of all projects put together in the form of combined std. deviation is given by the formula:

$$\sigma_p = [\sum P_{ij} \sigma_i \sigma_j]^{1/2}$$

where,

$\sigma_p$  – combined portfolio std. deviation

$P_{ij}$  – correlation between NPVs of pairs of projects

$\sigma_i \sigma_j$  – std. Deviation of  $i^{\text{th}}$  and  $j^{\text{th}}$  projects, i.e., any pair of projects taken at a time.

Three projects have their std. deviations as follows: Rs. 4000, Rs. 6000 and Rs. 10000. The correlation coefficients for different pairs are 1&2: 0.6, 1&3: 0.78 and 2&3: -0.5. What is the overall std. deviation of the portfolio of projects?

$$\begin{aligned} \sigma_p &= [\sum P_{ij} \sigma_i \sigma_j]^{1/2} = [\sigma_1^2 + \sigma_2^2 + \sigma_3^2 + 2P_{12} \sigma_1 \sigma_2 + 2P_{23} \sigma_2 \sigma_3 + 2P_{13} \sigma_1 \sigma_3]^{1/2} \\ &= [4000^2 + 6000^2 + 10000^2 + 2 \times 0.6 \times 4000 \times 6000 + 2 \times 0.78 \times 6000 \times \\ &\quad 10000 + 2 \times (-0.5) \times 10000 \times 4000]^{1/2} \\ &= [6000000 + 36000000 + 100000000 + 28800000 + 93600000 \\ &\quad - 4.0000000]^{1/2} \\ &= [234400000]^{1/2} = \text{Rs. } 15,310. \end{aligned}$$

What is the return from these multiple projects? This is simple. It is the aggregate NPVs. Suppose the three projects have NPVs of Rs. 16,000, Rs. 20,000 and Rs. 44,000. The combined NPV = 16000 + 20000 + 44000 = Rs. 80000.

The combined coefficient of variation = combined std. deviation/combined NPV = Rs. 15340/Rs. 80000 = 0.19 = 19%. If we take the correlation factor unadjusted figures of combined std. deviation and combined NPVs, the coefficient of variation would have been: 20000/80000 = 0.25 = 25%. The correlation factor has resulted in reducing overall portfolio risk from 25% to 19%. This results essentially when there is low degree of positive correlation among the projects. More so if there is higher negative correlation among the projects.

**Illustration:** Three projects involve an outlay of Rs. 2,00,000, Rs. 3,00,000 and Rs. 5,00,000 respectively. The estimated return from the projects are 14%, 16% and 20%.



The std. deviation of returns are 5%, 10% and 10%. The correlation coefficients are 1&2: 0.4, 2&3: 0.6 and 1&3: 0.2. Find the portfolio return and risk.

### Solution

The portfolio or combined return is simply the weighted return of the projects. This is given by:  $\sum W_i R_i$  where  $w_i$  - is the weight (0.2, 0.3 and 0.5 for the three projects respectively) and  $R_i$  - is the respective project return.

Portfolio return =  $\sum W_i R_i$

$$= 0.2 \times 14\% + 0.3 \times 16\% + 0.5 \times 20\%$$

$$= 2.8\% + 4.8\% + 10\% = 17.6\%$$

$$(p = \text{Portfolio risk} = [\sum \sum W_i W_j \rho_{ij} \sigma_i \sigma_j]^{1/2}$$

$$= [W_1 W_2 \sigma_1 \sigma_2 + W_2 W_2 \sigma_1 \sigma_2 + W_3 W_3 \sigma_1 \sigma_2 + 2W_1 W_2 \rho \sigma_1 \sigma_2 + 2W_2 W_3 \rho \sigma_2 \sigma_3 + 2W_1 W_3 \rho \sigma_1 \sigma_3]^{1/2}$$

Putting the given values, we get that,

$$\begin{aligned} \sigma_p &= [0.2 + 0.9 + 2.5 + 2.4 + 18 + 2]^{1/2} \\ &= [26]^{1/2} = 5.099\% \end{aligned}$$

### SUMMARY

Capital budgeting essentially involves evaluation of the worth of capital investment proposals based on estimates of cash inflows and outflows. It is scientific exercise and uses several techniques. PBP, ARR, NPV and IRR are certainty techniques. CAPM, sensitivity analysis, simulation analysis, decision tree technique etc. are techniques of evaluation used under conditions of risk and uncertainty. CAPM technique can be used for single as well as a portfolio of projects. For a portfolio of projects, overall return (in NPV or of IRR mode) and overall risk (in the form of std. deviation of NPV or IRR) can be computed to judge the efficiency of the portfolio.

### QUESTIONS

1. Bring out the meaning and significance of capital projects.
2. Explain various tools of evaluation of capital investment projects.
3. Calculate pay-back period, ARR, NPV (at  $k = 10\%$ ) and IRR given

Years	1	2	3	4
PBT (Lakhs Rs.)	40	45	50	55
Tax Rate	40%	40%	35%	35%

4. Using decision tree approach find the expected NPV of the project given the following cash flows:

Time zero	Time 1	Time 2
-10 lakhs	6 lakhs P.(.6)	4 lakhs P.(.6)
		5 lakhs P.(.4)
	10 lakhs P.(.4)	6 lakhs P.(.4)
		2 lakhs P.(.6)

The cost of capital is 10%

P = Probability

For two mutually exclusive projects the projected cash flows are:

Period	Project A	Project B
Time zero (outflows)	Rs. 2,20,000	Rs. 2,70,000
1 to 7 years (inflow each year)	Rs. 60,000	Rs. 70,000

using IRR method, find the better of the two (an annuity of the 1 for 7 years has a present value of Rs. 3.92, Rs. 3.81, Rs. 3.91 and Rs. 3.60 at 17%, 18%, 19% and 20%).

5. Machine A costs Rs. 10,00,000 payable immediately, while Machine B costing Rs. 12,00,000 can be paid Rs. 6,00,000 down and balance 1 year hence. The cash flow from the machines are:

Year	1	2	3	4	5
A (Rs. Lakhs)	2	6	4	3	2
B (Rs. Lakhs)	nil	6	6	8	nil

At 7% discount rate which is better by NPV?

6. Texas filaments Ltd., has the following figures for its expansion plan, involving a capital outlay of Rs. 5 crs.

Year	1	2	3	4
Unit selling price(Rs.)	7.0	10.0	12.0	15.0
Addl. Sales quantity (crs)	0.9	0.95	1	1.05
Unit variable cost (Rs.)	4.0	5.0	6.5	8.0
Tax rate	30%	30%	35%	35%

Find the PBP and ARR of the expansion project.

7. A project has an equity beta of 1.2 and debt beta zero and is to have a debt-equity ratio of 3:7. Given risk free rate of return of 10% and market return of 18%. Find the required return for the project per CAPM.
8. The P, V, Q, F, I, T and K of a project are as follows:  
 P = Rs. 300; Investment I = Rs. 20,00,000; N = 4 years, K = 10%, T = 30% fixed cost (excluding depreciation) = Rs. 15,00,000. The quantity of sales (a) is a sensitive factor with the range 12,000 to 20,000 with most likely value 17000, similarly, variable cost, V, is a sensitive factor with range Rs. 130 to Rs. 180, with most likely value of Rs. 160 per unit perform sensitivity analysis w.r.t. quantity and variable cost.
9. A project's cash flow, life and discount rate have the following probability distribution.

Cash flow	Prob.	Life	Prob.	Dis. Rate	Prob.
Rs.5crs	.20	2	.25	9%	.22
Rs.8crs	.72	3	.45	10%	.66
Rs.10crs	.08	4	.30	12%	.12

Perform simulation of PV of cash flow for five runs taking the following random number sets: i) 12, 18, 82; ii) 70, 38, 48; iii) 78, 02, 49; iv) 22, 18, 79; v) 65, 92, 36. If the project outlay is Rs. 18 crs, find the expected NPV of the project.

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# **UNIT - V**

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## **5. PROJECT APPRAISAL AND CAPITAL RATIONING**

# Project Appraisal and Capital Rationing

A project is a one-time activity. It may be a longterm project or a short term one. Introducing a new product, process modification, an export market entry, an advertisement campaign launch, entry into a new product, product upgradation, modernisation of plant, diversification, installing captive power units, etc are all long term projects. Office system modification, a market survey, recruitment and selection, a training programme etc are short term projects. There are large projects such as construction of a dam, bridge, ship, railway line, track doubling, new product development, etc. There are minor projects such as constructing a culvert, desilting of a lake, etc.

## PROJECT CLASSIFICATION

Projects of sorts are taken up these days. These can be classified in several ways. Size, period, sector, functional activity, strategic aspect, etc are the bases for project classification.

Mega, large, medium, small and tiny projects exist. A capital outlay of less than Rs. 2 lakhs may be taken as tiny projects, upto Rs. 3 crs may be considered small, upto Rs. 30 crs may be considered medium and beyond that may be considered large project. There are mega projects involving outlay, say exceeding Rs. 1000 crs. An auto repair shop is a tiny project, auto sales cum service is small project, a auto dealership for a state or more is a medium project and automobile manufacturing plant is a large project. A multinational size auto plant is a mega-project.

Short, medium and long period projects exist. A project that lasts for a a year is short-term project. 1 to 3 year period projects are medium term projects. Beyond 3 year period projects are long-term projects. Desilting of lake, an ad campaign, a leather fair, etc are short term project. Rail track doubling, laying of a double lane road, a 200 metre length bridge construction, a 16000 sq. ft area marriage hall construction, etc are medium term projects. A multipurpose river valley project, a 1000 km railway line building, putting up a 500 MW nuclear power plant, etc are long term projects.

Sectoral Projects are: (i) infrastructural, (ii) core and (iii) non-core projects. Agri, manufacturing and service projects are also sector classified. Infrastructural projects refer to transport, telecommunication, port, power, etc. Core projects refer to iron and steel projects, petro-chemical projects, etc. Non-core projects are hotel and tourism, automobile, etc. Agri projects include land reclamation, forestry development, etc. Manufacturing projects involve building aircrafts, textile manufacturing, production of computers, etc. Service projects include hospital establishment, PDS project, immunisation project, etc.

Function-wise projects may be classified as financial, manufacturing, marketing, personnel, public relations, R&D and so on. Raising capital through launch of GDRs/ADRs, public issue of shares, etc are financial projects. Manufacturing projects include production of say cosmetics, consumer durables, etc. New product launching, new market entry, etc are marketing projects. Completion of executive recruitment, skill upgradation training, etc are personnel projects. Technology building, process modification, etc are some R&D projects.

Turnkey Projects involve completion of the project from “design to run” and handling over the ‘key’ to the owner who has just to turn on and turn off using the ‘key’ provided.

Strategic Projects involve high stakes. The strength, weakness, opportunity and threat of a firm and growth, competitive edge and survival of the firm depend on strategic projects. New product launching, foreign market entry, technology upgradation, etc are strategic projects. Non-strategic projects are internal oriented. While strategic projects are external oriented.

## **FEASIBILITY ANALYSIS**

A project is analysed for feasibility on market, technical, financial, economic, environmental and ecological parameters.

*Market feasibility:* analysis involves the study of (i) aggregate demand for the product/service and (ii) the projects’ share in the aggregate demand.

Aggregate demand depends on the nature of the product/service, price-cost factors, export-import policies, demand elasticity and so on.

How the firm is going to cut a market share with its new project or enlarge its share with its existing project getting modified? This is the crucial point. Feasibility has to be studied from the point of view of getting a foot-hold through product superiority, price attraction, distribution manipulations or promotional tricks.

*Technical feasibility:* is the ability to produce the product/service meeting certain well-laid out technological parameters. Raw material availability, technology availability (indigenous, imported, transferred; upscales or otherwise), minimum size matters, process choice equipment & appliances availability, location and layout factors, energy efficiency of the production method chosen, rate of tech. obsolescence, etc are the factors to be considered. There is tech. feasibility when the product can be produced inexpensively or taking less time or with added technological sophistication and so on. Shorter gestation period is a hallmark of technological feasibility.

*Financial feasibility:* studies the capital needed, ability to raise capital effectively, the ROI, the BEP, the cash flow pattern and payback period, the level of risk and so on.

There is financial feasibility if and when, ROI is higher than your rivals and covers cost of capital comfortably, or BEP is lower than that of the competitors, or the payback

period is shorter or post payback period returns are large enough to meet difficulties due to longer pay-back period and so on.

*Economic Feasibility:* refers to the contribution of the project to NI, GDP, GDS, export, import substitution, income distribution, ancillary industries development, employment generation, BOP, social and political order of the people, local development, global competitiveness etc. Net positive contribution on many of these aspects is expected.

*Environmental & Ecological Feasibility:* Analysis involves evaluation of the project in terms of (i) energy consumption per rupee of value added, (ii) air, water, surface and noise pollution created per unit of value addition, (iii) extent of damage done to forest cover, water table, human habitat and settlements, etc. What will be costs of restoration? After restoration costs are added, will the project remain still cost effective? If yes, it is a project that can be considered.

## **INTERNAL AND EXTERNAL CONSTRAINTS**

On the basis of feasibility prospects, projects are subjected to a secondary screening. Projects that pass out the same are further subjected to internal & external constraints faced by the unit. Finally projects are selected.

### **Internal constraints**

Internal Constraints refer to the limitations the firm is currently facing in taking up a project.

Employees may resent a new project addition as this may lead to some changes in their work, position, benefits, etc. In a highly unionised plants introducing new projects is a difficult task.

Capital Availability is another internal constraint, assuming that the firm is not using external capital market in the time being.

Management Personnel, may, sometimes, have vested interests in blocking new projects. Perhaps, occasionally, for cannibalistic effects, management may reject a new project.

Locational disadvantages may make a project unattractive for a particular firm. Space and building constraints may also stand in the way.

Authority-Responsibility structure is an organisation might be a constraint in taking up a new project. While senior may not have time to assume additional responsibility, he is not interested in giving the project to his junior for fear of the latter becoming popular along with the project.

### **External constraints**

External constraints arise due to (i) project dependence, (ii) capital rationing and (iii) project indivisibility.

Dependence of Projects is taken up first.

There are projects which are though not mutually exclusive, i.e., the selection one does not affect the selection or otherwise of the other, when taken together, one is

eating into the revenues of the other. A toll bridge and toll ferry service over a perennial river are a case in point. Both can be simultaneously taken up. But, only either one or the other will emerge profitable. So, the choice of project is externally affected.

Capital Rationing, as a constraint affects the firm when it cannot raise resources at the planned cost of capital either due to sudden changes in capital market conditions or due to increased risk perception of the investors about the project.

Project Indivisibility is an important constraint. Small businesses are affected by this factor. There is no partial taking up of the project. Full scale implementation might put strains on the firm's budget, cost of capital etc.

Taking into account both the internal and external constraints project solution is made.

After selection detailed design, detailed project report, detailed review programme, etc are worked out.

## **FEASIBILITY REPORT**

The feasibility report is developed based on feasibility studies made and the constraints. The contents of the feasibility report could be as follows:

- Introduction. A brief summary of the contents of the Feasibility Report is to be given.
- Plan Requirements. The need for this plant/project from the point of view of National Plans is to be stated indicating the present importance of the project.
- Market Prospects. Prevailing prices, the location of demand (by region or by cities), the pattern of demand, the increase-in demand over the life-time of the project, the product-mix (by quantities) and the distribution channels are to be specified.
- Technical Details. The size and process to be used, should be mentioned.
- Location of the Project. Different locations are to be studied and an outline of economic comparisons to be made.
- Project Estimate (for the project selected). Construction cost, construction schedule (use of PERT recommended), the working capital requirement, the financial structure, the operating profit estimates, the cash flow statement and balance sheets are casts are to be known.
- Profitability of the Project. Showing the average return of original capital investment and the present worth of the project to be provided.
- Benefit Cost to National Economy. Giving the savings in foreign exchange, the earnings in foreign exchange, the fuller utilisation of resources, the associated increase in industrial skills in regions/nation, the development of the regions, the reduction of regional unemployment, the development of industry vital to national defence to be indicated, and, if possible, the national economic benefit index be indicated; also in qualitative terms, all the other benefits which cannot be converted into monetary terms are to be described.



## INFLATION ADJUSTMENT IN CAPITAL BUDGETING

Inflation can be simply defined as an increase in the average price of goods and services. The accepted measure of general inflation is the Retail Price Index (RPI) which is based on the assumed expenditure patterns of an average family. General inflation is a factor in investment appraisal but of more direct concern is what may be termed specific inflation, i.e., the changes in price of the various factors which may affect the project being investigated, e.g., wage rates, sales prices, material costs, energy costs, transportation charges and so on. Every attempt should be made to estimate specific inflation charges and so on. Every attempt should be made to estimate specific inflation for each element of the project in a detailed manner as feasible.

- **Synchronised and Differential Inflation:** Differential inflation is where costs and revenues change at differing rates of inflation or where the various items of cost and revenue move at different rates. This is the normal situation. But the concept of synchronised inflation - where costs and revenues rise at the same rate - although unlikely to be encountered in practice, is useful for illustrating various faces of project appraisal involving inflation.
- **Money Cash Flows and Real Cash Flows:** Money cash flows are the actual amounts of money changing hands whereas real cash flows are the purchasing power equivalents of the actual cash flows. In a world of zero inflation there would be no need to distinguish between money and real cash flows as they would be identical. Where inflation does exist then a difference arises between money cash flows and their real value and this difference is the basis of the treatment of inflation in project appraisal. The real discount factor can be calculated with the help of the following formula.

$$\text{Real discount factor} = \frac{1 + \text{Money discount factor}}{1 + \text{Inflation rate}} - 1$$

### Illustration 5.1

A machine costs Rs. 10,000 and is expected to yield the following net cash returns (estimated in today's prices):

	(Rs.)
1	5,000
2	8,000
3	6,000

We expect inflation to be at the rate of 5% per annum, and the cost of capital is 15.5% per annum.

#### **Solution:**

If we estimate cash flow at time 1 to be Rs. 5,000 in 'today's prices' it means that we would expect a cash receipt of Rs. 5,000 in one year's time were there no inflation. It

further implies that with inflation at 5%, the actual cash receipt in one year's time will be Rs. 5,000 plus one year's inflation, and that, similarly, the 'actual' cash receipt in two years' time will be Rs. 8,000 plus two years' inflation and so on.

Since the object of the exercise is, as always, to discount the actual cash flows at the cost of money (15.5%), there is no point in discounting the flows as they stand as they do not represent our actual cash expectations.

Let us therefore calculate the actual cash flows we expect:

		Rs.
Year	Current prices	Actual cash flows
0	(10,000)	(10,000)
1	$5,000 \times 1.05$	5,250
2	$8,000 \times (1.05)^2$	8,820
3	$6,000 \times (1.05)^3$	6,946

For each flow we have added inflation at 5% by multiplying by  $(1.05)^n$  where  $n$  is the number of years inflation. Having calculated the 'actual' cash flows, we are now in a position to complete the problem by discounting in the usual manner.

Year	Cashflow	DF @ 15.5%	PV
0	(10,000)	1	(10,000)
1	5,250	$1/1.155$	4,545
2	8,820	$[1/1.155]^2$	6,612
3	6,946	$[1/1.155]^3$	4,508
			NPV = 5,665

Since the NPV is positive, we should accept the investment.

## CAPITAL RATIONING

Capital rationing is a situation where a budget ceiling is placed on the total size of capital expenditures during a particular period. Often firms draw up their capital budget under the assumption that the availability of financial resources is limited.

Capital rationing refers to a situation where a company cannot undertake all positive NPV projects it has identified because of shortage of capital. Under this situation, a decision maker is compelled to reject some of the viable projects having positive net present value because of shortage of funds. It is known as a situation involving capital rationing. In terms of financing investment projects, the following important questions is to be answered.

- What should be the requirement of funds for capital investment decisions in the forthcoming planning period?
- How much quantum of funds available for capital investment?
- How to assign the available funds to the acceptable proposals which require more funds than are available?

The answer to the first and second questions are given with reference to the capital investment appraisal decisions made by the top management. The third question is answered with specific reference to the appraisal of investment decisions from the angle of capital rationing.

Factors leading to capital rationing - Two different types of capital rationing situation can be identified, distinguished by the source of the capital expenditure constraint.

1. *External factors*: Capital rationing may arise due to external factors like imperfections of capital market or deficiencies in market information which might affect for the availability of capital. Generally, either the capital market itself or the Government will not supply unlimited amounts of investment capital to a company, even though the company has identified investment opportunities which would be able to produce the required return. Because of these imperfections the firm may not get necessary amount of capital funds to carry out all of the profitable projects.
2. *Internal factors*: Capital rationing is also caused by internal factors which are as follows:
  - Reluctance to resort to financing by external equities in order to avoid assumption of further risk.
  - Reluctance to broaden the equity share base for fear of losing control.
  - Reluctance to accept some viable projects because of its inability to manage the firm the scale of operation resulting from inclusion of all the viable projects.

The following factors influence capital availability

- Top management philosophy towards capital spending.
- The outlook for future investment opportunities and security capital.
- Current commitments.
- Funds provided by current operations.
- The feasibility of acquiring additional capital through borrowing or share issues.

Under capital rationing, the management has to determine not only the profitable investment opportunities but also decide to obtain that combination of the profitable projects which yields highest NPV within the available funds by ranking them according to their relative profitabilities.

Theoretically, projects should be undertaken to the point where the return is just equal to the cost of financing these projects. If safety and the maintaining of, say, family control are considered to be more important than additional profits, there may

be a marked unwillingness to engage in external financing, and hence a limit will be placed on the amounts available for investment. Even though the enterprise may wish to raise external finance for its investment programme, there are many reasons why it may be unable to do this. Examples include:

- The enterprise's past record and its present capital structure may make it impossible or extremely costly to raise additional debt capital.
- Its record may make it impossible to raise new equity capital because of low yields or even no yield.
- Covenants in existing loan agreements may restrict future borrowing. Further more, in the typical company, one would expect capital rationing to be largely self-imposed.

Situations of Capital Rationing - Capital rationing decisions can be studied under the following situations:

### **Situation I: Projects are divisible and constraint is a single period one**

The following are the steps to be adopted for solving the problem under this situation.

- Calculate the profitability index of each project.
- Rank the projects on the basis of the profitability index calculated in (a) above.
- Choose the optimal combination of the projects.

### **Illustration 5.2**

<b>Project</b>	<b>Required initial Investments</b>	<b>NPV at the appropriate cost of capital</b>
A	1,00,000	20,000
B	3,00,000	35,000
C	50,000	16,000
D	2,00,000	25,000
E	1,00,000	30,000

Total fund available is Rs. 3,00,000. Determine the optimal combination of projects assuming that the projects are divisible.

## Solution

Project	Required initial outlay (Rs.)	NPV at the appropriate cost of capital (Rs.)	Profitability index [(3)/(2)]	Rank
(1)	(2)	(3)	(4)	(5)
A	1,00,00	20,000	0.2	3
B	3,00,00	35,000	0.115	5
C	50,00	16,000	0.32	1
D	2,00,00	25,000	0.125	4
E	1,00,00	30,000	0.3	2

Rank Investment (Rs.)			
	Rank	Project	Required initial
	1	C	50,000
	2	E	1,00,000
	3	A	1,00,000
	4	1/4th of D	50,000*
	Total		3,00,000

Therefore, the optimal combination of projects is C, E, A and 1/4th portion of D.

### Situation II: Projects are indivisible and constraint is a single period one

- Construct a table showing the feasible combinations of the project (whose aggregate of initial outlay does not exceed the fund available for investment).
- Choose the combination whose aggregate NPV is maximum and consider it as the optimal project mix.

### Illustration 5.3

Using the same data as used in the previous illustration, determine the optimal project mix on the basis of the assumption that the projects are indivisible.

Feasible Combinations	Aggregate of NPVs
A, C	36,000
A, D	45,000
A, E	50,000
C, D	41,000
C, E	46,000
D, E	55,000
A,C,E	66,000

By a careful inspection of the feasible combination constructed in the above table, we can conclude that the optimal project mix is A, C and E because the aggregate of their NPVs is maximum.

### Situation III: Projects are divisible and constraint is multi-period one

Under this situation, the problem of capital rationing can be solved with the help of linear programming. It is a mathematical programming approach. It can be understood with the help of the following illustration.

#### Illustration 5.4

XYZ Ltd. has considered seven independent projects, namely A, B, C, D, E, F and G for implementation. The company has a capital budget of Rs. 400 lakhs. The minimal acceptable rate of return (MAR) is 7%. Let us now consider the capital rationing problem.

#### Ranking based on NPV

Project	Investment Rs. Lakhs	N.P.V. @ 7% s. Lakhs
A	100	54.73
B	100	40.47
C	200	87.01 II
D	200	283.01 I
E	200	62.23
F	50	4.76
G	50	26.08

The optimum set comprise of projects D and C. By implementing them with an investment of Rs. 400 lakhs (Rs. 200 + Rs. 200), the company would earn returns whose present value is Rs. 370.021 lakhs (Rs. 283.007 + Rs. 87.014).

#### Ranking based on IRR

Project	Investment Rs. Lakhs	IRR (%)
A	100	13.6
B	100	15.1
C	200	22.1 I
D	200	20.7 II
E	200	12.0
F	50	11.9
G	50	16.7

Among the seven projects, Project C has the highest IRR of 22.1% and hence this project is selected first and its commitment of funds is Rs. 200 lakhs. The project having next best IRR is project D (IRR = 20.7%) and its commitment of funds is also Rs. 200 lakhs.

**Ranking based on profitability Index (PI)**

Project	PV outflows	PV inflows	Profitability	
	Rs. Lakhs	Rs. lakhs	index	
A	1,00	154.73	1.547	II
B	1,00	140.47	1.405	
C	2,00	287.01	1.435	
D	2,00	483.01	2.415	I
E	2,00	262.23	1.311	
F	50	54.76	1.095	
G	50	76.08	1.522	III

Under the profitability index ranking projects D, A and G has scored the first three ranks with a total funds commitment of Rs. 350 lakhs. Obviously projects C, B and E which are next in the sequence of decreasing profitability index cannot be selected because they cannot be accommodated from the balance of funds i.e. Rs. 50 lakhs (Rs. 400 lakhs - Rs. 350 lakhs) available for investment. Hence project F is selected to complete the optimum set. The sum of NPVs of projects D, A, G and F amounts to Rs. 368.58 lakhs.

Analysis: As seen from the above illustration, the decision regarding choice of set of projects which best meets the corporate financial objective in a capital rationing situation depends upon the criterion used for selection. The present value of the returns to the enterprise is, in general, different for each of the combinations recommended by using different criteria. There is no guarantee that one particular criterion will always give a solution by which the present value of the returns will be more than that for the combination obtained by using other criteria. In some cases NPV may result in the best solution. In some others, IRR may give the best combination of projects. Which in still others, the set of projects chosen by using PI as the criterion may help maximise the net returns to the enterprise. Sometimes two or even all the three criteria may result in the same solution, while at other times the solutions may be totally different, especially when the number of viable projects is large.

**QUESTIONS**

1. What do you mean by project appraisal?
2. Explain the diff. aspects of feasibility analysis.
3. Bring out the need for feasibility analysis.
4. What is feasibility reporting? How is it prepared?
5. Explain the treatment of inflation in capital budgeting.
6. A firm has estimated at today's prices the following for a project. Initial cost Rs. 80,00,000. Annual cash flow Rs. 26,00,000 each from year 1 through year 4. The rate of inflation is 5% and discount rate is 12%. Can it be our choice? Why?
7. Explain the concept and need for capital rationing.
8. Capital rationing is influenced by internal and external factors.
9. How should mutually linked projects be evaluated.
10. A company has on investible funds Rs. 80 lakhs. Five candidate investment properly exist on how namely: A (Rs. 10 lakhs), B (Rs. 25 lakhs), C (Rs. 42 lakhs), D (Rs. 12 lakhs) and E (Rs. 7 lakhs). i) The IRR of the 5 projects are respectively, 12%, 7%, 16%, 8% and 14% choose the capital projects that may be selected. ii) The NPV of these 5 projects are : Rs. 2 lakhs, 7 lakhs, 12 lakhs, 4 lakhs and Rs. 3 lakhs. Make right choice.



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# **UNIT - VI**

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## **6. INTERNATIONAL FINANCING AND MANAGEMENT OF FUNDS**

# International Financing and Management of Funds

Today's world is financially more integrated than the old one. Global capital flows from the capital rich nations to capital deficient ones regularly. Plus, capital transfers within the developed world and within the developing world also take place side by side. International financing has become a conspicuous activity hence management of the same is very important. Where to raise funds, what instrument to raise fund, what terms be given to providers of fund, how to use the fund, what conditionality is acceptable, etc are all concerns of a global fundraiser. These and related issues are dealt in this lesson. Foreign exchange is a vital instrument in the global economy. Foreign exchange rate determination, the sub-markets of foreign exchange, the systems of foreign exchange, the derivatives in foreign exchange, exchange control measures, etc are aspects of currency management that are concern to any international fund user.

## **INTERNATIONAL FINANCIAL RESOURCES**

International financial resources are mobilized from global financial markets. These global sources of capital can be put into different classes. These are dealt with below.

### **External currency and foreign currency sources**

The external currency source or market, formerly restrictively referred to as euro dollar market or euro-currency market, is by far the biggest global financial market for all maturities and currencies. External currency market involves raising funds in currencies other than the currency of the fund raising unit's country and the place where fund is raised. Foreign currency market involves raising funds in the currency of the country where fund is raised by an entity that does not belong to that country. Compared to the external currency market this market is limited.

### **Multilateral, bilateral and private capital sources**

Finance for international investment may be raised from multilateral, bilateral and private sources.

The *multilateral sources* include multilateral financial institutions. There are many global financial institutions committed to the development of member countries. Now an overview of them relevant in the context of India is attempted in this presentation. World Bank, International Monetary Fund, Asian Development Bank, International

Development Association, International Finance Corporation etc are important multilateral financing institutions. A brief on these institutions follows.

*WORLD BANK Membership:* 181 (in 2001).. Subscribed Capital \$ 190 billion. Major subscribers to capital: USA, JAPAN, GERMANY, UK, FRANCE, INDIA, CHINA, SAUDIARABIA, RUSSIA & CANADA. Objectives: i. Reconstruction and Development ii. Promotion of private foreign investment iii. Long range balanced development of trade and BO iv. Development of Economic infrastructure in members Principles i. Catalyst role ii. Regional Integration iii. All round development of members Functions i. Sector Adjustment Lending ii. Food security in LDCs iii. Financial Intermediation iv. Economic Development Initiative v. Coordination with other bodies vi. Environment Protection. Types of Assistance: Direct Loans; Funding Affiliates; Indirect Loans; Project Loans; Investment Lending; Enclave Lending Sectors Assisted: Agriculture; Energy; Environment; HRD; Industry; Finance; Infrastructure; Urban Development; Tourism. Sum of Lending (2000): \$ mn. Mid East & North Africa 760; Africa 98; East Asia & Pacific 2495 ; South Asia 934; Europe & Central Asia 2733; Latin America & Caribbean 3898.

### *International monetary fund (IMF)*

#### 1. Objectives:

- Promotion of International Monetary Cooperation ii. Growth in balanced Global Trade iii. Promotion of Exchange Rate Stabilization iv. Promotion of a system of Multilateral Payments v. Funding countries suffering BOP dis-equilibrium vi. Special Drawing Rights to boost global liquidity.

#### 2. Funding Facilities

<b>Regular lending facilities</b>		
Tranche Credits	Basic 25% of Quota Upper Tranches allowed	Members must demonstrate BOP correction ability
Standby Arrangements	Normal period 12 to 18 months Extended to 3.25 to 5 years	Quantitative Performance Criteria in bank credit, Fiscal Deficit
Extended Fund Facility	Normal period 4.5 to 10 years	Reform Implementation
Precautionary Arrangements	Shorter Periods	Boost Economic Confidence

Special lending facilities		
Supplementary Reserve Facility	To fund exceptional BOP Crises	Repayment Max. 2.5 years. Interest 500bps above normal rate
Contingent Credit Lines	To fund exceptional BOP Crises due to lose of confidence	Repayment Max. 2.5 years. Interest 500bps above normal rate
Emergency Finance Mechanism	Assist Sudden crises affected members	Reform Implementation
Poverty Reduction and Growth Facility	Longer Periods, upto 10 years	Interest @ 0.5% p.a

*Asian development bank:* Regional Development Bank to specially address developmental funding of Asian Countries. Functions on the lines of WB with regional focus, that too less endowed poor countries.

*International development association:* Soft lending window of World Bank. Social infrastructure building is main concern. IDA credits are free of interest with longest initial moratorium. India got 30% of annual IDA credits upto 1985; later 15%. Eligibility: Lower Per Capita Income.

*International finance corporation:* Private Sector Development arm of WB.

Partnership with Private sector Co-financing with other institutional financiers.

Multilateral sources played a great role in the yester years. Nowadays their role is conspicuous in assisting countries in crisis .

*Bilateral capital sources :* Bilateral sources include foreign government, government controlled banks/institutions. India used to get such assistances from the developed world and their institutions. Bilateral sources are fair weather friends. Much depends on political equations of the nations involved and the extent of bilateral relations each wants to play.

*Private foreign financial sources :* Private financial sources include multinational banks, global investment funds/banks, non-resident citizens, foreign citizens, external currency market ,and so on. today this is the biggest market for global funds. The US, UK, Japanese and European capital market are grand private capital market sources. These are describes below.

*Us capital market:* The US financial market is the largest and the most versatile financial system in the world. It has the broadest range of funding options to offer and some of the most sophisticated and innovative financial institutions. The importance of the market is further enhanced by the dominant role played by the US dollar as the vehicle currency in international transactions . At the same time, it is not a market which is readily accessible by borrowers from developing countries like India except perhaps those with the highest ratings and sovereign guarantees.

*Funding options:* In terms of funding options, the dollar sector, both domestic and Eurodollar offers a wide choice and considerable depth. However, due to the strict regulation

and disclosure requirements, the domestic dollar market is not easily accessible while the Eurodollar segment is more freely accessible. This might be clear when one considers the fact that while GDR market has been tapped by many Indian firms, now only the ADR market is tapped and that too by only one Indian firm, Infosys Technologies, in March 1999.

*Credit instruments* : In the domestic dollar market, the three main funding avenues to foreign borrowers with sufficient credit reputation are dollar bonds (“**Yankee Bonds**”), MTNs and commercial paper. Top rated corporate borrowers have successfully issued dollar bonds in the domestic dollar market. The volume of new Yankee bond issues is ever rising. The fast growing MTN market has also been tapped by foreign borrowers, especially, the sovereign entities, that is Governments. MTNs are usually issued under the shelf registration scheme and, although they are designated “medium term”, maturities can range upto 15 years. Amounts involved can be as small as \$10 million. However, these avenues involve a lot of preparatory work and a high credit rating is absolutely essential to get reasonable terms. It is possible to issue bonds denominated in foreign currencies in the U.S market and there have been public offerings in Australian dollar (**the Yankee Kangaroo bond**), New Zealand dollar, Canadian dollar and the ECU. Most of these were subsequently swapped into U.S dollars. All Yankee bond issues as well as issues in foreign currencies, with a few exceptions (e.g. issues by supernationals like the World Bank), have to be registered with SEC and are subject to the usual disclosure requirements.

*Junk bonds*: For a time, there was a flourishing market in the so called “high yield securities” (a more forthright description being “junk bonds”) issued by borrowers with low credit ratings. A number of these issues were made during the years when leveraged buyouts (LBOs), mergers and acquisitions activity was at a peak. Following some failures and bankruptcies the, activity has practically come to a halt and prices in the secondary markets have dropped substantially.

*Commercial papers*: In the very large US commercial paper market, about a quarter of the outstanding issues is accounted for by non-resident entities. Here too, rating and investor cultivation are important when making an entry.

*Syndicated loans*: Syndicated Bank loans are available in the domestic dollar segment. Aside from these market-based options, the U.S. has a comprehensive export finance structure aimed at encouraging exports of American capital goods. EXIM USA, Private Export Funding Corporation (PEFCO), Foreign Credit Insurance Association etc. are the institutions involved in arranging export finance.

*Market institutions*: The American Stock Exchange, New York Stock Exchange, New York Mercantile Exchange, New York Futures Exchange, Philadelphia Board of Trade, the Chicago Board of Trade, Chicago Board of Options Exchange, Chicago Mercantile Exchange, International Monetary Market, are important institutions. There are famous merchant banking houses, options markets in commodity and financial product categories, futures exchange again in commodity and financial product divisions, and so on.

*Euromarket:* In the Euromarket, straight Eurodollar bonds, FRNs (floating rate notes) and NIFs (note issuance facilities) have been popular funding options. Till 1984, Eurodollar bonds accounts for an overwhelmingly large population of all Eurobond issues (85-90%). By 1990, this had come down to about 50%, the gainers being EuroDM and Euroyen issues. The FRN market was growing very rapidly till the end of 1986 when the collapse of the perpetual FRN market halted further expansion. Eurodollar commercial paper and Eurodollar MTN markets are much smaller than their domestic counterparts but growing. Syndicated Eurodollar loans are available and have been frequently accessed by developing country borrowers.

*India and US financial market:* It has been estimated that more than two-thirds of India's commercial borrowings are in dollars, of which, more than two-thirds are in the form of syndicated Eurodollar loans, the rest being FRNs, NIFs, Eurodollar commercial paper and a few Eurodollar bonds. In 1989, a few leading Indian institutions obtained ratings from either of the two ratings agencies in the U.S. (Moody's and Standard & Poor) to qualify for access to the domestic dollar market. In March 1999, Infosys Technology Ltd. made an ADR issue, the first ever equity issue in the US. In the recent years many Indian firms have successfully tapped this market at very competitive rates.

*The London (sterling) market :* The London financial market is a well developed system. The Bank of England, the London Stock Exchange, the London International Financial Futures Exchange, etc are all very reputed institutions of long standing. The system is well knit and streamlined one. Unit banking system is adopted. The 'big five', namely the five big banks, are very important sub-system.

*Euro-sterling:* The Euro-sterling market can be said to have emerged in a meaningful way after 1979 when exchange controls were lifted. However, the market remained volatile reflecting the underlying uncertainties about the British economy and gyrations of sterling against major OECD countries. The market is gradually gaining in strength since Britain's entry into the Exchange Rate Mechanism of EMS and the consequent stabilization of the Pound.

*Instruments:* In the Euro-sterling sector, short term (upto five years), and medium term (between 5 and 10 years) bonds constitute one market segment while long term bonds extending upto 20 years constitute the other market segment. In the former, a number of issues are linked to currency swaps. Sterling FRNs are also an important market particularly in combination with interest rate swaps. Equity-linked convertible bonds are another vehicle. The foreign bonds issued in UK are called as "**bull-dog**" bonds. The sterling commercial paper sector has been in operation since 1986. Interest rate futures in euro-dollar, sterling and Euro, options in Yen, US Dollar, Pound, Euro, etc are elaborately traded.

*Borrowers:* Borrowers in all these markets have been supranationals, sovereign governments, financial institutions and non-financial corporations. Borrowers with high ratings have found considerable investor interest at very attractive margin over UK government securities (Gilts). Lesser rated corporations have also been successful

in issuing short and medium term bonds. Foreign issues in the domestic sterling market (called “Bulldog” bonds) have largely come from sovereign borrowers. However, lately, corporations and others have tapped this market.

*Benchmark:* The hall mark of London market is the **LIBOR**, ( London Interbank Offer Rate), which is an international bench mark so far as interest rate for borrowers is concerned. Similarly, **LIBID** ( London Interbank Bid) is the bench mark deposit rate.

*Institutions:* Baltic International Freight Futures Exchange, London Grain Futures Exchange, London Futures and Options Exchange, London Metals Exchange, London Traded Options Exchange, etc are other institutions of repute.

*The japanese (tokyo) market:* The Japanese financial markets are among the world’s most strictly regulated and underdeveloped markets until recently. Expansion and deregulation of various segments has led to integration of the financial system with the international markets. Still the Japanese financial system retains some vestiges of earlier rigidities. On the other hand, there is considerable flexibility both in the attitudes of the bankers and occasionally even in the application of rules and guidelines.

*Instruments:* In the domestic yen market, funding options available to foreign borrowers are bonds and loans. **Samurai Bonds** are foreign yen bonds issued by non-resident entities in the Japanese market by way of a public offering. The MoF lays down eligibility criteria in terms of minimum rating from Japanese or US rating agency, the amount and tenure of the issue. It also regulates the timing of the issue. Pricing of the issue is done in the light of market conditions and with reference to the Long Term Prime Rate (LTPR) and the yield from seasoned Samurai bonds with equal credit rating. Elaborate underwriting and selling arrangements have to be made and documentation prepared. The cost of the issue therefore tends to be quite high when all the underwriting fees, selling commissions and other expenses are worked in some reform proposals are in the offing to reduce costs to foreign borrowers.

*Private placement:* The counterpart in Japan of the U.S. private placement issues are the **Shibosai Bonds** offered to a restricted segment consisting of institutional investors. All aspects of the issue – required minimum rating, size, maturity, and coupon – are governed by the MoF guidelines. Pricing formulas (i.e. coupon fixation) are quite elaborate. The cost of issue is relatively smaller. Foreign bonds issued in Japan are called “**Samurai**” bonds.

*Euroyen market:* The Euroyen bond market, though established as early as 1977, become really accessible to non-Japanese entities only in 1984. The market grew rapidly thereafter but continued to be under close supervision by the MoF. Over the years, the restrictions have been gradually relaxed and new instruments (Euroyen FRNs, zero-coupons etc) have been allowed to develop. Pricing of the issues is decided by negotiations between the borrower and the underwriters and maturities range from 4 years upwards.

*Syndicated loans:* Syndicated yen loans are available both in the domestic and Euro segments. In terms of costs of syndication, documentation etc. loans are less



expensive than bond issues. The MoF guidelines are also more lenient in respect of loans. Domestic yen loans are priced with reference to the LTPR while euroyen loans are linked to the LIBOR.

*Institutions:* The Tokyo Stock Exchange, the Tokyo International Financial Futures and Options Exchange, Bank of Japan, Tokyo Commodity Exchange, Osaka Securities Exchange, etc. are important institutions.

*India yen market:* Next to Eurodollar loans, the yen market has been the major source of external funding for Indian borrowers. Japanese capital market, EXIM bank, insurance companies and leasing companies have all been involved in arranging financing. IDBI made a Shibosai issue in 1984 and ONGC issued Samurai bonds in 1988. Other public sector and private sector borrowers have also made forays in yen finance from various sources.

*European financial market:* The European Monetary system is the nucleus of the European Financial System. The EMS evolved in 1979 by the European Union. The European Currency Unit is the nucleus of the EMS. The ECU consisted of fixed units of currencies of member countries. The ECU was the intervention and settlement currency among the central banks of members of EU. 10 years later in 1989 European Monetary Union was created. The ultimate goal of the EMU was to replace all national currencies of EU by a common currency. And this happened in January 2000 with a truncated membership. That is all 15 members of EU have not joined the common currency arrangement. Only 11 joined together, leaving England, Italy and two other countries. There are many institutions. The Brussels Stock Exchange, the Copenhagen Stock Exchange, Finland Options Market, Marche a Terme International de France (MATIF), OMF Futures and Options Exchange, European Options Exchange of Netherlands, Norwegian Options Exchange, Stockholm Options Exchange, Swiss Options and Futures Exchange etc are notable entities. The EU now holds much of the euro market in dollar, sterling, yen , etc.

## **FINANCING MULTINATIONAL ORGANISATIONS**

Multinational organisations are companies which have direct operations through own plants or service units in a plural number of countries. These are incorporated or unincorporated enterprises comprising parent enterprises and their foreign affiliates. A parent enterprise is deemed as an enterprise that controls assets of other entities in countries other than its home country, usually by owning a certain equity capital stake. An equity capital stake of 10 per cent or more of the ordinary shares or voting power for an incorporated enterprise, or its equivalent for an unincorporated enterprise, is normally considered as a threshold for the control of assets in some countries such as Germany and United Kingdom, the threshold is a stake of 20 per cent or more. multinational organisations abound in number and they have enormous clout on the global geo-economics as well as geo-politics.



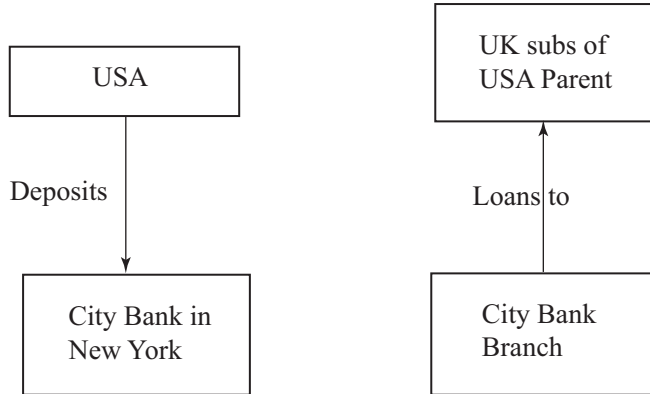
Multinational organizations have been growing in number, volume, geographical spread and so on. Though, generally a multinational organisation consists of a parent company located in the home country and at least five or six foreign subsidiaries with a high degree of strategic alliance among the units, there are multinational organisations who have over 100 foreign subsidiaries each as well. The multinational organisations had global sales in excess of \$ 4.8 trillion which is larger than the value of global trade in 1992. In 1998, the sales of top 100 multinational organisations were \$ 2 trillion. About of third of world output is contributed by the multinational organisations. About 73 mn people are in direct employment with the multinational organisations, representing 10% of world employment in non-agriculture employment in 1992. In 1998 multinational organisations employed about 350 million people. The number of multinational organisations was at around 37000 in 1992 with over 2 lakh foreign subsidiaries. The top most 100 multinational organisations, excluding those in banking and finance, held \$ 3.4 trillion in global assets in 1992, of which 40% were located outside their home country. With liberalization of economic policy being earnestly followed by most countries of the world, there has been enormous increase in the geographical spread of multinational organisations. The popularity of multinational organisations can be known from the fact that most of them receive 50% or more of their revenues in profits. Some of them read like who's who: IBM, Gillette, 3M, Colgate-Palmolive, Philips, Xerox, Pepsi, Hero Honda, Suzuki, Ford, General Motors, Sony, Unilever, Hewlett-Packard, Coca-Cola and so on. It is said that Coca-Cola earns more money by selling Soda in Japan than it does in the USA. Exxon, an American base multinational organisation, had about 56% of its assets, 73% of its sales and 97% of its profits abroad. According to World Investment Report 1997, there were 45000 multinational organisations with 2,80,000 affiliates. According to World Investment Report 2001, there were 63000 multinational organisations with 8,22,000 affiliates. 12% of these affiliates were in the developed countries. China hosts about 44% affiliates, compared to India's pittance of 0.16%. In India of the 10 top 500 companies by market value, about 75 were multinational organisations present in India include the Lever, the ITC, the Castro, the Colgate-Palmolive, the Nestle, the Siemens, the Ponds, the ABB, the Ingersoll Rand, the Philips, the MICO, the Glaxo, the Reckitt and Colman, the Procter & Gamble, the Smithkline-Beecham, etc. Thus multinational organisations have been growing in stature and spread all over.

Multinational organizations finance their operations worldwide diversely. Public issue of shares, bonds, borrowings from banks, financial institutions, floating global equity offerings and debt securities, syndicated loans, commercial papers, are means of financing adopted. Matured multinational organizations fund their operations through accruals of profits mostly. Multinational organizations adopt *Back to Back loan and Parallel loan* facilities to finance group organizations. The modus operandi of the financing methods is dealt below:

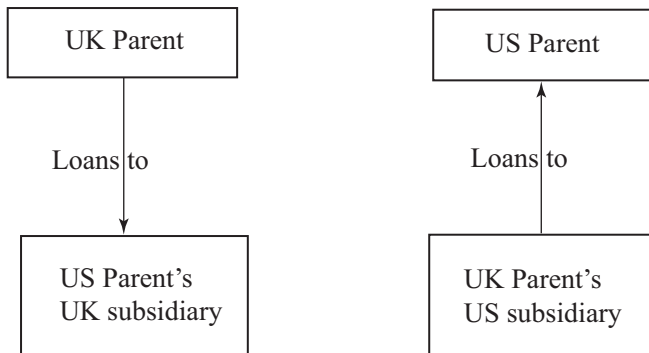
*Back to back loan:* A multinational organisation unit deposits money with a bank with the intention of transferring the fund to its group unit in another country.

The bank, directs, its branch in the other territory to extend funding to the group unit of the multinational organisation.

## BACK TO BACK LOAN



## PARALLEL LOAN



## International equity and debt instruments

There are different types of equity and debt financing instruments in international market adopted by multinational and other organizations to raise capital.

### *International equity financing*

International equity offering generally takes any one of the two forms, viz. i) dual syndicate equity offering, where the equity offering is split into overseas and domestic tranches and each is handled by separate lead managers and ii) Euro-equity offering placed overseas and managed by one lead manager. GDRs, ADRs and IDRs (Global, American and International Depository Receipts) are the prime modes of Euro-equity offerings.

The shares are issued by the company to an intermediary called the depository in whose name the shares are registered. It is the depository which subsequently issues the GDRs. The

physical possession of the equity shares is with another intermediary called the custodian who is an agent of the depository. Thus while a GDR represents the issuing company's shares, it has a distinct identify and in fact does not figure in the books of the issuer.

The concept of GDRs has been in use since 1927 in Western Capital Market originally they were designed as an instrument to enable US investors to trade in securities that were not listed in US Exchanges in the form of American Depository Receipts (ADRs). Issues traded outside the US were called International Depository Receipt (IDR) issues.

Until 1983, the market for depository receipts was largely investor driven and depository banks often issued them without the consent of the company concerned. In 1983, the Securities and Exchange Commission (SEC) of the US made it mandatory for certain amount of information to be provided by the companies.

Till 1990, the companies had to issue separate receipts in the Untied States (ADRs) and in Europe (IDRs). Its inherent weakness was that there was no cross border trading possible as ADRs had to be traded, settled and charged through DTC (an international settlement systems in the US) while the IDRs could only be traded and settled via **Euroclear** in Europe.

In 1990, changes in Rule 144A and regulation 5 of the SEC allowed companies to raise capital without having to register the securities within the SEC or changing financial statements to reflect US accounting principles. The GDR evolved out of these changes.

Under rule 144A, the purchaser may offer and resell those securities to any Qualified Institutional Buyer (QIB). If:

- The securities are not the same class as securities of the issuer quoted in NASDAQ or listed on a US Stock Exchange;
- The buyer is advised that the seller is relying on Rule 144A; and
- Unless the issuer is a reporting company or is exempt from Exchange Act registration under Rule 12g 3-2(b), the buyer, upon request, has the right to receive at of prior to the time of sale, specific financial statements of the issuer and information as to its business.

In view of the foregoing, it is permissible for a foreign private issuer to sell its shares through an underwriter into the US provided the shares are eligible for Rule 144A treatment and US market is limited to QIBs. To accomplish this, the underwriter would purchase the securities from the issues in a transaction exempt from the Registration requirements of the Securities Act and relying upon Rule 144A, resell those securities to QIBs in the US.

A leading South Korean trading company, Samsung Co. Ltd., with floated a truly global instrument in December 1990, tradable both in Europe and in the US set the trend for GDR issues. The GDR issue allowed the company to raise capital both in US and Europe simultaneously through one security.

Depository Receipts (DRs) are offered for subscription as under:

- *Un-sponsored*: Issued by one or more depositories in response to market demand. Today this is obsolete.
- *Sponsored*: This is prominent today thanks to flexibility to list on a national exchange in the US and the ability to raise capital.
- *Private placement (144A) DRs*: A company can access the US and other markets through a private placement of sponsored DRs. In this a company can raise capital by placing DRs with large institutional investors and avoid registering with the SEC. The National Association of Securities Deal (NASD) of the US has established an Electronic Trading System similar in NASDAQ, called PORTAL within which Rule 144A eligible securities approved by NASD for deposit may be traded by QIBs.
- *Sponsored level - DRs*: This is the simplest method for companies to access the US and non-US capital markets. Level-I DRs trade on the OTC market and as a result the company does not have to comply with US Generally Accepted Accounting Principles (US GAAP) or full securities and Exchange Commission (SEC) disclosures. Under this, companies enjoy the benefits of a publicity traded security without changing the current reporting process.
- *Sponsored level II and III DRs*: Companies that wish to either list their securities on an exchange in the US or raise capital, use sponsored Level II and III DRs respectively. Each level requires different SEC registration and reporting plus adherence to US GAAP. The companies must also meet the listing requirements of the National Exchange or NASDAQ whichever it chooses.

## ADRs

ADRs are financial assets that are issued by US banks and represent indirect ownership of a certain number of shares of a specific foreign firm that are held on deposit in a bank in the firm's home country. The advantage of ADRs over direct ownership is that the investor need not worry about the delivery of the stock certificates or converting dividend payments from a foreign currency into US dollars. The depository bank automatically does the covering for the investor and also towards all financial reports from the firm. The investor pays the bank a relatively small fee for these services. Typically non-Canadian firms utilize ADRs.. In March 1999, the first even ADR issue by an Indian firm took off. The Infosys Technology Ltd. floated ADRs which were received very well.

One study that examined the diversification implications of investing in ADRs found that such securities were of notable benefit to U.S investors. Specifically, a sample of 45 ADRs was examined and compared with a sample of 45 U.S securities over the period from 1973 to 1983. Using an index based on all NYSE-listed stocks, the betas of the ADRs had an average value of .26, which was much lower than the average beta of 1.01 for the U.S. securities. Furthermore, the correlation of the ADRs returns

with those of the NYSE market portfolio averaged 0.33, whereas US securities had a notably higher average correlation of 53.

Given these two observations, it is not surprising that portfolios formed from US securities and ADRs had much lower standard deviations than portfolios consisting of just U.S securities. For example, portfolios consisting of 10 U.S securities had an average monthly standard deviation of 5.50%, whereas a 10-security portfolio split evenly between U.S securities and ADRs had an average monthly standard deviation of 4.41%. Thus in contrast to investing in multinationals, it seems that investing in ADRs brings significant benefits in terms of risk reduction.

The SEC currently requires that foreign firms prepare their financial statements using U.S. Generally Accepted Accounting Principles (GAAP) if they want their shares or ADRs to be listed on a U.S exchange or an NASDAQ. There are two consequences of this requirement. First, many foreign firms have their shares and ADRs traded in the part of the over-the-counter market that does not involve NASDAQ. Second, many large and actively traded foreign firms have decided against listing their shares in the United States. This has caused U.S exchange to fear that certain foreign exchanges which do not have such reporting requirements (particularly London) will reign as the financial centres of the world in the future. In respect to the complaints of the exchange, the SEC argues that this requirement is necessary to protect U.S investors and that it would be patently unfair to U.S firms if they had to meet such requirements but their foreign competitors did not have to do so.

## GDRs

A Global Depository Receipt (GDR) is a dollar denominated instrument traded, on a stock exchange in Europe or the US or both. It represents a certain number of underlying equity shares.

*Parties to GDRs:* The key parties involved in a GDR issue apart from the issuing company are:

- *The lead manager(s):* An investment bank which has the primary responsibility for assessing the market and successfully marketing the issue. It helps the company at all stages from preparing the documentation, making investor presentation, selection of other managers (subscribers) and post-issue support. It also owes a responsibility to investors of presenting an accurate picture of the company's present status and future prospects, to the best of its knowledge. This means that it must exercise due diligence in collecting and evaluating all possible information which may have bearing on the issue.
- Other managers or subscribers to the issue agree to take and market parts of the issue as negotiated with the lead manager.
- *Depository:* A bank or financial institution, appointed by the issuing company which has certain duties and functions to be discharged vis-à-vis the GDR holders and the

company. For this it receives compensation both from the company as well as the GDR holders.

- *Custodian*: A bank appointed by the Depository, generally in consultation with the issuing company which keeps custody of all deposited property such as share certificates, dividends, right and bonus shares etc. It receives its fees from the Depository.
- *Clearing Systems*: EUROCLEAR (Brussels), CEDEL (London) are the registrars in Europe and Depository Trust Company (DTC) is the registrar in USA who keeps records of all particulars of GDRs and GDR holders.

*Steps in issue of GDRs*: The steps involved in the GDR mechanism can be summarised as follows:

- The amount of issue is finalised in US dollars. The company considers factors such as gearing, dilution effect on future earnings per share etc. The lead manager assesses the market conditions.
- The lead manager and other managers agree to subscribe to the issue at a price to be determined on the issue date. These agreements are embodied in a subscription agreement signed on the issue date.
- Usually, the lead manager has an option to subscribe to specified additional quantity of GDRs. This option called green shoe has to be exercised within a certain number of days.
- Simultaneously, the Depository and the Custodian are appointed and the issuer is ready to launch the issue.
- The company issues a share certificate equal to the number of GDRs to be sold. This certificate is in the name of the Depository, kept in custody of the Custodian. Before receipts of the proceeds of the issue, the certificate is kept in escrow.
- Investors pay money to the subscribers.
- The subscribers (i.e. the lead manager and other managers to the issue) deposit the funds with the Depository after deducting their commissions and expenses.
- The company registers the Depository or its nominee as holder of shares in its register of shareholders.
- The Depository delivers the European Master GDR to a common depository for CEDEL and EUROCLEAR and holds an American Master GDR registered in the name of DTC or its nominee.
- CEDEL, EUROCLEAR and DTC allot GDRs to each of the ultimate investors based on the data provided by the managers through the Depository.
- The GDR holders pick up their GDR certificates. Anytime after a specified “cooling off” period after close of the issue they can convert their GDRs into the underlying shares by surrendering the GDR to the Depository. The Custodian will issue the share certificates in exchange for the GDR.



- Once surrendered in exchange for shares, such shares cannot be reconverted into GDRs. That is there is no fungibility.
- The GDRs are listed on stock exchanges in Europe such as Luxembourg and London.
- Dividends paid will be collected by the custodian converted into local currency and distributed to GDR holders.

The costs of the issue consist of various fees, commission and expenses paid to the lead manager and other managers, fees and expenses paid to the depository, preparation of documents, legal fees, expenses involved in investor presentation (road shows etc.) listing fees for the stock exchanges, stamp duties etc. Fees and commissions paid to managers vary but are generally in the neighbourhood of 3-4% of the issue amount. This is for less than issue costs in India which range between 8% and 15 percent of the issue size.

A very large number of documents have to be prepared prior to launching the issue. Apart from the various internal and government approvals, the key documents from the point of view of presentation to the subscribers are the offering circular and the research report. The former is compiled by the lead manager, and the latter by the lead and other managers on the basis of information provided by the company and other independent sources. Even though the lead manager is required to exercise due diligence in compiling the offering document, primary legal obligation for any misrepresentation or withholding material facts is on the issuing company. As to the research document, the liability is with the managers. Both these documents are circulated prior to the “road shows” and one-to-one meetings with prospective investors. Road shows are gatherings of potential investors organised in the major financial centres of the world where the company with the assistance of the lead manager makes a presentation and holds discussions to assess investor interest.

GDR holders have the right to dividends, the right to subscribe to new shares and the rights to bonus shares. All these rights are exercised through the depository. The depository converts the dividends from rupees to foreign currency. GDR holders have no voting rights. The depository may vote if necessary as per the Depository Agreement.

## **INTERNATIONAL DEBT MARKET AND INSTRUMENTS**

Global debt market is much older than global equity market. For a long time the global debt market has been in existence. Earlier the multilateral and bilateral debt market existed in full form. Now the commercial debt market is growing fast.

### **Interest rate in global debt market**

Interest rates on various Euromarkets instruments are tied to a benchmark or reference rate. The most commonly used benchmark is the London Inter Bank Offer Rate or LIBOR. This is calculated everyday, at a specific time, as the average of the lending rates of a group of reference banks in London on short term funds lent to first class

banks. Thus the rate refers to interbank lending. Further, it may not be the actual rate charged by any bank at a point in time but only a guidepost indicative of the conditions in the market. A particular bank will charge a rate with reference to LIBOR and in the light of its own funds position. Some less commonly used cousins of LIBOR are SIBOR (Singapore), NIBOR (New York) etc.

Rates charged to non-bank customers on loans are stated as LIBOR plus a margin or “spread”. The magnitude of the margin depends upon the creditworthiness of the borrower and the level of the LIBOR itself. Loans of maturities longer than six months are at a variable or “floating” interest rate which is periodically reset according to the “LIBOR + Spread” formula. (Thus for instance, every six months a rate is calculated as LIBOR on the reset date plus the margin and this rate applies for the next six months. Bench mark drill, that is the process of determining the right premium over the bench mark interest rate is very scientific taking into account of the credit ratings of the entity as well as the sovereign ratings. Bond market drill, that is, the process of complying with all the requirements for floating a bond issue, is strictly adhered to.

### **Varieties of global market debt instruments**

Debt investment guarantees periodic current return and priority repayment of capital over equity investment in the event of winding up. Of course, debt investments are redeemable after a fixed time period, usually 7 years or so. Security is there. Risk averse investors go for this investment. A brief description of debt instruments available in the Euro-market is presented below.

*Bonds:* For starters, there is a veritable plethora of securities, such as Euro-bonds, Yankee bonds, Samurai bonds, and Dragon bonds which tap the European, US, Japanese, and Asia-Pacific markets, respectively. More specifically, Eurobonds are unsecured debt securities maturing at least a year after the launch. Usually fixed-rate instruments, with bullet repayments ( one-shot redemption ) these bonds are listed on stock exchanges abroad. And borrowers access global investors with deep pockets: individuals with high net worth as well as institutions. (Chapter leads more of Eurobonds).

*Foreign commercial paper:* Commercial papers are continuously offered unsecured debt by the borrower. Most FCPs mature in 30, 60, or 90 days and are sold at a discount to their face value. That reflects the interest on the instrument as well as the overall yield to the investor. It's extremely flexible, since commercial papers can be structured according to different maturities, amounts and rates according to the issuer's needs for funds.

*Fixed/floating rate notes:* Instruments for lending a period of one year to 18 months, medium-term notes are better for longer periods of one to five years. Again flexibility is the primary benefit: a note can be sold in small tranches, or in larger amounts, with different maturity periods, depending on the M conditions in the market and the company's need for funds. The interest rate may be fixed or floating.

*Increasing rate debt:* This debt instrument matures in 90 days' time but it can be extended at the issuer's option for an additional period at each maturity date;



simultaneously, the interest rate also increases. Several variations are possible; extendable bonds and stepped-up coupon put table bonds. As the term suggests, extendable bonds have fixed redemption dates. However, the investor can choose to hold on to the bond for some more time usually at a higher coupon rate.

As for stepped-up coupon put table bonds, they are a hybrid between debt with warrants and extendable bonds or notes. After a specified period of time, investors can either put the bonds back up to the issuer or hold on to the bonds for a stated period at a higher - stepped-up - coupon rate.

*Flip-flop notes:* A bond with reverse flexibility, a flip-flop note offers investors the option to convert to another debt instrument. And in some cases, investors can even go back to the original bond at a later date. The option changes the maturity of the issue and the interest rate profile. It gives issuers the opportunity to persuade investors to accept lower interest rates, thus reducing their costs. Conversely, investors have options which come in handy when interest rates fluctuate sharply.

*Dutch auction notes:* Here, investors bid for seven-year notes on which the coupon rate is repriced every 35 days. As a result, the notes are sold at the lowest yield possible. Bids are conducted through a real auction by dealers in the US markets. The main advantage is that these notes provide money for longer period than commercial paper, since they are repriced only once every 35 days and, unlike commercial paper are not redeemed and resold.

*Bunny bonds:* These bonds permit investors to deploy their interest income from a host bond into more bonds with the same terms and conditions. Since the option to reinvest interest at the original yield is attractive to long-term investors, like the pension funds, companies find it a cheap source of finance.

*Euro-rupee bonds:* It doesn't exist yet, but several foreign institutions are toying with the idea of gobbling together such a tool for wary companies. Denominated in rupees, Euro-Rupee bonds can be listed in, say, Luxembourg. Interest will be paid out in rupees, and investors play the risks of currency fluctuations.

*Euro-convertible bonds:* It's the most exciting Euro-option available. Equity-linked debt instruments, which can be converted into GDRs. ECBs represent the best of both worlds. And they may soon overtake GDRs in terms of their popularity in this country.

Traditionally, investors have the option to convert any such bonds into equity according to a pre-determined formula - and, appropriately, even at a pre-determined exchange rate. Such bonds allow investors the flexibility to remain with the debt instrument if the share price refuses to rise. These bonds have also spawned subtle variations like those with call and put options, which allow the issuer to insist on conversion beyond certain limits or permit investors to sell the bonds back to the issuer. What's more significant are the structural variations that the Euromarket is becoming famous for.

*Deep discount convertibles:* Such a bond is usually issued at a price which is 70 to 80 per cent of its face value. And the initial conversion price, and the coupon rate levels, are lower than that of a conventional Eurobond.

*ECBs with warrants:* Strictly speaking, these financial instruments are nothing but derivatives of Euro-bonds. They are a combination of debt, with the investor getting an option on the issuer's equity. The equity option, or warrant, is detachable from the host bond and it can be cashed after specific points of time. However, the bonds, which have a debt life of seven to 10 years, remain outstanding until they mature. "There can be structural variations, or even derivative products which combine the risk, yield, and expectations of the issuer and the lender". For instance, they could be zero coupon bonds which carry a conversion option at a predetermined price, which are called liquid yield option notes.

*Bull spread warrants:* These warrants offer an investor exposure to the underlying share between a lower level, L, and an upper level, U. The lower level is set to provide a return to investors above the dividend yield on the share. After maturity - usually three years - if the share price is below the level L, then the investor receives the difference from the company.

Compensating for the downside protection, the issuer can cap the up-side potential on the share. When it matures, if the issuer's share price is above the level U, the issuer has to pay but only the amount U. If the stock is between L and U on maturity, the issuer has a choice of either paying the investor cash or delivering shares. As the minimum return is set above the dividend yield on shares, the structure works best for companies with a low dividend yield.

*Money-back warrants (MBWs):* MBWs entitle an investor to receive a certain predetermined sum from the issuer provided the investor holds the warrant until it matures, and does not convert it into shares. To the investor, the cost of doing so is not only the cash he loses, but also the interest foregone on that sum of the money. This means that companies must offer a higher premium than they normally do.

*Syndicated loan:* The earliest to be evolved and, for a time, the most dominant form of cross-border lending was the syndicated bank loan. Throughout the late seventies and early eighties most of the developing country borrowers relied on this source since their credit ratings and reputations were not good enough for them to avail of other avenues such as bond issues. A large bank loan could be arranged in a reasonably short time and with few formalities. This was also a period during which banks found themselves being flooded with inflows of short term funds and a relatively depressed demand for loans from their traditional developed country borrowers.

*Bonds:* A bond is a debt security issued by the borrower, purchased by the investor, usually through the intermediation of a group of underwriters.

The traditional bond is the straight bond. It is a debt instrument with a fixed maturity period, a fixed coupon which is a fixed periodic payment usually expressed as percentage of the face value, and repayment of the face value at maturity (This is known as bullet repayment of the principal). The market price at which such a security is bought by an investor either in the primary market (a new issue) or in the secondary

market (an existing issue made sometime in the past) is its purchase price, which could be different from its face value. When they are identical the bond is said to be selling at par, when the face value is less than (more than) the market price, the bond is said to be trading at a premium (discount). The difference could arise because the coupon is different from the ruling rates of interest on bonds with equal perceived risk or because market's perception of creditworthiness of the issuer is different. The yield is a measure of return to the holder of the bond and is a combination of purchase price and the coupon. However there are many concepts of yield. Coupon payments may be annual, semiannual or some other periodicity. Maturities can be upto thirty years. Bonds with maturities at the shorter end (7-10 years) are often called notes.

A very large number of variants of the straight bond have evolved over time to suit varying needs of borrowers and investors.

A callable bond can be redeemed by the issuer, at issuer's choice, prior to its maturity. The first call date is normally some years from the date of issue; e.g. a 15 year bond may have a call provision which allows the issuer to redeem the bond at any time after 10 years. The call price i.e. the price at which the bond will be redeemed is normally above the face value with the difference shrinking as maturity is approached. This feature allows the issuer to restructure his liabilities or refund a debt at a lower cost if interest rates fall. In an environment of higher interest rates (i.e. when they are expected to fall) the callable bond will have to give an incentive to the investor in the form of a higher yield compared to an otherwise similar non-callable bond. A puttable bond is the opposite of a callable bond. It allows the investor to sell it back to the issuer price to maturity, at investor's discretion, after a certain number of years from the issue date. The investor pays for this privilege in the form of a lower yield.

Sinking fund bonds were a device, often used by small risky companies to assure the investors that they will get their money back. Instead of redeeming the entire issue at maturity, the issuer would redeem a fraction of the issue each year so that only a small amount remains to be redeemed at maturity.

A floating rate note (FRN) is, as its name implies, a bond with varying coupon. Periodically (typically every six months), the interest rate payable for the next six months is set with reference to a market index such as LIBOR. In some cases, a ceiling may be put on the interest rate (capped FRNs), while in some cases there may be a ceiling and a floor (collared FRNs).

Zero coupon bonds are similar to the cumulative deposit schemes offered by companies in India. The bond is purchased at a substantial discount from the face value and redeemed at face value on maturity. There are no interim interest payments. One possible advantage can arise from tax treatment if the difference between the face value and the purchase price, realised at maturity is deemed to be entirely capital gains and taxed at a rate lower than the rate applicable to regular interest received on coupon bonds.

Convertible bonds are bonds that can be exchanged for equity shares either of the issuing company or of some other company. The conversion price determines the number

of shares for which the bond will be exchanged; the conversion value is the market value of the shares which is less than the face value of the bond at the time of issue. As the price rises, the conversion value rises. There is generally a call provision attached which allows the issuer to redeem the bond when the share price rises above a certain level which forces the holder to convert in order to avoid losing the premium on the bonds. Convertible bonds carry a coupon below that of a comparable straight bond, thus reducing cash outflow on account of interest. Small but rapidly growing companies find it an attractive funding device. It is a form of deferred equity, effectively sold above the current market price. One motivation might be that the issuer believes that the market is currently underpricing its shares.

Warrants are an option sold with a bond which gives the holder the right to purchase a financial asset at a stated price. The asset may be a further bond, equity shares of a foreign currency. (Currency warrants have been particularly popular in the Euromarkets). The warrant may be permanently attached to the bond or detachable and separately tradable. Initially warrants were used by speculative issues as an added incentive to the investor to keep the interest cost within reasonable limits. Recently even high grade companies have issued warrants.

A large number of other variants have been brought to the market. Among them are drop-lock FRNs, convertible FRNs, dual currency bonds, bonds with exotic currency options embedded in them, bonds denominated in artificial currency units such as ECU and so on. Short descriptions of some of these are given in the appendix to this chapter. A few of these will be analysed in detail in later chapters.

Bonds (straights, FRNs, zero-coupons etc.) can be classified into three categories. Domestic bonds are bonds issued by a resident issuer in its country of residence, denominated in the currency of that country. Examples are dollar bonds issued by US Treasury of a US corporation in the US capital market. Foreign bonds are bonds issued by a non-resident entity denominated in the currency of the country of issue. A US dollar bond issue, in the US capital market, by a British corporation or the Mexican government is a foreign dollar bond. Eurobonds are bonds denominated in a currency other than the currency of the country in which they are issued. Thus a deutsche-mark bond issued in Luxembourg is a Eurodm bond. In earlier years the main distinction between foreign bonds and Eurobonds used to be in the character of the underwriting syndicate and composition of the investors. For foreign bonds, the syndicates were constituted by investment banks resident in the country of issue and investors too were predominantly residents of that country. Thus, a foreign dollar bond in the US would be underwritten by a syndicate composed of American investment banks and predominantly subscribed to by American investors. A Eurobond issue on the other hand would be underwritten by an international syndicate and subscription would be spread across a number of countries. Over the years, this distinction has more or less disappeared and it has become difficult to distinguish between the two on this basis.

The other basis for distinguishing between foreign bonds and Eurobonds could be the role played by domestic regulatory authorities. Thus for dollar bonds, issues made in US are subject to SEC regulations and registration; Eurodollar bonds are not. They are thus like bearer bonds. Different countries have different regulations in this matter.

Many Eurobonds are listed on stock exchanges in Europe. This requires that certain financial reports be made available to the exchanges on a regular basis. Trading in the secondary markets is done on the exchange through dealers (e.g. Eurodollar bonds).

Compared to syndicated bank loans, bond issues are a more expensive funding device in terms of issue costs. Much more elaborate preparations are required to ensure success of the issue. In some segments such as the US and Japan domestic markets, formal credit ratings are essential and, as in the case of US, disclosure requirements are quite elaborate. In general, bond issues as a funding device, are difficult to access without a good credit standing.

Bond issues can be public offerings or private placements aimed at a limited number of large institutional investors. Registration and other requirements can be different for private placements. In the Eurobond markets, costs of an issue consisting of management fees, underwriting fees and selling commissions can be quite large amounting upto 2% of the issue size.

It has been estimated that during the 1980s, 70% of all Eurobond issues were tied to a Swap deal. A financial swap is not a funding instrument in itself. Rather, it is a transaction which allows both investors and issuers to achieve specific financial objectives such as particular currency composition of assets or liabilities, changing the interest basis of a liability or asset from fixed to floating or vice versa, reduce cost of borrowing by arbitraging certain market imperfections or differences in tax regulations and so forth. A swap deal can be done at the time of a new borrowing or with an existing asset or liability.

### **Short term instruments**

The short term capital market can be used to raise funds. The instruments are:

*Certificate of deposit:* Certificate of deposit is a certificate issued by a bank evidencing receipt of money and carries the bank's guarantee for the repayment of principal and interest. Certificates of deposits are negotiable instruments and are issued payable to bearer and are traded in the secondary market. The certificate of deposits are issued for a minimum denomination of U.S. dollar 50,000/- and for a maximum period, generally of 1 year.

Certificates of deposits provide an excellent avenue to the investors in Eurocurrency market who would like to park their surplus in a high interest instrument with liquidity. For example if an investor say bank surplus fund which it would like to invest for a period of say 3 months it can buy a C.D. for 3 months. If need be, the bank can sell the C.D. in the secondary market and liquidate it.

*Straight or top CDs:* These are certificates of deposits with a fixed rate of interest and a fixed date of maturity (Generally 1-12 months). The interest is fixed in terms



of LIBOR and interest rate depends on the standing of the issuing bank and liquidity position in the market **Floating Rate CDs:** These are certificates of deposits which are issued with the interest rate linked to the LIBOR rate and are normally issued for a period of maximum of 3 years. Interest rate is reviewed at predetermined periodicity say every six months and adjusted in line with the base rate (i.e.) LIBOR rate. **Discount CDs:** These are issued at a discount and are paid at maturity for the face value, the difference between the issue price and face value representing the interest. **Tranche CDs:** A Tranche CD is a share in a programme of CD issues by a bank upto a predetermined level. Each Tranche CD carries the same rate of interest and matures on the same date. They are normally placed directly with the investors and they represent short term bonds. These CDs are issued with maturities upto 5 years.

**Commercial papers:** Commercial Paper (CP) is a short term unsecured promissory note that is generally sold by large corporations on discount basis to institutional investors and other corporates for maturities ranging from 7 to 365 days. Commercial paper is cheap and flexible source of fund for highly rated borrowers as it works out cheaper than bank loans. For an investor it is an attractive short term investment which offers higher interest than bank accounts.

In U.S.A. the commercial paper is in existence for more than 100 years and accounts more than 400 billion US dollars. U.S.A. is the largest commercial paper market. It is used extensively by U.S. and non U.S. corporations. Any issuer who wants to launch a C.P. in U.S.A. has to get it rated by Moody's or by Standard and Poor's Corporation, the credit rating agencies. The commercial papers then can be placed either directly or through C.P. dealers. The major investors are Corporates, Trusts, Insurance Companies, Pension Funds and other funds, banks etc.

Commercial papers can be issued either directly in their own name or with third party support in the form of standby letters. Most C.P. programs have a back-up credit line of a commercial bank covering at least 50% of the issue.

In Europe, commercial paper evolved out of Euronotes like Note issuance facility, which are under-written facilities. As the underwriting facility is expensive, in 1984, Saint Gobbain, an issuer and Banque Indo-Suez dealer issued Euronotes without underwriting facility and thus became the first Euro-CP issue. The commercial paper issues in the Euromarkets developed rapidly in an environment of securitisation and disintermediation of traditional banking.

## RESOURCES FOR INVESTING ABROAD

For investing abroad resources can come from all the above sources as well as internal sources of the organization and the domestic capital market. Developed country entities use internal and external sources extensively. Developing country entities hitherto depended on external sources heavily and foreign exchange earnings. Now domestic capital sources are also depended on.

## FOREIGN CURRENCY MANAGEMENT

International financing as well as investment involve quite a lot of currency management exercises. Foreign exchange management is an integral part .

### Concept of foreign exchange

Foreign exchange refers to foreign currency and includes i) all deposits, credits and balances payable in any foreign currency, and any drafts, travellers' cheques, letters of credit, bills of exchange expressed or drawn in Indian currency but payable in any foreign currency and ii) any instrument payable, at the option of the drawee or holder thereof or any other party thereto in foreign currency or partly in foreign and domestic currency. Foreign exchange refers to foreign money, which includes foreign currencies and foreign currency denominated assets. Foreign exchange includes foreign currency balances abroad and instruments claimable in foreign currency payable abroad.

Foreign exchange refers to the mechanism of converting currency of one country into another country's currency. Foreign exchange is the value of monetary claims that the nationals of a country enjoy over the rest of the world.

Foreign exchange facilitates exchange of goods and services among countries, because it serves as the medium of exchange and store of value. Foreign exchange is simply foreign money in the possession and ownership of nationals of a country and the same results from receipts across borders and is paid for payments across borders. Thus trade between countries is the cause and use of foreign exchange.

Stock of foreign exchange in a country indicates the economic superiority of the country either as a major power in export of goods and services or as major power of attracting foreign capital or both. Huge stock of foreign currency indicates that the country is depended more on by the rest of the countries than this country's dependence on the rest.

Huge stock of foreign exchange in a country enhances the external value of the domestic currency. In today's world this is one of the few yardsticks of a country's well-being.

Foreign exchange is needed for settlement of trade and non-trade transactions. Foreign exchange is a treasure that helps to tide over external, economic and natural shocks.

### Foreign exchange market

Foreign exchange market is the market where money denominated in one currency is bought and sold with money denominated in another currency. Transactions in currencies of countries, parties to these transactions, rates at which one currency is exchanged for other or others, ramifications in these rates, derivatives to the currencies and dealings in them and related aspects constitute the foreign exchange (in short, forex) market.

*Demand and supply sides of forex market:* Foreign exchange transactions take place whenever a country imports goods and services, people of a country undertake visits to other countries, citizens of a country remit money abroad and whatever purpose, business units set up foreign subsidiaries and so on. In all these cases the nation concerned buys relevant and required foreign exchange, in exchange of its own

currency, or draws from foreign exchange reserves built. On the other hand, when a country exports goods and services to another country, when people of other countries visit the country, when citizens of the country settled abroad remit money homewards, when foreign citizens, firms and institutions invest in the country and when the country or its business community raises funds from abroad, the country's currency is brought by others, giving foreign exchange, in exchange, inflow of foreign exchange takes place. In the former set of situations demand for foreign exchange takes place, while in the latter case there results supply of foreign exchange. Parity in the demand and supply factors lead to stability to the price of one currency in terms of another. When demand exceeds supply, the country's currency suffers value diminishment in terms of other currencies and vice versa. These supply and demand imbalances are caused by changes in exports and import of goods and services. Usually when a country's exports rise, its currency appreciates in value. In the opposite situation, the currency depreciates. Also, International capital flows affect value of one currency in terms of another. Due to favourable investment climate in India, capital from the west has been gushing into India, of late. In the situation, Rupee ought to have appreciated against major free currencies, especially the US dollar but for the Central Bank's market intervention operation whereby, Reserve Bank of India (RBI) buys US dollar in the open market just to help the capital inflows flow continuously. Through currently US 1 \$ = Rs. 46.5 or so, without RBI's intervention, US 1 \$ may be available for Rs. 45 or so. Central Bank's buying of foreign currency is a demand propelling factor, or a supply neutralising factor which keeps domestic currency subdued. In case Central Bank pumps forex into the market the domestic currency appreciates in value.

*Players in forex market:* Exporters and importers of goods and services, the Central monetary authority of the countries, people undertaking international visits for whatever purpose, forex dealers, forex speculators, cross border investors including transnational corporations, etc. are parties to the forex market. Exporters and importers cause the primary demand for an supply of forex. Central monetary authorities (the RBI in India, the Federal Reserve Bank in the USA, and the like), by the their monetary policy measures, control over inflation in their countries and intervention in the forex market, operate in the forex market effectively. International travellers just like exporters and importer contribute to demand and supply of forex, as the case may be. Forex dealers and speculators (ie. bankers, businesses, etc.) influence market forces decisively by their operations. They undertake genuine 'buy and sell' operations and also speculative 'buy and sell' operations. Cross border investors are instrumental for capital outflows and inflows. Individual and institutional investors are affecting transnational investments. Their operations affect the supply side of the forex market in the recipient nation. When they resort to disinvestment, the demand side is affected. There are 'havala' operators too. They are operating a forex market outside the ambit of national accounting. They are, perhaps the 'black' marketers or the 'illegal' marketers. Finally governments are also operators, for they



may take loans from or give loans to other governments and therefore, buy or sell claims on foreign exchanges. Some of the major players in forex markets are dealt here.

- *Brokers:* Brokers play a important role in the foreign exchange market: the foreign exchange brokers bring the buyer and seller together and put through the deals. The brokers through well developed telecommunication network have easy access to many banks and other operators apart from access to market intelligence. Brokers deal in the market for a fixed scale of commission and they do not generally deal on their own account. Brokers by specialising in certain currencies and maintaining constant touch with dealers tend to have greater knowledge and information about certain currencies and hence pass on market intelligence to dealers. The forex brokers' level of activity depends upon the tradition and practice prevailing at a particular centre and the law of the land.
- *Dealers:* The banks and other big corporate houses who deal in the foreign exchange market as principals, buy and sell foreign exchange on their own account. They are dealers in the market. They are the major players in the foreign exchange market and they are at liberty to put through the transactions either directly or through foreign exchange brokers.
- *Commercial banks:* A major force in forex market is that of the commercial banks. Banks are the major players in forex market accounting for major chunk of the business, about 90%. Commercial banks are the major players in the forex market and they are the 'Market Makers'. Commercial banks dealing in international trade transactions offer services of conversion of one currency into another to its clients. These banks specialise in foreign exchange dealings and they have a large network of correspondents/their own foreign offices spread globally. This kind of wide network helps commercial banks to conduct foreign exchange business with fitness and in an orderly way.

When a banker gives a quotation for a foreign currency, he will give two rates - his buying rate and his selling rate of the foreign currency. The bank's buying rate for the foreign currency is called 'bid' rate. The selling rate is called 'ask' or 'offer' rate. The bid rate will be and should be greater than ask rate. The bid-ask spread is meant to help the banker to meet his expenses of the transaction and register a reasonable profit for his entrepreneurship in rendering the service.

A commercial bank quotes on demand, a two way quotation, its buying and selling rates for a particular currency against another currency with a readiness to buy or sell the currency. They buy and sell foreign exchange and take positions. Normally, a commercial bank buys foreign exchange from an exporter and sells to an importer. In an ideal situation if a bank sells all the foreign exchange it buys then it is not taking positions and remain square. However the amounts involved do not match and hence in the process they end up with more or less of a foreign currency, i.e., they take positions

in the currency. If a bank buys more of a certain currency than what it ends up with a overbrought position. Similarly, when a bank ends up selling more than what it buys in a certain currency it is said to be in a oversold position. Then the bank, to eliminate the risk involved in keeping open positions, goes to the inter-bank market either directly or through foreign exchange brokers and square up their positions. In other words banks having over brought position sell the currency in the market to square up their position. All the banks dealing in forex business build up positions and approach inter-bank market to square up their position and hence there is a huge market.

A commercial bank may instruct a broker to buy or sell a particular currency against another currency at a specific rate or within a band. The broker hunts around to locate a bank, with a matching need, strikes the deal and takes his commission. However banks do not always engage the services of a broker and they do deal directly in the inter-bank market. Commercial banks by taking an active and direct role in the forex market with wide network of offices and correspondents all over the world develop the necessary expertise and hence render better professional service to its clients in international trade and through astute forex risk management, improve their bottomline.

- *Corporate houses:* Another major force in forex market is that of the corporate houses. Big corporate houses particularly multinationals and transnational with business interest spread in more than one country have a need to deal in the forex market for a variety of purposes related to their business. To list a few 1. Import payments, 2. Export receipt conversions, 3. Payment of dividend to investors, 4. Repayment of loan designated in foreign currency, 5. Interest payment on borrowings etc. Some corporate houses participate in the market just to cover their exposures present or prospective to eliminate risk element in forex without any profit motive on forex front. However, big multinationals with considerable expertise in foreign exchange dealings do take positions in currencies with an objective of making profit.
- *Speculators:* Speculators like in any other market, play a very active role in the foreign exchange market. More than 90% of the forex deals put through the market are speculative in nature. Speculators take positions in the market with a view to profit from the exchange rate movements. Hence speculators end up gaining or losing on account of the movements in the exchange rate. Such a speculative trading do no good to the international trade or economy but could prove to be harmful to the global economy. However, a school of thought opines that it is the speculators who provide the much-needed liquidity and efficiency to the forex market which is essential for its smooth functioning. Speculation is an inevitable concomitant to the forex market and whether it is constructive or not is a matter of perception. The following are the speculators in the forex market:
  1. Banks which take positions without squaring up with a view to make profit on currency movements, ii. Corporate entitles with forex dealings taking positions

in the market with a motive to boost up their bottomline, iii. Governments which take positions without covering in the forex market with the objective of profiting from currency trading and iv. Individuals who, like share market operators, buy and sell foreign exchange or foreign currency denominated deposits, securities, bonds, stocks, etc. with an objective of making short term gains from favourable exchange rate fluctuations. The above list of speculators is only illustrative and not exhaustive.

2. *Central banks:* In most of the countries the Central Banks are entrusted with the responsibility of maintaining the external parity of the country's currency. In countries following fixed exchange rate system - (fixed exchange rate means maintenance of external value of the currency at a predetermined level) - the central bank of the country is responsible for taking necessary steps to maintain the rate. In case of countries where floating exchange rate system exists the Central Banks have the responsibility to ensure orderly movement of foreign exchange rates. Floating exchange rate system means a system where exchange rates are determined by demand for and supply of foreign exchange in the market.

### Exchange rate types

Foreign exchange rate, more widely known as exchange rate, is the price of a unit of a foreign currency in terms of the domestic currency. It is the ratio between the value of one currency and that of the other. One American dollar is available for about Rs. 46.50 in Mar 2001. That is: \$ 1 = Rs. 46.5 or Rs. 46.5/\$. It can be quoted the other way also. That is: Rs. 1 = \$ 0.0215 or \$ 0.0215/Re. As exchange rate is, price of one currency in terms of other, when a currency appreciates in value against the other, the latter's value depreciates against the former. There is a cluster of rates in use in forex market. Direct and Indirect rates, Spot rate and forward rate, buying rate and selling rate, single rate, fixed rate, floating rate, flexible rate, cable or T.T. (Telegraphic Transfer) rate, havala rate, official rate, market rate, futures rate etc.

- *Direct and indirect rates:* Direct rate expresses units of home currency per unit of foreign currency. In India, Rs./\$ or Rs./Euro or so is the style of giving quotation now adopted. This is direct quotation. Indirect rate expresses units of foreign currency per unit of home currency. This style is adopted in UK. But when the two currencies compared are foreign currencies, the direct and indirect quote concept does not exist.
- *Spot and forward rates:* Before we go into spot and forward rates, let us deal with the spot and forward markets. Spot market in foreign exchange refers to buying and selling forex, with payments and delivery taking place immediately. In practice, payments and delivery take place 2 days after. In extreme cases, payments and delivery upto a week may be accepted or payments may be made on the same day

or the next day of transaction as well. Forward market in foreign exchange refers to transactions which are completed at the end of specified periods, but the rates are settled at the time when the contracts are made. The essence of a forward transaction is that a rate of exchange is fixed now between the parties. Both payment and delivery will take place at the future date. The rate is determined in advance to ward off against uncertainty of exchange rate in future. The relationship between spot and forward rate, the determinants of discount/premium of forward rate against the spot rate and relevant other points are dealt with under our discussion of spot and forward exchange rates.

Spot Rate of exchange is the rate for immediate delivery of foreign exchange. It is prevailing at a particular point of time. Though immediate delivery is construed, in practice delivery takes place 2 working days later is followed. Spot market also has the segment where settlement has to take place the same day of transaction. This is called cash or ready market. If settlement is posted for next day, the market is called “tom market”, the term “tom” means tomorrow.

In Forward rate, the rate quoted is for delivery at a future date, which is usually 1, 2, 3, 4, 5 or 6 months later. The forward rate may be at a premium or discount to the spot rate. Premium rate, i.e., forward rate is higher than the spot rate, implies that the foreign currency is to appreciate in value in the future. May be due to larger demand for goods and services of the country of that currency. Say, for example, the forward premia in cents per UKPS in July, for importers and exporters are as given below for Aug, Sep, Oct, Nov and Dec (Direct quotations are assumed here).

**Premium—discount in forward deals**

Category	Aug	Sep	Oct	Nov	Dec
Importers	16	29	43	58	77
Exporters	12	25	39	54	73
Premia %	5.15	5.1	5.2	5.35	5.78

(Annualised)

As UKPS is expected to appreciate, premium quotes are prevailing. On the other hand if it is expected to depreciate forward discounts shall be quoted. The percentage of annualised discount or premium in a forward quote, in relation to the spot rate, is computed by the following:

$$\text{Forward premium} = \frac{\text{Forward rate} - \text{Spot rate}}{\text{Spot rate}} \times \frac{12}{\text{No. of months forward}}$$

If the spot rate is higher than forward rate, there is forward discount and if the forward rate is higher than the spot rate, there is forward premium rate. The annualised premium in per cent is given above in table 3.1, in the last row. Among others, the inflation and

interest rate factors affect the forward rate of foreign exchange. When the rates of inflation in the countries of currencies compared, differ during the forward contract period, difference between 'spot and forward' rates is bound to happen. The change in the ratio of domestic prices measured by inflation rates is matched by corresponding changes in exchange rates. Say, the inflation is 4% in US and 8% in India. Then the price of rupee in terms of dollar must fall by  $(0.04-0.08)/1.08$  or by  $1/27$  of the spot rate. Dollar, here will quote at premium.

Interest rate differences in the two countries also affect forward rates. It is held that the ratio of the forward and spot exchange rates will be equal to the foreign and domestic interest rates. Taking rupees and dollar:

$$\frac{\text{Forward rate Rs./\$ 'n' period}}{\text{Spot rate Rs./\$}} = \frac{[1+\text{Interest rate in India 'n' period}]}{[1+\text{Interest rate in US 'n' period}]}$$

Besides the interest and inflation factors, expectation as to spot rate in the future is likely to cause difference between current spot and current forward rates.

What is the need for forward rates? An Indian firm is importing a machinery, valued at Rs. 46,50,000 from a USA concern which gives a trade credit of 2 months. At the spot exchange rate of 1 US \$ = Rs. 46.5, the amount payable by the Indian firm is US \$ 1,00,000. It can buy US \$ 1,00,000, 60 days later and settle the account. But, by 2 months from now, if the dollar is expected to appreciate to say Rs. 46.80, the company has to shell out additional Rs. 30,000 to get the same \$ 1,00,000. Buying dollar now itself leads to locking up of investment and hence an avoidable interest cost is involved. To guard against both, the company goes for a forward trade. Say the forward rate is \$ 1 = Rs. 46.65. Irrespective of the spot price 60 days later, the Indian firm can get the needed \$ 1,00,000 for a price of Rs. 46,65,000, involving additional Rs. 5000 outgo. Thus, fear of appreciation/depreciation of currencies, drive individuals/ institutions to take shelter under forward rates. The price of this secured feeling is Rs. 5000, the forward premium involved.

- *TT rates:* Forex market is not exactly a place and that there is no physical meeting, but meeting is affected by mail or over phone. Below in table 3.2 is given the Telegraphic Transfer (TT) selling and buying rates for different foreign currencies as on 24th July 1995 and on 25th Feb 2001. Between the two dates, that is during the six year period, the rates have changed. If the rate on 25th Feb 2001 is greater than that of 25th July 1995, against that currency, rupee has depreciated and vice versa. Rupee has depreciated against all but DM, Netherland Guilder and FF.

**Rate per unit of forex in Rupees**

Currency	TT selling on		TT buying Rate on	
	25.7.95	24.2.01	25.7.95	24.2.01
US Dollar	31.52	46.71	31.29	46.25
Sterling	50.34	67.93	49.95	66.60
D Mark	22.78	21.70	22.60	21.28
Japan Yen	0.3595	0.4027	0.3568	0.3949
Swiss Franc	27.33	27.71	27.10	27.17
French Franc	6.96	6.47	6.50	6.35
Netherland Guilder	20.33	19.26	20.17	18.89
Australian Dollar	22.55	26.88	22.36	26.36
Canadian Dollar	23.21	30.64	23.03	29.75
Sweedish Kroner	4.42	4.7	4.37	4.57
Hong Kong Dollar	4.08	5.98	4.04	5.93

*Merchant rates or quotations:* The bid-ask rates given by a banker are meant for another banker. For merchant clients (exporters, importers, tourists, etc.) the rates given by a banker are different and these are called as merchant rates.

Merchant TT buying rate = Inter bank bid rate - Exchange Margin

Merchant TT selling rate = Inter Bank ask rate + Exchange margin

(Exchange margin is the margin taken over by the banker. Margin is subtracted when the banker buys the forex and is added when the banker sells the forex. The rate of margin is fixed generally by forex dealers association).

*Single and multiple rates:* Single rate refers to the practice of adopting just one rate between two currencies. A rate for exports, other for imports, other for transactions with preferred area, etc. if adopted by a country, that situation is known as multiple rates.

*Fixed, flexible and floating rates:* Fixed rate refers to that rate which is fixed in terms of gold or is pegged to another currency which has a fixed value in terms of gold. Flexible rate means the exchange rate is fixed over a short period, but allows the same to vary in the long term in view of the changes and shifts in demand and supply. Floating rate refers to the 'natural price' of one currency in terms of another as conditioned by the free play of market forces. The rate is allowed to freely float at all times. The rate of exchange between two currencies adopting floating rate system fluctuates from day to day or even minute, due to changes in demand and supply. But those movements take place around a rate which may be called the 'normal rate' or the par of exchange or the true rate.

*Cross rates:* The exchange rate between 2 given currencies may be obtained from the rates of these two currencies expressed in terms of a third currency. The resulting



rate is called the cross rate.  $1 \text{ PS} = \text{Rs. } 66.60$  and  $1 \$ = \text{Rs. } 46.25$  on 25th Feb 2001. We may write these as follows:  $\text{Rs. } 66.60/\text{PS}$  and  $\text{Rs. } 46.25/\$$ . To get, the value of US dollar in terms of pound sterling (PS), we need to find the value of PS/\$. We have to note that  $\text{PS}/\$ = \text{PS}/\text{Re.} \times \text{Re.}/\$ = 1/66.60 \times 46.25 = 0.6944$ .

*Other rates:* Buying rate and selling rates refer to the rate at which a dealer in forex is willing to buy the forex and sell the forex. In theory, there should not be difference in these rates. But in practice, the selling rate is higher than the buying rate. The forex dealer, while buying the forex pay less rupees, but demands more rupees when he sells the forex. After adjusting for operating expenses, the dealer books a profit through the 'buy' and 'sell' rates differences. Transactions in exchange market consists of purchases and sales of currency between dealers and customers and between dealers and dealers. The dealers buy forex in the form of bills, drafts and credits with foreign banks, from customers to enable them to receive payments from abroad. The resulting accumulated currency balances with dealers are disposed of by selling instruments to customers who need forex to make payments to foreigners. The selling price for a currency quoted by the dealer (a bank) is slightly higher than the purchase price to give the bank small profit in the business. Each dealer gives a two-way quote in forex.

### Sub-markets

The forex market has many sub-markets like the spot, forward, arbitrage and derivatives (i.e., options, futures and swap ) markets. These are dealt here.

1. *Spot market:* We have already discussed a little about spot market. Spot market is used by buyers and sellers of forex where the delivery is immediate. An exporter has received the demand draft for value exported. He has to go the spot forex market for conversion of forex into home current. A foreign tourist similarly goes for spot forex market. A banker who buys forex drafts and who issues forex drafts, uses the spot market.
2. *Forward market:* Forward market is used by importers to buy forward forex needed in future and by exporters to sell forward the forex receivable in future, importer goes to the forward buying, because he fears appreciation of the foreign currency in due course and he wants to lock into a currently prevailing forward rate instead of taking chance on the future spot rate. The exporter goes to sell forward forex, for the fears depreciation of the foreign currency and by selling forward he knows the amount of home currency he can get against his forex receivables. Speculators use forward market to speculate. If they expect a particular currency to depreciate they will sell forward that currency. If their expectation is appreciation of a currency, they will buy forward the currency. Apart forward buying and forward selling contracts, there are option forward contracts and rollover forward contracts. In option forward contracts, the client has option as to time, spread over a certain period, of exercising his contract. Roll over forward contracts involve rolling over of the forward contracts again and again for further periods.

Say a US importer has to pay pound sterling (PS) 2,00,000 to her seller on 20th December for imports made in August. In September she is worried that the pound sterling may appreciate against the dollar. So she covers her position to buy forward pound sterling at \$ 1.8518/PS. The spot rate is \$ 1.7241/PS. Say the spot rate by Dec. become \$ 1.9231/PS expected.

The US importer can get US 2,00,000 at \$ 1.8518/PS even though pound sterling has increased in value to \$ 1.9231/PS. She has thus hedged herself against pound sterling appreciation. However, if pound sterling depreciates to say \$ 1.4286/PS she can't benefit out of this.

3. *Arbitrage market:* Arbitrage In foreign exchange market, arbitrage refers to buying a foreign currency in a market where it is selling lower and selling the same in a market where it is going higher. Consider the case given below. Arbitrage involves no risk as rates are known in advance. Further, there is no investment required, as the purchase of one currency is financed by the sale of the other currency. Arbitragers gain in the process of arbitrating

Market A	Market B
Rate: PS 0.7/\$	Rate: \$ 1.39/PS
Then, \$ 1.428/PS	\$ 1.39/PS (originally given as above)
Then, Sell PS (to get more \$)	Buy \$ (Paying less PS)
Buy PS (Paying less \$)	Sell \$ (to get more PS)

4. *Derivatives market:* Derivative markets include options, futures and swaps. Derivatives are essentially hedging instruments. Hedging refers to risk avoidance. In forex market, risk arises due to fluctuation in exchange rate. Gone are the days of fixed exchange rate system. In most part of the world trade, investment and financial liberalisation are being introduced. With that, residents of a nation, foreign institutional investors, GDR/ADR issuers, non-residents having investments in their own country and corporations bidding for/executing projects abroad are put to trade or non-trade related foreign exchange exposures. They prefer to hedge against risk. Options, futures and swaps help hedging.

### Foreign exchange derivatives

Derivatives are second line instruments derived from and on the strength of the prime instruments. On the strength of the basic instrument, viz., foreign exchange, derived foreign instruments such as options, futures and swaps are in vogue these days. And these derivatives are separately traded and priced. The forex market dealing in the derivatives is called the derivatives forex market.

There are three types of derivatives in forex. These are: options, futures and swaps. These are explained in detail below.



**Options:** An options contract gives right and does not entail any obligation to the buyer of the option. The seller of the option, however, has obligation if the buyer exercises his right.

- *Types of options:* An options contract is a contract whereby one party, say 'A' confers the right to other party, say 'B', entitling B to buy an underlying asset, say \$ 1 mn, on or before 22 December, at a price (called strike or exercise price now itself agreed) of say, Rs. 46.8/\$, for an upfront commission (also called as price or premium) of Re. 0.735/\$. This is called **call option** as the right traded is right to "buy" an asset. If the right given is to "sell" an asset, it is called **put option**. A put option is one where, say M gives a right to N, whereby N is entitled to sell PS 1 mn to M at a strike price of \$ 1.38 per PS on 23rd Dec., for an upfront commission of \$ 0.32/PS. This is a put option. If P gives right to Q, enabling Q to buy or sell PS 1 mn at a strike price of \$ 1.42/PS on or before 22 Dec., for an upfront commission of \$ 0.52/PS, the contract is called "**put and call**" option as 'Q' can go for buying or for selling as he finds good for him. In options contract, buyer has right and no obligation. The seller has obligation if the first party exercises his right. From another perspective options in foreign exchange are of two types. In the context, options may be '**cross currency**' options and '**rupee based options**'. Rupee based options include writing of options involving sale or buy of a foreign currency against Indian rupee. Cross currency options would include those involving sale/purchase of foreign currencies against US \$ Cross currency options market is a fully developed global market
- *Option terminologies:* The person giving the 'right' is the '**writer**' of the contract or is called the seller of the option. The party who is entitled to the right is the '**holder**' or the buyer of the option. The foreign exchange rate at which the 'buy', 'sell', or 'buy and sell' right is specified to be executed is known as the '**strike price**'. If the strike price is equal to the current exchange rate, then the contract is said to entered into '**at the money**'. If the strike is otherwise called the '**exercise price**' If it is more than the current exchange rate, in the case of call option the contract is said to be **out of money** as it is not beneficial to the holder and in the case of a put option the contract is said to be **in the money**. Similarly, a call option will be in the money when the current exchange rate is higher than the strike rate and in such a case the put option becomes out of money To give the right, the writer gets a price, which is called the '**premium**'. '**Intrinsic value**' of an option refers to:  $\text{Max} \{ 0, \text{Current Rate} - \text{Strike Rate} \}$  for call option and for put option:  $\text{Max} \{ 0, \text{Strike rate} - \text{Current Rate} \}$ . The difference between the 'option premium' and the 'intrinsic value' is **time value**.

'**Bid price**' is the price the buyer of option will pay for an option contract and '**offer price**' is the price at which will sell. An '**European option**' is one which can be exercised on the expiry date only, while an '**American option**', can be exercised any time until the expiry date. 'Expiry date' is the last date on which the option can be exercised.

- *Option quotation and market:* From the table 3.3 it may be understood, that, for example for PS 25000 call option, at the strike price of \$ 1.30/PS, the option premium for a contract expiring by June is 30.75 cents per PS, at the strike price \$ 1.60/PS, the option premium for a contract expiring by July, the premium is 5 cents per PS. For a similar 'puts' option the premium is 6.4 cents/PS and so on. As the strike rate rises, premium decreases for call options, and rises for put options. As the maturity period increases, premium increases for both types of options. If an option is not exercised, the premium paid is forfeited. In the table 3.3 given below quotations for sterling option contracts are given (figures hypothetical)

**London international finance futures exchange PS/\$ options 25000 (Cents per PS)**

Strike	Calls-last				Puts-last price			
	April	May	June	July	April	May	June	July
1.30	--	--	30.75	30.75	--	--	0.00	0.06
1.35	--	--	29.75	25.75	--	--	0.01	0.18
1.40	20.75	20.75	20.75	20.75	0.00	0.00	0.04	0.49
1.45	15.75	15.75	15.75	15.75	0.00	0.02	0.19	1.12
1.50	10.75	10.75	10.75	10.75	0.00	0.16	0.68	2.23
1.55	5.75	5.79	6.44	7.56	0.13	0.81	0.84	3.96
1.60	1.75	2.60	3.56	5.00	1.34	2.62	3.96	6.40

- *Options market:* Options are traded both on the over-the-counter market and regular exchanges. The options market is presently dominated by American Exchanges such as the Chicago Mercantile Exchange and Chicago Board of Trade. London International Financial Futures Exchange and London Trade Options Market (being merged into London Derivatives Market) are also important market. Other noteworthy options exchanges are MATIF of France, OSE and TCE of Japan, EOE of Holland, SOFFEX of Switzerland and DTB of Germany. Individual bankers and brokers play in the over- the- counter markets for derivatives with tailor-made products.
- *When the Option Is Exercised?* In the case of a call option, the option holder will exercise the option, when the market price of the underlying asset has risen beyond the strike price. Suppose the call option in PS against \$ is signed at a strike of \$ 1.38. If at maturity the price goes to, say, \$ 1.49/PS, the holder will exercise his option and will get PS at \$ 1.38 and he can sell the same at \$ 1.49 and pocket a gain of \$ 0.11 per PS bought. If he has paid a \$ 0.088 commission upfront, the net gain is \$ 0.022. On a std. PS option contract of the size 31250, the gain is = \$ 687.5. A put option will be exercised, when market price has fallen. The option holder can sell at the strike price (which is higher than market price) and make a profit. A 'put and call' option shall be exercised, whichever may market price goes. When an options

contract is exercised it is to the loss of the writer of the option. He has to net the loss against the upfront commission and find the net position.

- *Uses of options:* A call option can be used to hedge forex payable. Importers and debt-servicing entities can go for call option. If on the maturity date the foreign currency has not appreciated, the holder of call option can simply ignore the contract, as he is not under obligation to buy. A put option can be used to hedge forex receivables against depreciating foreign currency. Exporters and others with dated future receivables go for put option. Option contracts can be used for speculation as well.

## 2. *Futures*

One of the popular derivatives is futures. Futures contract involves an agreement between parties to exchange one asset for another at a pre-determined price fixed one in terms of the other, delivery taking place at a pre-specified date, subject to terms and conditions of futures exchange. The futures exchange, like a stock exchange or commodity exchange, sets terms and conditions governing members' dealings in the exchange. In a way, futures contract is similar to a forward contract, wherein also one buys an asset and other party sells the asset, settlement taking place at a future date, but at price mutually set while concluding the contract itself. But forward contract is different from futures contract on several counts, will be taken up for presentation later.

- *Types of futures :* Futures contracts are quite popular and have been practised since long time in commodities like wheat, cotton, coffee, etc and in bullion metals viz., gold and silver. Stock futures, interest rate futures and currency futures are of recent origin, ie., since 1970s. Broadly there are commodity, bullion and financial futures. Futures are traded in futures exchanges. The International Monetary Market (IMM) is a financial futures exchange of repute in the USA. It is a part of the Chicago Board of Trade (CBT). London International Financial Futures Exchange (LIFFE) is another reputed futures exchange.
- *Why futures?* Futures help insuring against risk. A firm has an export order delivery to be made in two months from now, payment to be received at the time of delivery. Let us assume that the contract is designated in foreign currency. By the time delivery is to be made, if the foreign currency has depreciated against the home currency, the exporter will be hurt. Say at the time of entering the contract, the Rs./Yen rate was 32/100. By the time of delivery, say the rate went down to 30/100. On an export of order of Yen 125 mn, the Indian exporter would realise only Rs. 37.5 mn, though at the time of entering the contract the value of the contract stood Rs. 40 mn, the loss being Rs. 2.5 mn.

There is another firm which contracts to buy a machine from a Singapore firm. Delivery and settlement to be made 3 months' time from now. The rates at the time of entering into the contract and at the time of performing the contract say, were: Rs./SD 24 and Rs./SD 26 respectively. The cost of the contract being SD 12.5 mn. The Indian

importer had to shell out Rs. 325 mn to get the SD 1 mn paid. Had rupee not depreciated against SD only Rs. 300 mn would have been sufficient, the loss being Rs. 25 mn.

The Indian exporter and the importer thus had lost money due to currency fluctuation. If any means by which this loss could be mitigated were available they would consider using the same.

Futures are one such means. Through futures one can hedge or cover one's exposure. The Indian exporter to Japan, having a long position in Yen, should go short by selling Yen futures. Say two month's Yen futures is going at Rs./Yen: 31.68/100. Then Rs. 39.6 mn could be obtained. Normally, futures trade are closed by entering reverse transaction towards the end and say the trader can buy the future at Rs./Yen 29.90. Then the Yen earnings would be sold in the spot at Rs./Yen 30. The loss in the spot is Rs.  $(30-32) \times 125/100$  mn = 2.5 mn as earlier worked out. The gain in the futures deal is: Rs.  $(31.68-29.90) \times 125/100 =$  Rs. 2.225 mn. There is net loss anyway of Rs. 0.275 mn. But this is far less than the loss that would have be fallen had there been no hedging through the futures, put at Rs. 2.5 mn. The loss is only 11% of the loss that would have resulted in the event of open position.

The Indian importer being short in SD, through the futures exchange, can buy figures, say he buys 10 futures, since each futures deal in SD is for SD 1.25 mn. Say the going futures rate Rs./SD is 24.6. By the time of delivery, say the future rate is Rs. 26.4. By selling 10 futures now, the previous futures deal can be squared up. And the profit in the squared up deal will be Rs. Rs.  $(26.4-24.6) \times 125$  mn = Rs. 22.5 mn. The net loss is: Rs. 25 mn - 22.5 mn = Rs. 2.5 mn. This is just 10% of the loss that would have resulted under unhedged trade. Hence the need for futures. Futures are also used for speculative dealings.

- *Futures market mechanism:* The features of the futures market are dealt below:
  - Organised:* Futures market is organised one. Members of the exchange can only deal in the exchange. Members can deal on their own or deal on behalf of others. Members who do business on their own are known as floor traders and those who trade on behalf of others are known as floor brokers. Those who do both are called as dual traders. Traders who give bid offer quotations are known as scalpers. They are market-makers, as they provide two-way quotes.
  - Standardised:* Deals are standardised in terms of size and settlement. In the IMM a futures contract in pound sterling is for 62500 pound sterling, in SD for SD 1,25,000, in Yen for Yen 125,00,000 and so on. A set of delivery months and specific, delivery day in each such month are specified. In the LIFFE delivery months are March, June, September and December and delivery day is Third Friday of respective months. All contracts remaining open until the settment day shall have to be settled by delivery, unless squared.
  - Clearing House:* Inter-posing of clearing house of the exchange between the parties is the order. That is, a contract between A & B is replaced immediately by two

contracts, viz between A and clearing house and between clearing house and B. This ensures protection against counter party risk.

*Marking to Market:* Marking to market is the daily practice. That is, say A buys SD 1,25,000 @ \$ 0.7000 per SD, from B. Say the next day, the closing rate is \$ 0.7005 per SD. Then, A has gained \$ 0.0005 per SD. On the SD 1,25,000 futures his gain is \$ 62.5. This is credited to A and he can withdraw. Being zero-sum, A's gain is B's loss and his account is debited \$ 62.5. This amounts to the contract being re-entered at \$ 0.7005 per SD. Next day, say the closing rate is 0.7002 per SD. Then, A has lost \$ 37.5 while B has gained \$ 37.5 and their accounts debited and credited. Minimum change in price that is recognised for making purpose is \$ 0.0001, which is called as one tick. One tick on a SD futures yields a gain/loss of \$ 12.5.

*Margin Money:* Margin Money is to be maintained by both parties. The amount depends on the currency, the duration of futures and the volatility of rates. The amount varies between 2.5% to 10% of the value of the contract. It is to this margin money account daily tick related gains/losses are credited/debited. If due to continuous losses, margin account balance gets depleted, the member will be asked to maintain his margin money balance at certain level, known as "maintenance margin".

- *Hedging with Forex Futures:* As was earlier made out, the main purpose of forex futures is hedging. Importers and exporters, investors and borrowers, bidders for global contracts and others can cover their exposure through forex futures.

Sep 3: A UK firm owes \$ 2,25,000 due on Dec 5. Present rates are:

\$/PS Spot: 1.8250

December Futures: 1.8000

3 Month \$/PS forward rate: 1.6850

Since the pound sterling is losing, the UK firm decides to hedge. It sells two sterling futures. The \$ value of the deal is:  $$(62500 \times 2 \times 1.8) = \$2,25,000$ . This is equal to the payable. Normally such perfect equalisation is impossible leading to less than perfect hedge.

On Dec 1 the rates are, say:

Spot \$/Ps 1.7080

Dec. Futures 1.7000

The UK firm can buy \$ 2,25,000 in the spot market. The PS cost is PS 1,31,733 ( i.e.,  $225000/1.7080$ ). Had the PS not depreciated, the PS cost of the \$ 2,25,000 payable would be PS 1,23,288, ( i.e.,  $225000/1.8250$ ). So, the loss is PS 8445. The firm should buy 2 sterling futures to square up the earlier short selling. The profit is  $$(62500)(1.8 - 1.7)(2) = \$12500$ . The PS equivalent at Dec 3 spot rate is PS 7353. A loss of PS 1092 has resulted. After we add transaction cost of PS 200, the total loss is PS 1292. The total PS outlay is  $PS 1,31,733 + 1292 = PS 1,33,025$ . This works



out to \$/PS rate of:  $2,25,000/1,33,025 = 1.6914$ . This is better than the 3 months forward rate obtaining at September.

If the PS has appreciated with the spot 1.9000 and December futures rate at 1.9250, the following situation will emerge.

Buy \$ in the spot spending PS  $2,25,000/1.9 = \text{PS } 1,18,421$ . The gain in the spot deals will be  $\text{PS } 1,23,288 - 1,18,421 = \text{PS } 4867$ . In the futures the dollar loss is \$  $62500 (1.9250 - 1.8000)(2) = \$ 15625$ . At Dec 3rd spot, the loss comes to PS 9191. The net position is a loss of PS 4324. After transaction cost the loss is PS 4524. The effective \$/PS rate is:  $2,25,000/(118421 + 4524) = 1.83$ . This is much better than the forward rate.

- **Speculating with Forex Futures** :Open position speculation and spread strategy speculation are available. Under spread speculation inter-commodity and intra-commodity speculation strategies exist. Spread speculation limits loss and of course profits too. Open position is riskier and hence may reward smartly.

### 3. *SWAPS*

The third form of derivatives is currency swap. This involves exchange of two currencies between the participants at a pre-determined rate, exchange of periodic interest payments over the period of swap and re-exchange of the principal at the end of the term or upon its termination.

“SWAP” literally means exchange or barter. In the foreign exchange context swap means simultaneous buying and selling of same amount of foreign currency for different investment (maturity) dates. Hence, “Swap deal” involves:

- Simultaneous purchase of a spot deal and sale of a forward deal or vice-versa; or
- Simultaneous purchase and sale of both forward but for different maturity dates.

*Need for SWAP Deals:* In foreign exchange market, swap deals are undertaken for different reasons. Some of the cases are described below:

- Banks enter into forward purchase/sale contracts with customers but may not be in a position to find a suitable/matching cover deal in the market. But, a bank which has entered into a forward contract with a customer cannot stay idle due to nonavailability of matching deal as he runs exchange risk. Hence, the bank will cover itself in the market by buying/selling spot immediately and cover the exchange risk. But this will lead to mismatch in currency flow and to correct the mismatch it will undertake a swap transaction. In case a bank has bought forward 2 months from a customer and could not strike matching forward sale deal in the underbank market, it will sell spot and square its position. Later, to correct the mismatch in cash-flow it will undertake the following swap “Buy spot; Sell two months forward”.
- When a banker enters into a forward contract with a customer he covers himself in the interbank market to avoid exchange risk. This cover deal results in an obligation for the bank to deliver to/take delivery of foreign exchange on due date in the interbank market.

Sometimes the customer may fail to deliver/take delivery on due date or the customer may deliver/take delivery before or after due date. But, still bank has to fulfil its obligation in its interbank market which may necessitate a swap deal. Example: Bank enters into a forward purchase contract with a customer for US dollar 1 million delivery April 30. On the date of entering the forward purchase contract bank would have covered itself in the market by selling forward value April 30. If customer approaches the bank on March 30 with a request for early delivery, bank will accede to such request after undertaking the following swap. “Sell spot; buy forward 1 month”.

- Banks undertake swap transactions with a view to benefit from interest rate arbitrage. Interest between two currencies in its purest form consists of borrowing one currency and converting into the other one, placing the proceeds in an investment for the period of hedge and the borrowing. In such cases, no net exchange position is created and are known as covered interest arbitrages.
- Banks undertake swap transactions for the purpose of funding their Nostro accounts.
- Banks in anticipation that forward premium/discount will change in their favour, build swap position forward against forward.

### *Currency SWAP*

In 1981, the World Bank was looking for Swiss franc borrowings as part of its overall funding operations. However, at that point of time, the World bank had made several swiss franc issues in the comparatively small swiss market in the recent past and it was feared that another similar major issue would have required the World Bank to pay a higher coupon rate in order to make it attractive to Swiss investors. At the same time, the giant computer company IBM, was looking for a dollar issue and had not accessed the swiss franc market for quite some time. Given this, an IBM issue in the swiss franc market was cheaper than a World Bank flotation. What was done, therefore, was that IBM went in for a swiss franc issue and the World Bank floated a dollar debt. The liabilities were swapped and the comparative advantage of IBM in the swiss market split between the two institutions so that, after the swap, both received the kind of debt they needed at a cheaper cost than otherwise.

Another example that would throw light on the economies of currency swaps involves the Housing Development Finance Corporation (HDFC). Under U.S. law, a housing finance company from a developing country is eligible to raise floating rate dollar debt in the US domestic market, with the guarantee of the U.S. Agency for International Development (USAID).

HDFC lends long-term fixed rate rupees to house buyers. Thus, its requirements of funds is for long term fixed rate rupees. On the other hand, it has access to cheap floating rate dollars - it would be appreciated that the guarantee of the U.S. Government would ensure that HDFC's dollar borrowings are at very fine rates. In this scenario, HDFC has



raised several floating rate dollar loans and swapped them with Indian banks and financial institutions for fixed rate rupees. In the process, the counterparties have secured floating rate dollars at a rate they would not have been able to raise on their own; simultaneously HDFC has access to fixed rate rupees it would otherwise not have got.

## QUESTIONS

1. Explain the concepts forex and forex market and Present the diff. types forex quotations or rates
2. What are spot and forward markets? State their features .What is forward rate? How is it derived?
3. What is an options contract? State the types and terminologies involved and uses of options contracts
4. Explain features of futures contract. How is a futures contract used for hedging and speculation?
5. What is a SWAP? State the need for SWAP. What is currency SWAP? How is the SWAP rate decided?
6. Bring out the nature and feature of global equity instruments.
7. Explain the features of ADRs, IDRs and GDRs.
8. Present the mechanism of GDRs.
9. Explain the features of bond market, with. respect to international bonds.
10. Present the different debt investments with respect to international market.
11. How do multinational organizations tap global debt market.
12. Explain the different forms of short-term financial instruments.
13. Explain the features of the New York Financial System, Market and Instruments.
14. Explain the features of the European Financial System, Market and Instruments.
15. Explain the features of the Japanese Financial System, Market and Instruments.
16. Explain the features of the London Financial System, Market and Instruments.
17. Give an account of financial resources for investing abroad.
18. Explain the scope of foreign currency management functions.

# MODEL QUESTION PAPER

## Paper 4.21 MANAGEMENT OF FUNDS

Time : 3 hours

Maximum Marks: 100

### PART-A

(5 × 8 = 40)

Answer any **Five** questions

1. Describe the organisation structure of funds management division of an organisation.
2. Explain the different concepts of cost of capital.
3. Given  $K_e = 18\%$ , Floatation cost 3% and tax bracket of shareholders of a firm at 25%. Find the cost of retained earnings.
4. Calculate pay-back period, ARR, NPV (at  $k = 10\%$  and IRR given

Years	1	2	3	4
PBT (Lakhs Rs.)	40	45	50	55
Tax Rate	40%	40%	35%	35%

5. A project has an equity beta of 1.2 and debt beta zero and is a have a debt-equity ratio of 3:7. Given risk free rate of return of 10% and market return of 18%. Find the required return for the project per CAPM.
6. What is feasibility reporting? How is it prepared?
7. What is currency SWAP? How is the SWAP rate decided?
8. Give an account of financial resources for investing abroad.

### PART-B

(4 × 15 = 60)

Answer any **Four** questions.

9. Examine the role of financial system.
10. XYZ Ltd. has a paid up capital of Rs. 6 crs of equity shares of Rs. 10 each. Its shares due currently quoting at Rs. 45. The company has declared dividend as follows for past 5 years.

Year	1	2	3	4	5
Dividend (Rs. crs)	9	10.5	15	18	21

Find the cost of equity as per D + g approach.

11. ABC Ltd. is a 100% equity firm with a  $K_e$  of 21%, XYZ Ltd. is similar to ABC, except in capital mix, has a debt - equity ratio of 2:1 and its  $K_d$  is 14%. Find the  $K_e$  of XYZ Ltd. as per MM Hypothesis and find the overall average cost of capital.  
[Hint:  $K_{e,L} = K_{e,u} + (K_{e,u} - K_d)D/E$ ]

The  $K_e$  and  $K_d$  at different levels of D/E ratio are as follows:

D/E	$K_e$ (%)	$K_d$ (%)
0.0	21	0
0.4	21	12
0.8	22	12
1.2	22	14
1.6	24	16
2.0	24	16
2.4	28	20

Find the optimum capital structure.

12. Explain the methods of evaluation of profitability of business projects.  
 13. Using decision tree approach find the expected NPV of the project given the following cash flows:

Time zero	Time 1	Time 2
-10 lakhs	6 lakhs P(.6)	4 lakhs P(.6)
		5 lakhs P(.4)
	10 lakhs P(.4)	6 lakhs P(.4)
		2 lakhs P(.6)

The cost of capital is 10%

P = Probability

For two mutually exclusive projects the projected cash flows are:

Period	Project A	Project B
Time zero (outflows)	Rs. 2,20,000	Rs. 2,70,000
1 to 7 years (inflow each year)	Rs. 60,000	Rs. 70,000

using IRR method, find the better of the two (an annuity of the 1 for 7 years has a present value of Rs. 3.92, Rs. 3.81, Rs. 3.91 and Rs. 3.60 at 17%, 18%, 19% and 20%).

14. A project's cash flow, life and discount rate have the following probability distribution.

Cash flow	Prob.	Life	Prob.	Dis. Rate	Prob.
Rs.5crs	.20	2	.25	9%	.22
Rs.8crs	.72	3	.45	10%	.66
Rs.10crs	.08	4	.30	12%	.12

Perform simulation of PV of cash flow for five runs taking the following random number sets: i) 12, 18, 82; ii) 70, 38, 48; iii) 78, 02, 49; iv) 22, 18, 79; v) 65, 92, 36. If the project outlay is Rs. 18 crs, find the expected NPV of the project.

15. Explain the concepts forex and forex market and Present the different types forex quotations or rates.

# REFERENCES

1. International Financial Management – P.G. Apte
2. Multinational Financial Management – Alan C Shapiro
3. Options and Financial Futures – David A. Dubofsky
4. Multinational Finance – Adrian Buckley