Final Course

(Revised Scheme of Education and Training)

Study Material

PAPER 2

Strategic Financial Management

BOARD OF STUDIES

THE INSTITUTE OF CHARTERED ACCOUNTANTS OF INDIA

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BEFORE WE BEGIN...

The ICAI has recently revised its course curriculum. The course has been changed keeping in view the modern requirements of Finance. Strategic Financial Management (SFM) is one of the core papers for students appearing in Final Level of Chartered Accountancy Course. The present study material is meant for the students appearing in SFM paper.

As you all are aware that SFM is a blend of Strategic Management and Financial Management. Recently, it has gained significance due to growing globalization and continuous cross border flow of capital.

Moreover, some chapters have been excluded from the study material which was there in the previous edition of August 2017. These are enumerated as follows:

(i) Indian Financial System

(ii) International Financial Centre (IFC)

(iii) Small and Medium Enterprises

Further, there are several significant characteristics of this study material which are outlined as below:

(i) It comprehensively covers the course requirements of students preparing for SFM paper.

(ii) It is written in a very simple and lucid manner to make the subject understandable to the students.

(iii) At the beginning of each chapter, learning outcomes have been given so that the students have some sort of idea about what he will learn after going through the chapter.

(iv) At the end of each chapter, the caption, "Test your Knowledge" is given. Basically, the purpose is to motivate the students to recapitulate the chapter which they have already read.

(v) While preparing the study material, it has been kept in mind that students understand the study material. Therefore, every effort has been made to keep the chapters concise, giving appropriate headings, sub-headings and mentioning examples at suitable places.

We are confident that this study material will prove to be extremely useful to the students.

Although, sincere efforts have been made to keep the study material error free, it is possible that some error might have inadvertently crept in. In this respect, students are encouraged to highlight any mistake they may notice while going through the study material by sending an e-mail at: sfm-final@icai.in or write to the Director of Studies, The Institute of Chartered Accountants of India, A-29, Sector-62, Noida-201309.

Happy Reading and Best Wishes!

SYLLABUS

PAPER 2: STRATEGIC FINANCIAL MANAGEMENT

(One paper – Three hours – 100 marks)

Objective:

To acquire the ability to apply financial management theories and techniques in strategic decision making.

Contents:

(1) Financial Policy and Corporate Strategy

(i) Strategic decision making framework

(ii) Interface of Financial Policy and strategic management

(iii) Balancing financial goals vis-à-vis sustainable growth.

(2) Risk Management

(i) Identification of types of Risk faced by an organisation

(ii) Evaluation of Financial Risks

(iii) Value at Risk (VAR)

(iv) Evaluation of appropriate method for the identification and management of financial risk.

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(ii) Technical Analysis

a) Meaning

b) Assumptions

c) Theories and Principles

d) Charting Techniques

e) Efficient Market Hypothesis (EMH) Analysis

(4) Security Valuation

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(ii) Return Concepts

(iii) Equity Risk Premium

(iv) Required Return on Equity

(v) Discount Rate Selection in Relation to Cash Flows

(vi) Approaches to Valuation of Equity Shares

(vii) Valuation of Preference Shares

(viii) Valuation of Debentures/ Bonds

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(ii) Portfolio Selection

(iii) Capital Market Theory

(iv) Portfolio Revision

(v) Portfolio Evaluation

(vi) Asset Allocation

(vii) Fixed Income Portfolio

(viii) Risk Analysis of Investment in Distressed Securities

(ix) Alternative Investment Strategies in context of Portfolio Management

(ii) Foreign currency market

(iii) Management of transaction, translation and economic exposures

(iv) Hedging currency risk

(v) Foreign exchange derivatives – Forward, futures, options and swaps

(10) International Financial Management

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(ii) International Working Capital Management

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- Objectives of Effective Cash Management
- Optimization of Cash Flows/ Needs
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b) Earning Based Models

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- Arbitrage Pricing Theory
- Estimating Beta of an unlisted company

e) Relative Valuation

- Steps involved in Relative Valuation
- Equity Valuation Multiples
- Enterprise Valuation Multiple

f) Other Approaches to Value Measurement

- Economic Value Added (EVA)
- Market Value Added (MVA)
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g) Arriving at Fair Value

(13) Mergers, Acquisitions and Corporate Restructuring

(i) Conceptual Framework

(ii) Rationale

(iii) Forms

(iv) Mergers and Acquisitions

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CHAPTER 14 – STARTUP FINANCE

CHAPTER 1

FINANCIAL POLICY AND CORPORATE STRATEGY

LEARNING OUTCOMES

After reading this chapter student shall be able to understand:

- Strategic Financial Decision Making Frame Work
- Strategy at different hierarchy levels
- Financial Planning
- Interface of Financial Policy and Strategic Management
- Balancing Financial Goals vis-à-vis Sustainable Growth

1. STRATEGIC FINANCIAL DECISION MAKING FRAME WORK

Capital investment is the springboard for wealth creation. In a world of economic uncertainty, the investors want to maximize their wealth by selecting optimum investment and financial opportunities that will give them maximum expected returns at minimum risk. Since management is ultimately responsible to the investors, the objective of corporate financial management should implement investment and financing decisions which should satisfy the shareholders by placing them all in an equal, optimum financial position. The satisfaction of the interests of the shareholders should be perceived as a means to an end, namely maximization of shareholders' wealth. Since capital is the limiting factor, the problem that the management will face is the

strategic allocation of limited funds between alternative uses in such a manner, that the companies have the ability to sustain or increase investor returns through a continual search for investment opportunities that generate funds for their business and are more favourable for the investors. Therefore, all businesses need to have the following three fundamental essential elements:

- A clear and realistic **strategy**,
- The **financial** resources, controls and systems to see it through and
- The right **management** team and processes to make it happen.

We may summarise this by saying that:

Strategy + Finance + Management = Fundamentals of Business

Strategy may be defined as the long term direction and scope of an organization to achieve competitive advantage through the configuration of resources within a changing environment for the fulfilment of stakeholder's aspirations and expectations. In an idealized world, management is ultimately responsible to the investors. Investors maximize their wealth by selecting optimum investment and financing opportunities, using financial models that maximize expected returns in absolute terms at minimum risk. What concerns the investors is not simply maximum profit but also the likelihood of it arising: a risk-return trade-off from a portfolio of investments, with which they feel comfortable and which may be unique for each individual.

We call this overall approach strategic financial management and define it as being the application to strategic decisions of financial techniques in order to help achieve the decision-maker's objectives. Although linked with accounting, the focus of strategic financial management is different. *Strategic financial management combines the backward-looking, report-focused discipline of (financial) accounting with the more dynamic, forward-looking subject of financial management.* It is basically about the identification of the possible strategies capable of maximizing an organization's market value. It involves the allocation of scarce capital resources among competing opportunities. It also encompasses the implementation and monitoring of the chosen strategy so as to achieve agreed objectives.

1.1 Functions of Strategic Financial Management:

Strategic Financial Management is the portfolio constituent of the corporate strategic plan that embraces the optimum investment and financing decisions required to attain the overall specified objectives. In this connection, it is necessary to distinguish between strategic, tactical and operational financial planning. While strategy is a long-term course of action, tactics are intermediate plan, while operations are short-term functions. Senior management decides strategy, middle level decides tactics and operational are looked after line management.

Irrespective of the time horizon, the investment and financial decisions involve the following

functions[1]:

- Continual search for best investment opportunities;
- Selection of the best profitable opportunities;
- Determination of optimal mix of funds for the opportunities;
- Establishment of systems for internal controls; and
- Analysis of results for future decision-making.

Since capital is the limiting factor, the strategic problem for financial management is how limited funds are allocated between alternative uses.

The key decisions falling within the scope of financial strategy include the following:

1. Financing decisions: These decisions deal with the mode of financing or mix of equity capital and debt capital.

2. Investment decisions: These decisions involve the profitable utilization of firm's funds especially in long-term projects (capital projects). Since the future benefits associated with such projects are not known with certainty, investment decisions necessarily involve risk. The projects are therefore evaluated in relation to their expected return and risk.

3. Dividend decisions: These decisions determine the division of earnings between payments to shareholders and reinvestment in the company.

4. Portfolio decisions: These decisions involve evaluation of investments based on their contribution to the aggregate performance of the entire corporation rather than on the isolated characteristics of the investments themselves.

You have already, learnt about the Financing, Investment and Dividend decisions in your Intermediate (IPC) curriculum, while Portfolio decisions would be taken in detail later in this Study Material.

2. STRATEGY AT DIFFERENT HIERARCHY LEVELS

Strategies at different levels are the outcomes of different planning needs. There are three levels of Strategy – Corporate level; Business unit level; and Functional or departmental level.

2.1 Corporate Level Strategy

Corporate level strategy fundamentally is concerned with selection of businesses in which a company should compete and with the development and coordination of that portfolio of businesses.

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[1] Strategic Financial Management: Exercises, Robert Alan Hill.

Corporate level strategy should be able to answer three basic questions:	
Suitability	Whether the strategy would work for the accomplishment of common objective of the company.
Feasibility	Determines the kind and number of resources required to formulate and implement the strategy.
Acceptability	It is concerned with the stakeholders' satisfaction and can be financial and non-financial.

2.2 Business Unit Level Strategy

Strategic business unit (SBO) may be any profit centre that can be planned independently from the other business units of a corporation. At the business unit level, the strategic issues are about practical coordination of operating units and developing and sustaining a competitive advantage for the products and services that are produced.

2.3 Functional Level Strategy

The functional level is the level of the operating divisions and departments. The strategic issues at this level are related to functional business processes and value chain. Functional level strategies in R&D, operations, manufacturing, marketing, finance, and human resources involve the development and coordination of resources through which business unit level strategies can be executed effectively and efficiently. Functional units of an organization are involved in higher level strategies by providing input to the business unit level and corporate level strategy, such as providing information on customer feedback or on resources and capabilities on which the higher level strategies can be based. Once the higher-level strategy is developed, the functional units translate them into discrete action plans that each department or division must accomplish for the strategy to succeed.

Among the different functional activities viz production, marketing, finance, human resources and research and development, finance assumes highest importance during the top down and bottom up interaction of planning. Corporate strategy deals with deployment of resources and financial strategy is mainly concerned with mobilization and effective utilization of money, the most critical resource that a business firm likes to have under its command. Truly speaking, other resources can be easily mobilized if the firm has adequate monetary base. To go into the details of this interface between financial strategy and corporate strategy and financial planning and corporate planning let us examine the basic issues addressed under financial planning.

3. FINANCIAL PLANNING

Financial planning is the backbone of the business planning and corporate planning. It helps in defining the feasible area of operation for all types of activities and thereby defines the overall planning framework. Financial planning is a systematic approach whereby the financial planner

helps the customer to maximize his existing financial resources by utilizing financial tools to achieve his financial goals.

There are 3 major components of Financial planning:

- Financial Resources (FR)
- Financial Tools (FT)
- Financial Goals (FG)

Financial Planning: FR + FT = FG

For an individual, financial planning is the process of meeting one's life goals through proper management of the finances. These goals may include buying a house, saving for children's education or planning for retirement. It is a process that consists of specific steps that helps in taking a big-picture look at where you financially are. Using these steps you can work out where you are now, what you may need in the future and what you must do to reach your goals.

Outcomes of the financial planning are the financial objectives, financial decision-making and financial measures for the evaluation of the corporate performance. Financial objectives are to be decided at the very outset so that rest of the decisions can be taken accordingly. The objectives need to be consistent with the corporate mission and corporate objectives. Financial decision making helps in analyzing the financial problems that are being faced by the corporate and accordingly deciding the course of action to be taken by it. The financial measures like ratio analysis, analysis of cash flow statement are used to evaluate the performance of the Company. The selection of these measures again depends upon the Corporate objectives.

4. INTERFACE OF FINANCIAL POLICY AND STRATEGIC MANAGEMENT

The interface of strategic management and financial policy will be clearly understood if we appreciate the fact that the starting point of an organization is money and the end point of that organization is also money. No organization can run an existing business and promote a new expansion project without a suitable internally mobilized financial base or both i.e. internally and externally mobilized financial base.

Sources of finance and capital structure are the most important dimensions of a strategic plan. The need for fund mobilization to support the expansion activity of firm is very vital for any organization. The generation of funds may arise out of ownership capital and or borrowed capital. A company may issue equity shares and/or preference shares for mobilizing ownership capital and debentures to raise borrowed capital. Public deposits, for a fixed time period, have also become a major source of short and medium term finance. Organizations may offer higher rates of interest than banking institutions to attract investors and raise fund. The overdraft, cash credits, bill

discounting, bank loan and trade credit are the other sources of short term finance.

Along with the mobilization of funds, policy makers should decide on the capital structure to indicate the desired mix of equity capital and debt capital. There are some norms for debt equity ratio which need to be followed for minimizing the risks of excessive loans. For instance, in case of public sector organizations, the norm is 1:1 ratio and for private sector firms, the norm is 2:1 ratio. However this ratio in its ideal form varies from industry to industry. It also depends on the planning mode of the organization. For capital intensive industries, the proportion of debt to equity is much higher. Similar is the case for high cost projects in priority sectors and for projects in under developed regions.

Another important dimension of strategic management and financial policy interface is the investment and fund allocation decisions. A planner has to frame policies for regulating investments in fixed assets and for restraining of current assets. Investment proposals mooted by different business units may be divided into three groups. One type of proposal will be for addition of a new product by the firm. Another type of proposal will be to increase the level of operation of an existing product through either an increase in capacity in the existing plant or setting up of another plant for meeting additional capacity requirement. The last is for cost reduction and efficient utilization of resources through a new approach and/or closer monitoring of the different critical activities. Now, given these three types of proposals a planner should evaluate each one of them by making within group comparison in the light of capital budgeting exercise. In fact, project evaluation and project selection are the two most important jobs under fund allocation. Planner's task is to make the best possible allocation under resource constraints.

Dividend policy is yet another area for making financial policy decisions affecting the strategic performance of the company. A close interface is needed to frame the policy to be beneficial for all. Dividend policy decision deals with the extent of earnings to be distributed as dividend and the extent of earnings to be retained for future expansion scheme of the firm. From the point of view of long term funding of business growth, dividend can be considered as that part of total earnings, which cannot be profitably utilized by the company. Stability of the dividend payment is a desirable consideration that can have a positive impact on share prices. The alternative policy of paying a constant percentage of the net earnings may be preferable from the point of view of both flexibility of the firm and ability of the firm. It also gives a message of lesser risk for the investors. Yet some other companies follow a different alternative. They pay a minimum dividend per share and additional dividend when earnings are higher than the normal earnings. In actual practice, investment opportunities and financial needs of the firm and the shareholders preference for dividend against capital gains resulting out of share are to be taken into consideration for arriving at the right dividend policy. Alternatives like cash dividend and stock dividend are also to be examined while working out an ideal dividend policy that supports and promotes the corporate strategy of the company.

Thus, the financial policy of a company cannot be worked out in isolation of other functional policies. It has a wider appeal and closer link with the overall organizational performance and direction of growth. These policies being related to external awareness about the firm, especially the awareness of the investors about the firm, in respect of its internal performance. There is always a process of evaluation active in the minds of the current and future stake holders of the company. As a result preference and patronage for the company depends significantly on the financial policy framework. Hence, attention of the corporate planners must be drawn while framing the financial policies not at a later stage but during the stage of corporate planning itself. The nature of interdependence is the crucial factor to be studied and modelled by using an in depth analytical approach. This is a very difficult task compared to usual cause and effect study because corporate strategy is the cause and financial policy is the effect and sometimes financial policy is the cause and corporate strategy is the effect.

5. BALANCING FINANCIAL GOALS VIS-A-VIS SUSTAINABLE GROWTH

The concept of sustainable growth can be helpful for planning healthy corporate growth. This concept forces managers to consider the financial consequences of sales increases and to set sales growth goals that are consistent with the operating and financial policies of the firm. Often, a conflict can arise if growth objectives are not consistent with the value of the organization's sustainable growth. Question concerning right distribution of resources may take a difficult shape if we take into consideration the rightness not for the current stakeholders but for the future stakeholders also. To take an illustration, let us refer to fuel industry where resources are limited in quantity and a judicial use of resources is needed to cater to the need of the future customers along with the need of the present customers. One may have noticed the save fuel campaign, a demarketing campaign that deviates from the usual approach of sales growth strategy and preaches for conservation of fuel for their use across generation. This is an example of stable growth strategy adopted by the oil industry as a whole under resource constraints and the long run objective of survival over years. Incremental growth strategy, profit strategy and pause strategy are other variants of stable growth strategy.

Sustainable growth is important to enterprise long-term development. Too fast or too slow growth will go against enterprise growth and development, so financial should play important role in enterprise development, adopt suitable financial policy initiative to make sure enterprise growth speed close to sustainable growth ratio and have sustainable healthy development.

What makes an organisation financially sustainable?

To be financially sustainable, an organisation must:

- have more than one source of income;
- have more than one way of generating income;
- do strategic, action and financial planning regularly;
- have adequate financial systems;
- have a good public image;
- be clear about its values (value clarity); and
- have financial autonomy.

Source: CIVICUS "Developing a Financing Strategy".

The sustainable growth rate (SGR), concept by Robert C. Higgins, of a firm is the maximum rate of growth in sales that can be achieved, given the firm's profitability, asset utilization, and desired dividend payout and debt (financial leverage) ratios. The sustainable growth rate is a measure of how much a firm can grow without borrowing more money. After the firm has passed this rate, it must borrow funds from another source to facilitate growth. Variables typically include the net profit margin on new and existing revenues; the asset turnover ratio, which is the ratio of sales revenues to total assets; the assets to beginning of period equity ratio; and the retention rate, which is defined as the fraction of earnings retained in the business.

SGR = ROE x (1- Dividend payment ratio)

Sustainable growth models assume that the business wants to: 1) maintain a target capital structure without issuing new equity; 2) maintain a target dividend payment ratio; and 3) increase sales as rapidly as market conditions allow. Since the asset to beginning of period equity ratio is constant and the firm's only source of new equity is retained earnings, sales and assets cannot grow any faster than the retained earnings plus the additional debt that the retained earnings can support. The sustainable growth rate is consistent with the observed evidence that most corporations are reluctant to issue new equity. If, however, the firm is willing to issue additional equity, there is in principle no financial constraint on its growth rate. Indeed, the sustainable growth rate formula is directly predicted on return on equity.

Economists and business researchers contend that achieving sustainable growth is not possible without paying heed to twin cornerstones: growth strategy and growth capability. Companies that pay inadequate attention to one aspect or the other are doomed to fail in their efforts to establish practices of sustainable growth (though short-term gains may be realized). After all, if a company has an excellent growth strategy in place, but has not put the necessary infrastructure in place to execute that strategy, long-term growth is impossible. The reverse is also true.

The very weak idea of sustainability requires that the overall stock of capital assets should remain constant. The weak version of sustainability refers to preservation of critical resources to ensure support for all, over a long time horizon. The strong concept of sustainability is concerned with the preservation of resources under the primacy of ecosystem functioning. These are in line with the definition provided by the economists in the context of sustainable development at macro level.

What makes an organisation sustainable?

- In order to be sustainable, an organisation must:
- have a clear strategic direction;
- be able to scan its environment or context to identify opportunities for its work;
- be able to attract, manage and retain competent staff;
- have an adequate administrative and financial infrastructure;
- be able to demonstrate its effectiveness and impact in order to leverage further resources; and
- get community support for, and involvement in its work.

Source: CIVICUS "Developing a Financing Strategy".

The sustainable growth model is particularly helpful in situations in which a borrower requests additional financing. The need for additional loans creates a potentially risky situation of too much debt and too little equity. Either additional equity must be raised or the borrower will have to reduce the rate of expansion to a level that can be sustained without an increase in financial leverage.

Mature firms often have actual growth rates that are less than the sustainable growth rate. In these cases, management's principal objective is finding productive uses for the cash flows that exist in excess of their needs. Options available to business owners and executives in such cases includes returning the money to shareholders through increased dividends or common stock repurchases, reducing the firm's debt load, or increasing possession of lower earning liquid assets. These actions serve to decrease the sustainable growth rate. Alternatively, these firms can attempt to enhance their actual growth rates through the acquisition of rapidly growing companies.

Growth can come from two sources: increased volume and inflation. The inflationary increase in assets must be financed as though it were real growth. Inflation increases the amount of external financing required and increases the debt-to-equity ratio when this ratio is measured on a historical cost basis. Thus, if creditors require that a firm's historical cost debt-to-equity ratio stay constant, inflation lowers the firm's sustainable growth rate.

Mitsubishi Corporation (MC): New Strategic Direction (charting a new path toward sustainable growth)

Mitsubishi Corporation has abolished its traditional "*midterm management plan*" concept of committing to fixed financial targets three years in the future, in favour of a long-term, circa 2020 growth vision. The "*New Strategic Direction*" consists of basic concepts on management policy together with business and market strategies. It seeks to recognize the Company's value and upside potential as a *sogo shosha* capable of "*providing stable earnings throughout business cycles by managing a portfolio diversified by business model, industry, market and geography*".

MC remains dedicated to sustainable growth but as evidenced by its guiding philosophy, the "Three Corporate Principles", its business activities are even more committed to helping solve problems in Japan and around the world. Its chief goal is to contribute to sustainable societal growth on a global scale.

The summary of this New Strategic Direction is:

- Future pull approach eyeing 2020 with a vision to double the business by building a diversified but focussed portfolio.
- Clear portfolio strategy: Select winning businesses through proactive reshaping of portfolio.
- Grow business and deliver returns while maintaining financial discipline.

TEST YOUR KNOWLEDGE

Theoretical Questions

1. Explain the Interface of Financial Policy and Strategic Management.
2. Write a short note on Balancing Financial Goals vis-a-vis Sustainable Growth.

Answers to Theoretical Questions

1. Please refer paragraph 4
2. Please refer paragraph 5

CHAPTER 2

RISK MANAGEMENT

LEARNING OUTCOMES

After going through the chapter student shall be able to understand:

- Identification of types of Risk faced by an organization
- Evaluation of Financial Risks
- Value at Risk (VAR)
- Evaluation of appropriate method for the identification and management of financial risk.

1. IDENTIFICATION OF TYPES OF RISK FACED BY AN ORGANIZATION

A business organization faces many types of risks. Important among them are discussed as below:

1.1 Strategic Risk

A successful business always needs a comprehensive and detailed business plan. Everyone knows that a successful business needs a comprehensive, well-thought-out business plan. But it's also a fact of life that, if things changes, even the best-laid plans can become outdated if it cannot keep pace with the latest trends. This is what is called as strategic risk. So, strategic risk is a risk in which a company's strategy becomes less effective and it struggles to achieve its goal. It could be due to technological changes, a new competitor entering the market, shifts in customer demand, increase in the costs of raw materials, or any number of other large-scale changes.

We can take the example of Kodak which was able to develop a digital camera by 1975. But, it considers this innovation as a threat to its core business model, and failed to develop it. However, it paid the price because when digital camera was ultimately discovered by other companies, it

failed to develop it and left behind. Similar example can be given in case of Nokia when it failed to upgrade its technology to develop touch screen mobile phones. That delay enables Samsung to become a market leader in touch screen mobile phones.

However, a positive example can be given in the case of Xerox which invented photocopy machine. When laser printing was developed, Xerox was quick to lap up this opportunity and changes its business model to develop laser printing. So, it survived the strategic risk and escalated its profits further.

1.2. Compliance Risk

Every business needs to comply with rules and regulations. For example with the advent of Companies Act, 2013, and continuous updating of SEBI guidelines, each business organization has to comply with plethora of rules, regulations and guidelines. Non compliance leads to penalties in the form of fine and imprisonment.

However, when a company ventures into a new business line or a new geographical area, the real problem then occurs. For example, a company pursuing cement business likely to venture into sugar business in a different state. But laws applicable to the sugar mills in that state are different. So, that poses a compliance risk. If the company fails to comply with laws related to a new area or industry or sector, it will pose a serious threat to its survival.

1.3 Operational Risk

This type of risk relates to internal risk. It also relates to failure on the part of the company to cope with day to day operational problems. Operational risk relates to 'people' as well as 'process'. We will take an example to illustrate this. For example, an employee paying out ₹ 1,00,000 from the account of the company instead of ₹ 10,000.

This is a people as well as a process risk. An organization can employ another person to check the work of that person who has mistakenly paid ₹ 1,00,000 or it can install an electronic system that can flag off an unusual amount.

1.4 Financial Risk

Financial Risk is referred as the unexpected changes in financial conditions such as prices, exchange rate, Credit rating, and interest rate etc. Though political risk is not a financial risk in direct sense but same can be included as any unexpected political change in any foreign country may lead to country risk which may ultimately may result in financial loss.

Accordingly, the broadly Financial Risk can be divided into following categories.

1.4.1 Counter Party Risk

This risk occurs due to non-honoring of obligations by the counter party which can be failure to deliver the goods for the payment already made or vice-versa or repayment of borrowings and interest etc. Thus, this risk also covers the credit risk i.e. default by the counter party.

1.4.2 Political Risk

Generally this type of risk is faced by and overseas investors, as the adverse action by the government of host country may lead to huge loses. This can be on any of the following form.

- Confiscation or destruction of overseas properties.
- Rationing of remittance to home country.
- Restriction on conversion of local currency of host country into foreign currency.
- Restriction as borrowings.
- Invalidation of Patents
- Price control of products

1.4.3. Interest Rate Risk

This risk occurs due to change in interest rate resulting in change in asset and liabilities. This risk is more important for banking companies as their balance sheet's items are more interest sensitive and their base of earning is spread between borrowing and lending rates.

As we know that the interest rates are two types i.e. fixed and floating. The risk in both of these types is inherent. If any company has borrowed money at floating rate then with increase in floating the liability under fixed rate shall remain the same. This fixed rate, with falling floating rate the liability of company to pay interest under fixed rate shall comparatively be higher.

1.4.4 Currency Risk

This risk mainly affects the organization dealing with foreign exchange as their cash flows changes with the movement in the currency exchange rates. This risk can be affected by cash flow adversely or favorably. For example, if rupee depreciates vis-à-vis US$ receivables will stand to gain vis-à-vis to the importer who has the liability to pay bill in US$. The best case we can quote Infosys (Exporter) and Indian Oil Corporation Ltd. (Importer).

1.4.5 Liquidity Risk

Broadly liquidity risk can be defined as inability of organization to meet it liabilities whenever they become due.

This risk mainly arises when organization is unable to generate adequate cash or there may be some mismatch in period of cash flow generation.

This type of risk is more prevalent in banking business where there may be mismatch in maturities and receiving fresh deposits pattern.

2. EVALUATION OF FINANCIAL RISK

The financial risk can be evaluated from different point of views as follows:

(a) From stakeholder's point of view: Major stakeholders of a business are equity shareholders and they view financial gearing i.e. ratio of debt in capital structure of company as risk since in event of winding up of a company they will be least prioritized.

Even for a lender, existing gearing is also a risk since company having high gearing faces more risk in default of payment of interest and principal repayment.

(b) From Company's point of view: From company's point of view if a company borrows excessively or lend to someone who defaults, then it can be forced to go into liquidation.

(c) From Government's point of view: From Government's point of view, the financial risk can be viewed as failure of any bank or (like Lehman Brothers) down grading of any financial institution leading to spread of distrust among society at large. Even this risk also includes willful defaulters. This can also be extended to sovereign debt crisis.

3. VALUE-AT-RISK (VAR)

As per Wikipedia, VAR is a measure of risk of investment. Given the normal market condition in a set of period, say, one day it estimates how much an investment might lose. This investment can be a portfolio, capital investment or foreign exchange etc., VAR answers two basic questions -

(i) What is worst case scenario?

(ii) What will be loss?

It was first applied in 1922 in New York Stock Exchange, entered the financial world in 1990s and become world's most widely used measure of financial risk.

3.1 Features of VAR

Following are main features of VAR

(i) *Components of Calculations:* VAR calculation is based on following three components :

(a) Time Period

(b) Confidence Level – Generally 95% and 99%

(c) Loss in percentage or in amount

(ii) *Statistical Method:* It is a type of statistical tool based on Standard Deviation.

(iii) *Time Horizon:* VAR can be applied for different time horizons say one day, one week, one month and so on.

(iv) *Probability:* Assuming the values are normally attributed, probability of maximum loss can be predicted.

(v) *Control Risk:* Risk can be controlled by selling limits for maximum loss.

(vi) *Z Score:* Z Score indicates how many standard Deviations is away from Mean value of a population. When it is multiplied with Standard Deviation it provides VAR.

3.2 Application of VAR

VAR can be applied

(a) to measure the maximum possible loss on any portfolio or a trading position.

(b) as a benchmark for performance measurement of any operation or trading.

(c) to fix limits for individuals dealing in front office of a treasury department.

(d) to enable the management to decide the trading strategies.

(e) as a tool for Asset and Liability Management especially in banks.

3.3 Example:

The concept of VAR can be understood in a better manner with help of following example:

Suppose you hold ₹ 2 crore shares of X Ltd. whose market price standard deviation is 2% per day. Assuming 252 trading days a year, determine maximum loss level over the period of 1 trading day and 10 trading days with 99% confidence level.

Answer

Assuming share prices are normally for level of 99%, the equivalent Z score from Normal table of Cumulative Area shall be 2.33.

Volatility in terms of rupees shall be:

2% of ₹ 2 Crore = ₹ 4 lakh

The maximum loss for 1 day at 99% Confidence Level shall be:

₹ 4 lakh x 2.33 = ₹ 9.32 lakh,

and expected maximum loss for 10 trading days shall be:

√10 x ₹ 9.32 lakh = 29.47 lakhs

4. APPROPRIATE METHODS FOR IDENTIFICATION AND MANAGEMENT OF FINANCIAL RISK

As we have classified financial risk in 4 categories, we shall discuss identification and management of each risk separately under same category.

4.1 Counter Party risk:

The various hints that may provide counter party risk are as follows:

(a) Failure to obtain necessary resources to complete the project or transaction undertaken.

(b) Any regulatory restrictions from the Government.

(c) Hostile action of foreign government.

(d) Let down by third party.

(e) Have become insolvent.

The various techniques to manage this type of risk are as follows:

(1) Carrying out Due Diligence before dealing with any third party.

(2) Do not over commit to a single entity or group or connected entities.

(3) Know your exposure limits.

(4) Review the limits and procedure for credit approval regularly.

(5) Rapid action in the event of any likelihood of defaults.

(6) Use of performance guarantee, insurance or other instruments.

4.2 Political risk:

From the following actions by the Governments of the host country this risk can be identified:

1. Insistence on resident investors or labour.

2. Restriction on conversion of currency.

3. Repatriation of foreign assets of the local govt.

4. Price fixation of the products.

Since this risk mainly relates to investments in foreign country, company should assess country risk

(1) By referring political ranking published by different business magazines.

(2) By evaluating country's macro-economic conditions.

(3) By analyzing the popularity of current government and assess their stability.

(4) By taking advises from the embassies of the home country in the host countries.

Further, following techniques can be used to mitigate this risk.

(i) Local sourcing of raw materials and labour.

(ii) Entering into joint ventures

(iii) Local financing

(iv) Prior negotiations

4.3 Interest Rate Risk:

Generally, interest rate Risk is mainly identified from the following:

1. Monetary Policy of the Government.
2. Any action by Government such as demonetization etc.
3. Economic Growth
4. Release of Industrial Data
5. Investment by foreign investors
6. Stock market changes

The management of Interest risk has been discussed in greater detail in separate chapter later on.

4.4 Currency Risk:

Just like interest rate risk the currency risk is dependent on the Government action and economic development. Some of the parameters to identity the currency risk are as follows:

(1) Government Action: The Government action of any country has visual impact in its currency. For example, the UK Govt. decision to divorce from European Union i.e. Brexit brought the pound to its lowest since 1980's.

(2) Nominal Interest Rate: As per interest rate parity (IRP) the currency exchange rate depends on the nominal interest of that country.

(3) Inflation Rate: Purchasing power parity theory discussed in later chapters impact the value of currency.

(4) Natural Calamities: Any natural calamity can have negative impact.

(5) War, Coup, Rebellion etc.: All these actions can have far reaching impact on currency's exchange rates.

(6) Change of Government: The change of government and its attitude towards foreign investment also helps to identify the currency risk.

So far as the management of currency risk is concerned, it has been covered in a detailed manner in a separate chapter.

TEST YOUR KNOWLEDGE

Theoretical Questions

1. Explain the significance of VAR.

2. The Financial Risk can be viewed from different perspective. Explain.

Practical Questions

1. Consider a portfolio consisting of a ₹ 200,00,000 investment in share XYZ and a ₹ 200,00,000 investment in share ABC. The daily standard deviation of both shares is 1% and that the coefficient of correlation between them is 0.3. You are required to determine the 10-day 99% value at risk for the portfolio?

ANSWERS/ SOLUTIONS

Answers to Theoretical Questions

1. Please refer paragraph 3.2

2. Please refer paragraph 2

Answers to the Practical Questions

1. The standard deviation of the daily change in the investment in each asset is ₹ 2,00,000 i.e. 2 lakhs. The variance of the portfolio's daily change is

$$V = 2^2 + 2^2 + 2 \times 0.3 \times 2 \times 2 = 10.4$$

$$\sigma \text{ (Standard Deviation)} = \sqrt{10.4} = ₹ 3.22 \text{ lakhs}$$

Accordingly, the standard deviation of the 10-day change is

$$₹ 3.22 \text{ lakhs} \times \sqrt{10} = ₹ 10.18 \text{ lakh}$$

From the Normal Table we see that z score for 1% is 2.33. This means that 1% of a normal distribution lies more than 2.33 standard deviations below the mean. The 10-day 99 percent value at risk is therefore

$$2.33 \times ₹ 10.18 \text{ lakh} = ₹ 23.72 \text{ lakh}$$

CHAPTER 3

SECURITY ANALYSIS

LEARNING OUTCOMES

After going through the chapter student shall be able to understand:

- Fundamental Analysis
- Technical Analysis
  - (a) Meaning
  - (b) Assumptions
  - (c) Theories and Principles
  - (d) Charting Techniques
  - (e) Efficient Market Hypothesis (EMH) Analysis

INTRODUCTION

Investment decision depends on securities to be bought, held or sold. Buying security is based on highest return per unit of risk or lowest risk per unit of return. Selling security does not depend on any such requirement. A security considered for buying today may not be attractive tomorrow due to management policy changes in the company or economic policy changes adopted by the government. The reverse is also true. Therefore, analysis of the security on a continuous basis is a must.

Security Analysis involves a systematic analysis of the risk return profiles of various securities which is to help a rational investor to estimate a value for a company from all the price sensitive information/data so that he can make purchases when the market under-prices some of them and thereby earn a reasonable rate of return.

Two approaches viz. fundamental analysis and technical analysis are in vogue for carrying out Security Analysis. In fundamental analysis, factors affecting risk-return characteristics of securities are looked into while in technical analysis, demand/ supply position of the securities along with prevalent share price trends are examined.

1. FUNDAMENTAL ANALYSIS

Fundamental analysis is based on the assumption that the share prices depend upon the future dividends expected by the shareholders. The present value of the future dividends can be calculated by discounting the cash flows at an appropriate discount rate and is known as the *'intrinsic value of the share'*. The intrinsic value of a share, according to a fundamental analyst, depicts the true value of a share. A share that is priced below the intrinsic value must be bought, while a share quoting above the intrinsic value must be sold.

Thus, it can be said that the price the shareholders are prepared to pay for a share is nothing but the present value of the dividends they expect to receive on the share and this is the price at which they expect to sell it in the future.

As a first step, to arrive at a compact expression, let us make a simple assumption, that the company is expected to pay a uniform dividend of ₹ *D* per share every year, i.e.,

$$D(1) = D(2) = D(3) = \ldots = D, \qquad (1)$$

The Eq., would then become:

$$P(0) = \frac{D}{(1+k)} + \frac{D}{(1+k)^2} + \frac{D}{(1+k)^3} + \ldots + \ldots \qquad (2)$$

But it is unrealistic to assume that dividends remain constant over time. In case of most shares, the dividends per share (DPS) grow because of the growth in the earnings of the firm. Most companies, as they identify new investment opportunities for growth, tend to increase their DPS over a period of time.

Let us assume that on an average the DPS of the company grows at the compounded rate of g per annum, so that dividend $D(1)$ at the end of the first period grows to $D(1)(1+g)$, $D(1)(1+g)^2$, etc, at the end of second period, third period, etc. respectively. So we must have:

$$P(0) = \frac{D(1)}{(1+k)} + \frac{D(1)(1+g)}{(1+k)^2} + \frac{D(1)(1+g)^2}{(1+k)^3} + \ldots + \ldots (3)$$

which is a perpetual geometric series.

If growth rate in dividends, *g*, is less than the desired rate of return on share, *k*, we must have:

$$P(0) = \frac{D(1)}{(k-g)} \qquad (4)$$

or

$$P(0) = \frac{D(0)(1+g)}{(k-g)} \qquad (5)$$

Since $D(1)$ may be approximated as $D(0)(1+g)$, $D(0)$ being the DPS in the current period (0).

When growth rate in dividends, g, is equal to or greater than the desired rate of return on share, k, the above model is not valid, since the geometric series leads to an infinite price. The condition that g be less than k is not very restrictive, since the long-term growth in dividends is unlikely to exceed the rate of return expected by the market on the share.

The above result [Eq.(4)] is also known as Gordon's dividend growth model for stock valuation, named after the model's originator, Myron J. Gordon. This is one of the most well known models in the genre of fundamental analysis.

In equation (5), if "g" is set at zero, we get back equation (2).

1.1 Dividend Growth Model and the PE Multiple

Financial analysts tend to relate price to earnings via the P/E multiples (the ratio between the market price and earnings per share).

If a company is assumed to pay out a fraction b of its earnings as dividends on an average (i.e. the Dividend Payout Ratio = b), D(1) may be expressed as b E(1), where E(1) is the earning per share (EPS) of the company at the end of the first period. Equation (4) then becomes:

$$P(0) = \frac{bE(1)}{(k-g)} \qquad (6)$$

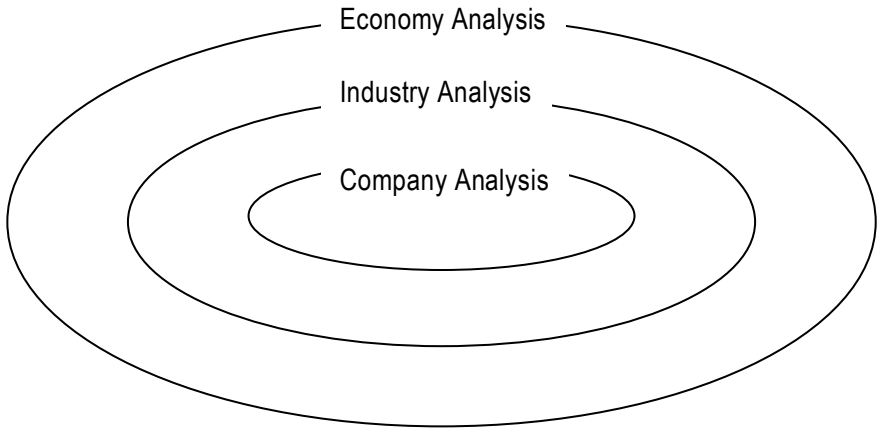
or

$$P(0) = \frac{bE(0)\,(1+g)}{(k-g)} \qquad (7)$$

The fundamental analysts use the above models or some of their variations, for estimating the fundamental or intrinsic price or the fundamental price-earnings multiple of a security. Towards this end, they devote considerable effort in assessing the impact of various kinds of information on a company's future profitability and the expected return of the shareholders. If the prevailing price or the P/E multiple of a security is higher than the estimated fundamental value (i.e. if the security appears to be overpriced), they recommend a selling stance with respect to that security, since once the information becomes common knowledge, the price of the security may be expected to fall. On the other hand, if the security is under-priced in the market, the prevailing price (or the P/E multiple) of the security being lower than the estimated fundamental value, they recommend buying the security, counting upon a price rise.

Because of these inherent complex interrelationships in the production processes, the fortunes of each industry are closely tied to those of other industries and to the performance of the economy as

a whole. Within an industry, the prospects of a specific company depend not only on the prospects of the industry to which it belongs, but also on its operating and competitive position within that industry. The key variables that an investor must monitor in order to carry out his fundamental analysis are economy wide factors, industry wide factors and company specific factors. In other words, fundamental analysis encompasses economic, industrial and company analyses. They are depicted by three concentric circles and constitute the different stages in an investment decision making process.



1.2 Economic Analysis

Macro- economic factors e. g. historical performance of the economy in the past/ present and expectations in future, growth of different sectors of theeconomy in future with signs of stagnation/degradation at present to be assessed while analyzing the overall economy. Trends in peoples' income and expenditure reflect the growth of a particular industry/company in future. Consumption affects corporate profits, dividends and share prices in the market.

1.2.1 Factors Affecting Economic Analysis

Some of the economy wide factors are discussed as under:

(a) Growth Rates of National Income and Related Measures*:* For most purposes, what is important is the difference between the nominal growth rate quoted by GDP and the 'real' growth after taking inflation into account. The estimated growth rate of the economy would be a pointer to the prospects for the industrial sector, and therefore to the returns investors can expect from investment in shares.

(b) Growth Rates of Industrial Sector*:* This can be further broken down into growth rates of various industries or groups of industries if required. The growth rates in various industries are estimated based on the estimated demand for its products.

(c) Inflation*:* Inflation is measured in terms of either wholesale prices (the Wholesale Price Index or WPI) or retail prices (Consumer Price Index or CPI). The demand in some industries, particularly

the consumer products industries, is significantly influenced by the inflation rate. Therefore, firms in these industries make continuous assessment about inflation rates likely to prevail in the near future so as to fine-tune their pricing, distribution and promotion policies to the anticipated impact of inflation on demand for their products.

(d) Monsoon: Because of the strong forward and backward linkages, monsoon is of great concern to investors in the stock market too.

1.2.2 Techniques Used in Economic Analysis

Economic analysis is used to forecast national income with its various components that have a bearing on the concerned industry and the company in particular. Gross national product (GNP) is used to measure national income as it reflects the growth rate in economic activities and has been regarded as a forecasting tool for analyzing the overall economy along with its various components during a particular period.

Some of the techniques used for economic analysis are:

(a) Anticipatory Surveys: They help investors to form an opinion about the future state of the economy. It incorporates expert opinion on construction activities, expenditure on plant and machinery, levels of inventory – all having a definite bearing on economic activities. Also future spending habits of consumers are taken into account.

In spite of valuable inputs available through this method, it has certain drawbacks:

(i) Survey results do not guarantee that intentions surveyed would materialize.

(ii) They are not regarded as forecasts per se, as there can be a consensus approach by the investor for exercising his opinion.

Continuous monitoring of this practice is called for to make this technique popular.

(b) Barometer/Indicator Approach: Various indicators are used to find out how the economy shall perform in the future. The indicators have been classified as under:

(i) *Leading Indicators*: They lead the economic activity in terms of their outcome. They relate to the time series data of the variables that reach high/low points in advance of economic activity.

(ii) *Roughly Coincidental Indicators:* They reach their peaks and troughs at approximately the same in the economy.

(iii) *Lagging Indicators:* They are time series data of variables that lag behind in their consequences vis-a- vis the economy. They reach their turning points after the economy has reached its own already.

All these approaches suggest direction of change in the aggregate economic activity but nothing about its magnitude. The various measures obtained form such indicators may give conflicting

signals about the future direction of the economy. To avoid this limitation, use of diffusion/composite index is suggested whereby combining several indicators into one index to measure the strength/weaknesses in the movement of a particular set of indicators. Computation of diffusion indices is no doubt difficult notwithstanding the fact it does not eliminate irregular movements.

Money supply in the economy also affects investment decisions. Rate of change in money supply in the economy affects GNP, corporate profits, interest rates and stock prices. Increase in money supply fuels inflation. As investment in stocks is considered as a hedge against inflation, stock prices go up during inflationary period.

(c) Economic Model Building Approach*:* In this approach, a precise and clear relationship between dependent and independent variables is determined. GNP model building or sectoral analysis is used in practice through the use of national accounting framework. The steps used are as follows:

(i) Hypothesize total economic demand by measuring total income (GNP) based on political stability, rate of inflation, changes in economic levels.

(ii) Forecasting the GNP by estimating levels of various components viz. consumption expenditure, gross private domestic investment, government purchases of goods/services, net exports.

(iii) After forecasting individual components of GNP, add them up to obtain the forecasted GNP.

(iv) Comparison is made of total GNP thus arrived at with that from an independent agency for the forecast of GNP and then the overall forecast is tested for consistency. This is carried out for ensuring that both the total forecast and the component wise forecast fit together in a reasonable manner.

1.3 Industry Analysis

When an economy grows, it is very unlikely that all industries in the economy would grow at the same rate. So it is necessary to examine industry specific factors, in addition to economy-wide factors.

First of all, an assessment has to be made regarding all the conditions and factors relating to demand of the particular product, cost structure of the industry and other economic and Government constraints on the same. Since the basic profitability of any company depends upon the economic prospects of the industry to which it belongs, an appraisal of the particular industry's prospects is essential.

1.3.1 Factors Affecting Industry Analysis

The following factors may particularly be kept in mind while assessing the factors relating to an industry.

(a) **Product Life-Cycle*:*** An industry usually exhibits high profitability in the initial and growth stages, medium but steady profitability in the maturity stage and a sharp decline in profitability in the last stage of growth.

(b) **Demand Supply Gap*:*** Excess supply reduces the profitability of the industry because of the decline in the unit price realization, while insufficient supply tends to improve the profitability because of higher unit price realization.

(c) **Barriers to Entry*:*** Any industry with high profitability would attract fresh investments. The potential entrants to the industry, however, face different types of barriers to entry. Some of these barriers are innate to the product and the technology of production, while other barriers are created by existing firms in the industry.

(d) **Government Attitude*:*** The attitude of the government towards an industry is a crucial determinant of its prospects.

(e) **State of Competition in the Industry*:*** Factors to be noted are- firms with leadership capability and the nature of competition amongst them in foreign and domestic market, type of products manufactured viz. homogeneous or highly differentiated, demand prospects through classification viz customer-wise/area-wise, changes in demand patterns in the long/immediate/ short run, type of industry the firm is placed viz. growth, cyclical, defensive or decline.

(f) **Cost Conditions and Profitability*:*** The price of a share depends on its return, which in turn depends on profitability of the firm. Profitability depends on the state of competition in the industry, cost control measures adopted by its units and growth in demand for its products.

Factors to be considered are:

(i) Cost allocation among various heads e.g. raw material, labors and overheads and their controllability. Overhead cost for some may be higher while for others labour may be so. Labour cost which depends on wage level and productivity needs close scrutiny.

(ii) Product price.

(iii) Production capacity in terms of installation, idle and operating.

(iv) Level of capital expenditure required for maintenance / increase in productive efficiency.

Investors are required to make a through analysis of profitability. This is carried out by the study of certain ratios such as G.P. Ratio, Operating Profit Margin Ratio, R.O.E., Return on Total Capital etc.

(g) **Technology and Research*:*** They play a vital role in the growth and survival of a particular industry. Technology is subject to change very fast leading to obsolescence. Industries which update themselves have a competitive advantage over others in terms of quality, price etc.

Things to be probed in this regard are:

(i) Nature and type of technology used.

(ii) Expected changes in technology for new products leading to increase in sales.

(iii) Relationship of capital expenditure and sales over time. More capital expenditure means increase in sales.

(iv) Money spent in research and development. Whether this amount relates to redundancy or not?

(v) Assessment of industry in terms of sales and profitability in short, immediate and long run.

1.3.2 Techniques Used in Industry Analysis

The techniques used for analyzing the industry wide factors are:

(a) **Regression Analysis*:*** Investor diagnoses the factors determining the demand for output of the industry through product demand analysis. Factors to be considered are GNP, disposable income, per capita consumption / income, price elasticity of demand. For identifying factors affecting demand, statistical techniques like regression analysis and correlation are used.

(b) **Input – Output Analysis*:*** It reflects the flow of goods and services through the economy, intermediate steps in production process as goods proceed from raw material stage through final consumption. This is carried out to detect changing patterns/trends indicating growth/decline of industries.

1.4 Company Analysis

Economic and industry framework provides the investor with proper background against which shares of a particular company are purchased. This requires careful examination of the company's quantitative and qualitative fundamentals.

(a) **Net Worth and Book Value*:*** Net Worth is sum of equity share capital, preference share capital and free reserves less intangible assets and any carry forward of losses. The total net worth divided by the number of shares is the much talked about book value of a share. Though the book value is often seen as an indication of the intrinsic worth of the share, this may not be so for two major reasons. First, the market price of the share reflects the future earnings potential of the firm which may have no relationship with the value of its assets. Second, the book value is based upon the historical costs of the assets of the firm and these may be gross underestimates of the cost of the replacement or resale values of these assets.

(b) **Sources and Uses of Funds*:*** The identification of sources and uses of funds is known as Funds Flow Analysis. One of the major uses of funds flow analysis is to find out whether the firm has used short-term sources of funds to finance long-term investments. Such methods of financing increases the risk of liquidity crunch for the firm, as long-term investments,

because of the gestation period involved may not generate enough surpluses in time to meet the short-term liabilities incurred by the firm. Many a firm has come to grief because of this mismatch between the maturity periods of sources and uses of funds.

(c) **Cross-Sectional and Time Series Analysis:** One of the main purposes of examining financial statements is to compare two firms, compare a firm against some benchmark figures for its industry and to analyze the performance of a firm over time. The techniques that are used to do such proper comparative analysis are: common-sized statement, and financial ratio analysis.

(d) **Size and Ranking:** A rough idea regarding the size and ranking of the company within the economy, in general, and the industry, in particular, would help the investment manager in assessing the risk associated with the company. In this regard the net capital employed, the net profits, the return on investment and the sales figures of the company under consideration may be compared with similar data of other companies in the same industry group. It may also be useful to assess the position of the company in terms of technical know-how, research and development activity and price leadership.

(e) **Growth Record:** The growth in sales, net income, net capital employed and earnings per share of the company in the past few years should be examined. The following three growth indicators may be particularly looked into: (a) Price earnings ratio, (b) Percentage growth rate of earnings per annum, and (c) Percentage growth rate of net block.

The price earnings ratio is an important indicator for the investment manager since it shows the number of times the earnings per share are covered by the market price of a share. Theoretically, this ratio should be the same for two companies with similar features. However, this is not so in practice due to many factors. Hence, by a comparison of this ratio pertaining to different companies the investment manager can have an idea about the image of the company and can determine whether the share is under-priced or over-priced.

Consider the following example:

		Company A	*Company B*
(a)	Market price of share of ₹ 100	150	250
(b)	Earnings per share	25	25
(c)	Price earnings ratio [(a) ÷ (b)]	6	10

It is obvious that the purchaser of company A's shares pays 6 times its annual earnings while the purchaser of company B's shares pays 10 times. If other factors (intrinsic value of share, growth potential, etc.) are quite similar, it is obvious that the shares of company A are preferable. In practice, however, the other factors are never similar in the case of two companies. The investment manager must try to ascertain why the EPS in company B is comparatively low – may be some factors are not apparent. EPS calculation cannot be the sole basis of deciding about an investment. Yet it is one of the most important factors on the basis of which the investment manager takes a decision to

purchase the shares. This is because it relates the market price of the shares and the earnings per share.

The percentage growth rate of net blocks shows how the company has been developing its capacity levels. Obviously, a dynamic company will keep on expanding its capacities and diversify its business. This will enable it to enter new and profitable lines and avoid stagnation in its growth.

In this context, an evaluation of future growth prospects of the company should be carefully made. This requires an analysis of existing capacities and their utilisation, proposed expansion and diversification plans and the nature of the company's technology. The existing capacity utilisation levels can be known from the quantitative information given in the published profit and loss accounts of the company. The plans of the company, in terms of expansion or diversification, can be known from the Directors' Reports, the Chairman's statements and from the future capital commitments as shown by way of notes in the balance sheets. The nature of technology of a company should be seen with reference to technological developments in the concerned fields, the possibility of its product being superseded or the possibility of emergence of a more effective method of manufacturing.

Growth is the single most important factor in company analysis for the purpose of investment management. A company may have a good record of profits and performance in the past; but if it does not have growth potential, its shares cannot be rated high from the investment point of view.

(f) Financial Analysis*:* An analysis of its financial statements for the past few years would help the investment manager in understanding the financial solvency and liquidity, the efficiency with which the funds are used, the profitability, the operating efficiency and the financial and operating leverages of the company. For this purpose, certain fundamental ratios have to be calculated.

From the investment point of view, the most important figures are earnings per share, price earning ratios, yield, book value and the intrinsic value of the share. These five elements may be calculated for the past 10 years or so and compared with similar ratios computed from the financial accounts of other companies in the industry and with the average ratios for the industry as a whole. The yield and the asset backing of a share are important considerations in a decision regarding whether the particular market price of the share is proper or not.

Various other ratios to measure profitability, operating efficiency and turnover efficiency of the company may also be calculated. The return on owners' investment, capital turnover ratio and the cost structure ratios may also be worked out.

To examine the financial solvency or liquidity of the company, the investment manager may work out current ratio, liquidity ratio, debt-equity ratio, etc. These ratios will provide an overall view of the company to the investment analyst. He can analyse its strengths and weaknesses and see whether it is worth the risk or not.

(g) Competitive Advantage: Another business consideration for investors is competitive advantage. A company's long-term success is driven largely by its ability to maintain its competitive

advantage.Powerful competitive advantages, such as Apple's brand name and Samsung's domination of the mobilemarket, create a shield around a business that allows it to keep competitors at a distance.

(h) Quality of Management*:* This is an intangible factor. Yet it has a very important bearing on the value of the shares. Every investment manager knows that the shares of certain business houses command a higher premium than those of similar companies managed by other business houses. This is because of the quality of management, the confidence that investors have in a particular business house, its policy vis-a-vis its relationship with the investors, dividend and financial performance record of other companies in the same group, etc. This is perhaps the reason that an investment manager always gives a close look to themanagement of a company in whose shares he is to invest. Quality of management has to be seen with reference to the experience, skills and integrity of the persons at the helm of affairs of the company. The policy of the management regarding relationship with the shareholders is an important factor since certain business houses believe in very generous dividend and bonus distributions while others are rather conservative.

However, an average investor is at a disadvantage when compared with a large investor. They do not get the facility to meet the top executives of the company. But, the fund managers interested in investing huge amount of money generally get to meet the top brasses of an organization.

It is true that every listed company give detailed information about its management. But, the information they give is always positive. This is because; no company will host any negative information about its company. So, the question is how to find the dirt inside the management. The remedy is to have a look out for the conference calls hosted by the company's CEO and CFO. After reading the company's financial results, they take question and answers session from the investors. That's where one can pick something that can indicate about the true position about the company.

Some other ways to judge the management of the company is to read the Management Discussion and Analysis Report. Further, it helps when top management people are also the shareholders. If the large scale unloading of their shares are taking place and something else is communicated to the media, then it is a sign that something is wrong. Another way to judge the effectiveness of the management is to see the past performance of the executives, say, for five years.

(i) Corporate Governance: Following factors are to be kept in mind while judging the effectiveness of corporate governance of an organization:

- Whether company is complying with all aspects of clause 49.
- How well corporate governance policies serve stakeholders?
- Quality and timeliness of company financial disclosures.
- Whether quality independent directors are inducted.

(j) Regulation: Regulations plays an important role in maintaining the sanctity of the corporate form of organization. In Indian listed companies, Companies Act, Securities Contract and Regulation

Act and SEBI Act basically look after regulatory aspects of a company. A listed company is also continuously monitored by SEBI which through its guidelines and regulations protect the interest of investors.

Further, a company which is dealing with companies outside India, needs to comply with Foreign Exchange Management Act (FEMA) also. In this scenario, the Reserve Bank of India (RBI) does a continuous monitoring.

(k) Location and Labour-Management Relations: The locations of the company's manufacturing facilities determines its economic viability which depends on the availability of crucial inputs like power, skilled labour and raw-materials, etc. Nearness to markets is also a factor to be considered.

In the past few years, the investment manager has begun looking into the state of labour-management relations in the company under consideration and the area where it is located.

(l) Pattern of Existing Stock Holding: An analysis of the pattern of existing stock holdings of the company would also be relevant. This would show the stake of various parties in the company. An interesting case in this regard is that of the Punjab National Bank in which the Life Insurance Corporation and other financial institutions had substantial holdings. When the bank was nationalised, the residual company proposed a scheme whereby those shareholders, who wish to opt out, could receive a certain amount as compensation in cash. It was only at the instance and the bargaining strength, of institutional investors that the compensation offered to the shareholders, who wished to opt out of the company, was raised considerably.

(m) Marketability of the Shares: Another important consideration for an investment manager is the marketability of the shares of the company. Mere listing of a share on the stock exchange does not automatically mean that the share can be sold or purchased at will. There are many shares which remain inactive for long periods with no transactions being affected. To purchase or sell such scrips is a difficult task. In this regard, dispersal of shareholding with special reference to the extent of public holding should be seen. The other relevant factors are the speculative interest in the particular scrip, the particular stock exchange where it is traded and the volume of trading.

1.4.1 Techniques Used in Company Analysis

Through the use of statistical techniques the company wide factors can be analyzed. Some of the techniques are discussed as under:

(a) Correlation & Regression Analysis: Simple regression is used when inter relationship covers two variables. For more than two variables, multiple regression analysis is followed. Here the inter relationship between variables belonging to economy, industry and company are found out. The main advantage in such analysis is the determination of the forecasted values along with testing the reliability of the estimates.

(b) Trend Analysis: The relationship of one variable is tested over time using regression analysis. It gives an insight to the historical behavior of the variable.

(c) Decision Tree Analysis: Information relating to the probability of occurrence of the forecasted value is considered useful. A range of values of the variable with probabilities of occurrence of each value is taken up. The limitations are reduced through decision tree analysis and use of simulation techniques.

In decision tree analysis, the decision is taken sequentially with probabilities attached to each sequence. To obtain the probability of final outcome, various sequential decisions given along with probabilities, the probabilities of each sequence is to be multiplied and them summed up.

Thus, fundamental analysis is basically an examination of the economic and financial aspects of a company with the aim of estimating future earnings and dividend prospects. It includes an analysis of the macro-economic and political factors which will have an impact on the performance of the company. After having analysed all the relevant information about the company and its relative strength vis-a-vis other companies in the industry, the investor is expected to decide whether he should buy or sell the securities.

Apart from these, the Group Analysis has also become an important factor. SEBI, in particular, emphasizes the need for disclosure, in public offer documents, of all relevant parameters – especially the financial health and promise versus performance of the group companies. RBI has also been focusing more and more on the Group Exposure Norms of commercial Banks.

2. TECHNICAL ANALYSIS

2.1 Meaning

Technical Analysis is a method of share price movements based on a study of price graphs or charts on the assumption that share price trends are repetitive, that since investor psychology follows a certain pattern, what is seen to have happened before is likely to be repeated. The technical analyst is concerned with the fundamental strength or weakness of a company or an industry; he studies investor and price behaviour.

A technical analyst attempts to answer two basic questions:

(i) Is there a discernible trend in the prices?

(ii) If there is, then are there indications that the trend would reverse?

The methods used to answer these questions are visual and statistical. The visual methods are based on examination of a variety of charts to make out patterns, while the statistical procedures analyse price and return data to make trading decisions.

2.2 Assumptions

Technical Analysis is based on the following assumptions:

(i) The market value of stock depends on the supply and demand for a stock.

(ii) The supply and demand is actually governed by several factors. For instance, recent initiatives taken by the Government to reduce the Non-Performing Assets (NPA) burden of banks may actually increase the demand for banking stocks.

(iii) Stock prices generally move in trends which continue for a substantial period of time. Therefore, if there is a bull market going on, there is every possibility that there will soon be a substantial correction which will provide an opportunity to the investors to buy shares at that time.

(iv) Technical analysis relies upon chart analysis which shows the past trends in stock prices rather than the information in the financial statements like balance sheet or profit and loss account.

2.3 Principles of Technical Analysis

Technical analysis is based on the following three principals:

a. The market discounts everything.

b. Price moves in trends.

c. History tends to repeat itself.

a. **The Market Discounts Everything:** Many experts criticize technical analysis because it only considers price movements and ignores fundamental factors. The argument against such criticism is based on the Efficient Market Hypothesis, which states that a company's share price already reflects everything that has or could affect a company. And it includes fundamental factors. So, technical analysts generally have the view that a company's share price includes everything including the fundamentals of a company.

b. **Price Moves in Trends:** Technical analysts believe that prices move in trends. In other words, a stock price is more likely to continue a past trend than move in a different direction.

c. **History Tends to Repeat Itself:** Technical analysts believe that history tends to repeat itself. Technical analysis uses chart patterns to analyze subsequent market movements to understand trends. While many form of technical analysis have been used for many years, they are still are considered to be significant because they illustrate patterns in price movements that often repeat themselves.

2.4 Theories of Technical Analysis

2.4.1 The Dow Theory

The Dow Theory is one of the oldest and most famous technical theories. It was originated by Charles Dow, the founder of Dow Jones Company in late nineteenth century. It is a helpful tool for determining the relative strength of the stock market. It can also be used as a barometer of business.

The Dow Theory is based upon the movements of two indices, constructed by Charles Dow, Dow Jones Industrial Average (DJIA) and Dow Jones Transportation Average (DJTA). These averages reflect the aggregate impact of all kinds of information on the market. The movements of the market are divided into three classifications, all going at the same time; the primary movement, the secondary movement, and the daily fluctuations. The primary movement is the main trend of the market, which lasts from one year to 36 months or longer. This trend is commonly called bear or bull market. The secondary movement of the market is shorter in duration than the primary movement, and is opposite in direction. It lasts from two weeks to a month or more. The daily fluctuations are the narrow movements from day-to-day. These fluctuations are not part of the Dow Theory interpretation of the stock market. However, daily movements must be carefully studied, along with primary and secondary movements, as they go to make up the longer movement in the market.

Thus, the Dow Theory's purpose is to determine where the market is and where is it going, although not how far or high. The theory, in practice, states that if the cyclical swings of the stock market averages are successively higher and the successive lows are higher, then the market trend is up and a bullish market exists. Contrarily, if the successive highs and successive lows are lower, then the direction of the market is down and a bearish market exists.

Charles Dow proposed that the primary uptrend would have three moves up, the first one being caused by accumulation of shares by the far-sighted, knowledgeable investors, the second move would be caused by the arrival of the first reports of good earnings by corporations, and the last move up would be caused by widespread report of financial well-being of corporations. The third stage would also see rampant speculation in the market. Towards the end of the third stage, the far-sighted investors, realizing that the high earnings levels may not be sustained, would start selling, starting the first move down of a downtrend, and as the non-sustainability of high earnings is confirmed, the second move down would be initiated and then the third move down would result from distress selling in the market.

2.4.2 Elliot Wave Theory

Inspired by the Dow Theory and by observations found throughout nature, Ralph Elliot formulated Elliot Wave Theory in 1934. This theory was based on analysis of 75 years stock price movements and charts. From his studies, he defined price movements in terms of waves. Accordingly, this theory was named Elliot Wave Theory. Elliot found that the markets exhibited certain repeated patterns or waves. As per this theory wave is a movement of the market price from one change in the direction to the next change in the same direction. These waves are resulted from buying and selling impulses emerging from the demand and supply pressures on the market. Depending on the demand and supply pressures, waves are generated in the prices.

As per this theory, waves can be classified into two parts:-

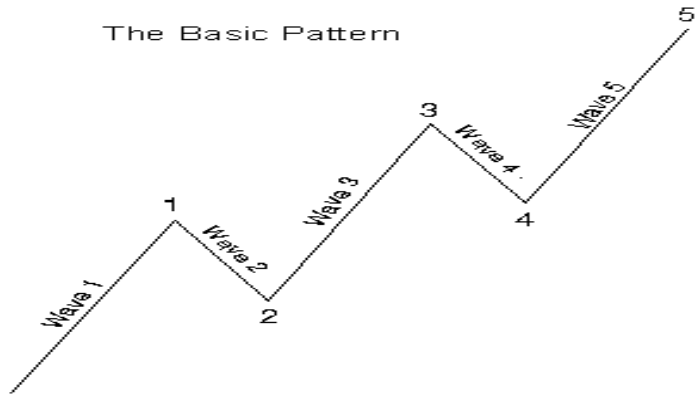
- Impulsive patterns
- Corrective patters

Let us discuss each of these patterns.

(a) **Impulsive Patterns-(Basic Waves) -** In this pattern there will be 3 or 5 waves in a given direction (going upward or downward). These waves shall move in the direction of the basic movement. This movement can indicate bull phase or bear phase.

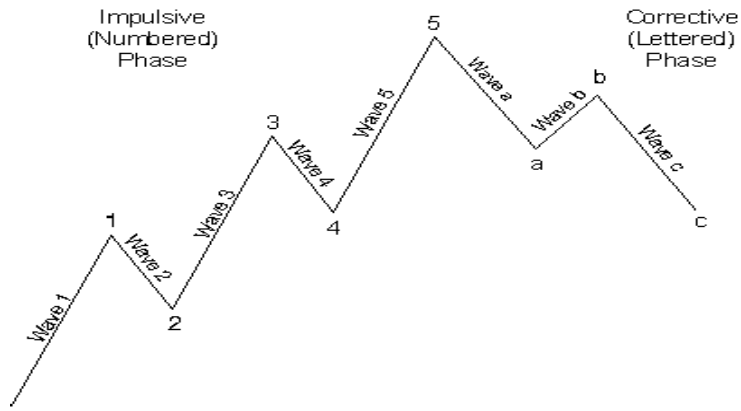
(b) **Corrective Patterns-** (**Reaction Waves) -** These 3 waves are against the basic direction of the basic movement. Correction involves correcting the earlier rise in case of bull market and fall in case of bear market.

As shown in the following diagram waves 1, 3 and 5 are directional movements, which are separated or corrected by wave 2 & 4, termed as corrective movements.



Source: http://elliotwave.net/

Complete Cycle -As shown in following figure five-wave impulses is following by a three-wave correction (a,b & c) to form a complete cycle of eight waves.



Source: http://elliotwave.net/

One complete cycle consists of waves made up of two distinct phases, bullish and bearish. On completion of full one cycle i.e. termination of 8 waves movement, the fresh cycle starts with similar impulses arising out of market trading.

2.4.3 Random Walk Theory

While discussing the Dow Jones theory, we have seen that the theory is based on the assumption that the behaviour of stock market itself contains trends which give clues to the future behaviour of stock market prices. Thus supporters of the theory argue that market prices can be predicted if their patterns can be properly understood. *Such analysis of stock market patterns is called technical analysis.* Apart from this theory there are many approaches to technical analysis. Most of them, however, involve a good deal of subjective judgment.

Many investment managers and stock market analysts believe that stock market prices can never be predicted because they are not a result of any underlying factors but are mere statistical ups and downs. This hypothesis is known as Random Walk hypothesis which states that the behaviour of stock market prices is unpredictable and that there is no relationship between the present prices of the shares and their future prices. Proponents of this hypothesis argue that stock market prices are independent. A British statistician, M. G. Kendell, found that changes in security prices behave nearly as if they are generated by a suitably designed roulette wheel for which each outcome is statistically independent of the past history. In other words, the fact that there are peaks and troughs in stock exchange prices is a mere statistical happening – successive peaks and troughs are unconnected. In the layman's language it may be said that prices on the stock exchange behave exactly the way a drunk would behave while walking in a blind lane, i.e., up and down, with an unsteady way going in any direction he likes, bending on the side once and on the other side the second time.

The supporters of this theory put out a simple argument. It follows that:

(a) Prices of shares in stock market can never be predicted.

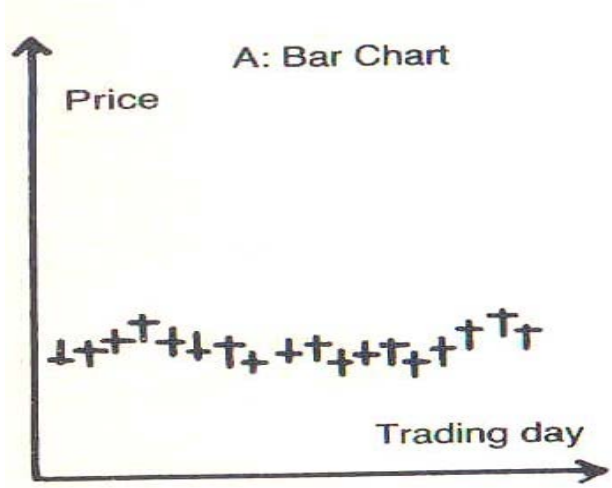
(b) The reason is that the price trends are not the result of any underlying factors, but that they represent a statistical expression of past data.

(c) There may be periodical ups or downs in share prices, but no connection can be established between two successive peaks (high price of stocks) and troughs (low price of stocks).

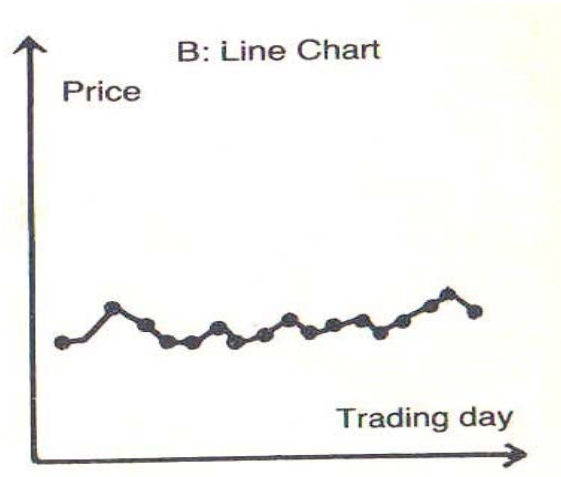
2.5 Charting Techniques

Technical analysts use three types of charts for analyzing data. They are:

(i) Bar Chart : In a bar chart, a vertical line (bar) represents the lowest to the highest price, with a short horizontal line protruding from the bar representing the closing price for the period. Since volume and price data are often interpreted together, it is a common practice to plot the volume traded, immediately below the line and the bar charts.



(ii) Line Chart: In a line chart, lines are used to connect successive day's prices. The closing price for each period is plotted as a point. These points are joined by a line to form the chart. The period may be a day, a week or a month.



(iii) Point and Figure Chart: Point and Figure charts are more complex than line or bar charts. They are used to detect reversals in a trend. For plotting a point and figure chart, we have to first decide the box size and the reversal criterion. The box size is the value of each box on the chart, for example each box could be Re.1, ₹ 2 or ₹ 0.50. The smaller the box size, the more sensitive would the chart be to price change. The reversal criterion is the number of boxes required to be retraced to record prices in the next column in the opposite direction.

Period	Price
1	24
2	26

30								
29								
28	X							

3	27
4	26
5	28
6	27
7	26
8	25
9	26
10	23

27	X							
26	X							
25	X	O						
24	X	O						
23		O						
22								

2.6 Market Indicators

(i) Breadth Index: It is an index that covers all securities traded. It is computed by dividing the net advances or declines in the market by the number of issues traded. The breadth index either supports or contradicts the movement of the Dow Jones Averages. If it supports the movement of the Dow Jones Averages, this is considered sign of technical strength and if it does not support the averages, it is a sign of technical weakness i.e. a sign that the market will move in a direction opposite to the Dow Jones Averages. The breadth index is an addition to the Dow Theory and the movement of the Dow Jones Averages.

(ii) Volume of Transactions: The volume of shares traded in the market provides useful clues on how the market would behave in the near future. A rising index/price with increasing volume would signal buy behaviour because the situation reflects an unsatisfied demand in the market. Similarly, a falling market with increasing volume signals a bear market and the prices would be expected to fall further. A rising market with decreasing volume indicates a bull market while a falling market with dwindling volume indicates a bear market. Thus, the volume concept is best used with another market indicator, such as the Dow Theory.

(iii) Confidence Index*:* It is supposed to reveal how willing the investors are to take a chance in the market. It is the ratio of high-grade bond yields to low-grade bond yields. It is used by market analysts as a method of trading or timing the purchase and sale of stock, and also, as a forecasting device to determine the turning points of the market. A rising confidence index is expected to precede a rising stock market, and a fall in the index is expected to precede a drop in stock prices. A fall in the confidence index represents the fact that low-grade bond yields are rising faster or falling more slowly than high grade yields. The confidence index is usually, but not always a leading indicator of the market. Therefore, it should be used in conjunction with other market indicators.

(iv) Relative Strength Analysis: The relative strength concept suggests that the prices of some securities rise relatively faster in a bull market or decline more slowly in a bear market than other securities i.e. some securities exhibit relative strength. Investors will earn higher returns by investing

in securities which have demonstrated relative strength in the past because the relative strength of a security tends to remain undiminished over time.

Relative strength can be measured in several ways. Calculating rates of return and classifying those securities with historically high average returns as securities with high relative strength is one of them. Even ratios like security relative to its industry and security relative to the entire market can also be used to detect relative strength in a security or an industry.

(v) Odd - Lot Theory*:* This theory is a contrary - opinion theory. It assumes that the average person is usually wrong and that a wise course of action is to pursue strategies contrary to popular opinion. The odd-lot theory is used primarily to predict tops in bull markets, but also to predict reversals in individual securities.

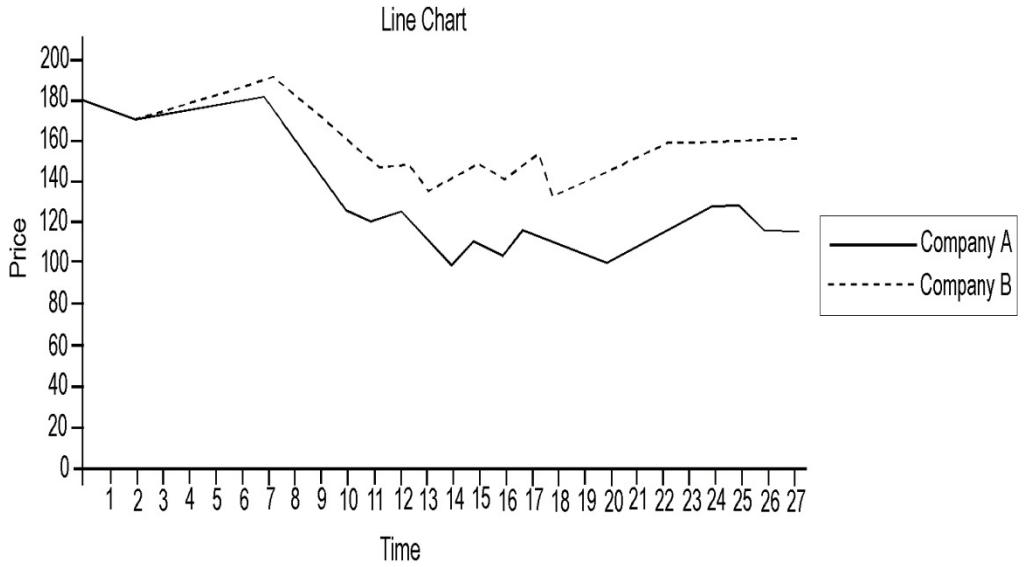
2.7 Support and Resistance Levels

When the index/price goes down from a peak, the peak becomes the resistance level. When the index/price rebounds after reaching a trough subsequently, the lowest value reached becomes the support level. The price is then expected to move between these two levels. Whenever the price approaches the resistance level, there is a selling pressure because all investors who failed to sell at the high would be keen to liquidate, while whenever the price approaches the support level, there is a buying pressure as all those investors who failed to buy at the lowest price would like to purchase the share. A breach of these levels indicates a distinct departure from status quo, and an attempt to set newer levels. Let us get a better understanding about these levels by using price data for about two months for shares of companies A and B given in the following Table:

Date	A	B
Dec. 1, 2005	177	177
5	171	171.5
7	172	175.5
12	174	177
13	177.5	181
14	181	184
15	180	186.5
18	163	176
19	142	162.5
20	127	156
22	123	147
25	124	147

Jan. 3, 2006	107.5	137.5
4	97.5	140
8	105	145
10	102.5	143.75
12	108.75	150
15	100	142.5
25	95	135
26	91.25	133.75
Feb. 1	97.5	138.75
2	106.25	147.5
5	113.75	152.5
6	120	155
7	120	152.5
8	113.75	150
9	113.75	147.5

The line charts for Company A and Company B shares are shown in the graph below. From the charts, it appears that the support level and resistance level for Company A at that time were about ₹ 100 and ₹ 125, while these levels for Company B were ₹ 140 and ₹ 160.

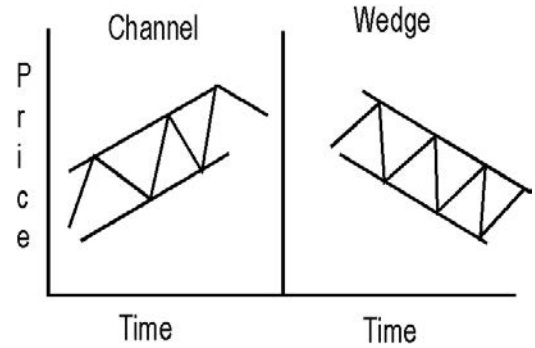


2.8 Interpreting Price Patterns

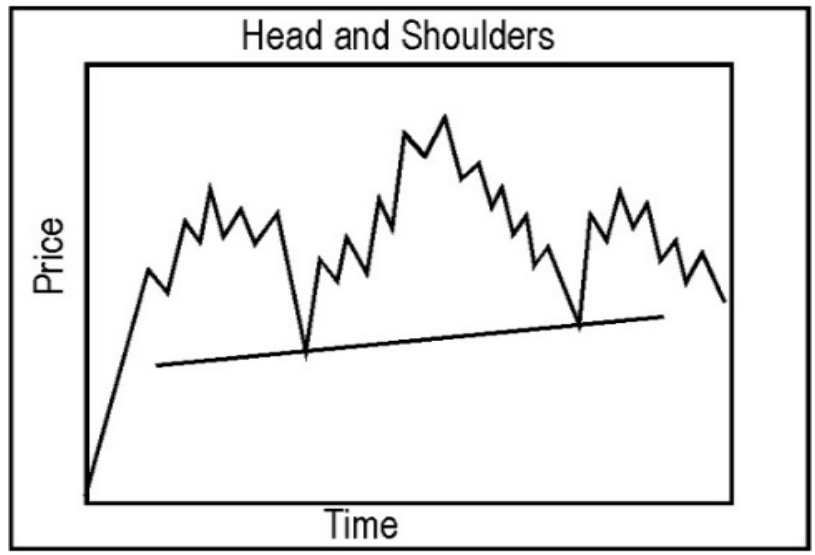
There are numerous price patterns documented by technical analysts but only a few and important of them have been discussed here:

(a) Channel: A series of uniformly changing tops and bottoms gives rise to a channel formation. A downward sloping channel would indicate declining prices and an upward sloping channel would imply rising prices.

(b) Wedge: A wedge is formed when the tops (resistance levels) and bottoms (support levels) change in opposite direction (that is, if the tops, are decreasing then the bottoms are increasing and vice versa), or when they are changing in the same direction at different rates over time.

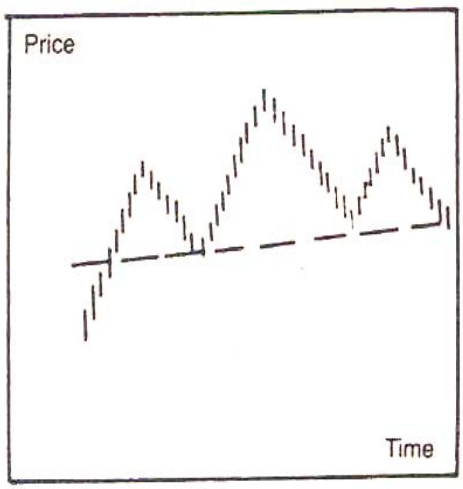


(c) Head and Shoulders: It is a distorted drawing of a human form, with a large lump (for head) in the middle of two smaller humps (for shoulders). This is perhaps the single most important pattern to indicate a reversal of price trend. The neckline of the pattern is formed by joining points where the head and the shoulders meet. The price movement after the formation of the second shoulder is crucial. If the price goes below the neckline, then a drop in price is indicated, with the drop expected to be equal to the distance between the top of the head and the neckline.

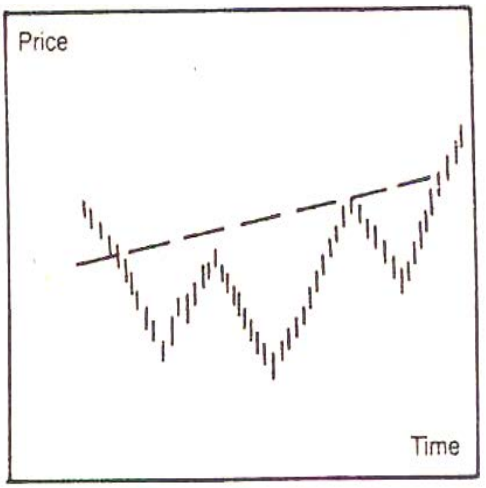


(i) *Head and Shoulder Top Pattern*: This has a left shoulder, a head and a right shoulder. Such formation represents bearish development. If the price falls below the neck line (line drawn tangentially to the left and right shoulders) a price decline is expected. Hence it's a signal to sell.

(ii) Inverse Head and Shoulder Pattern: As the name indicates this formation, it is an inverse of head and shoulder top formation. Hence it reflects a bullish development. The price rise to above the neck line suggests price rise is imminent and a signal to purchase.



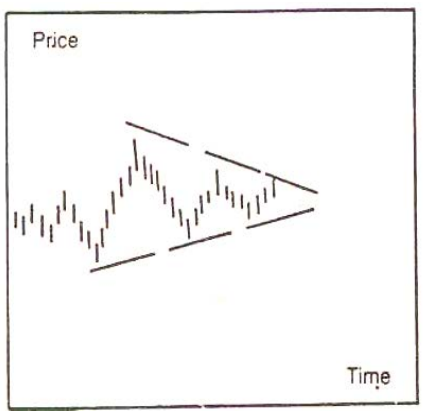
HEAD & SHOULDERS



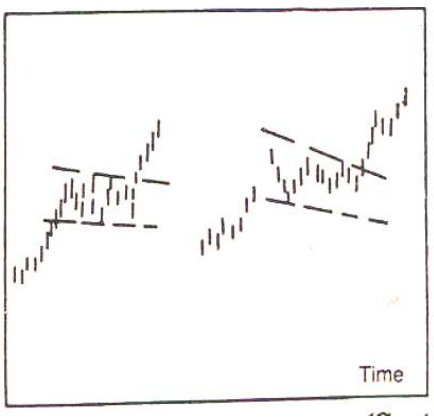
INVERSE HEAD & SHOULDERS

(d) Triangle or Coil Formation: This formation represents a pattern of uncertainty and is difficult to predict which way the price will break out.

(e) Flags and Pennants Form: This form signifies a phase after which the previous price trend is likely to continue.



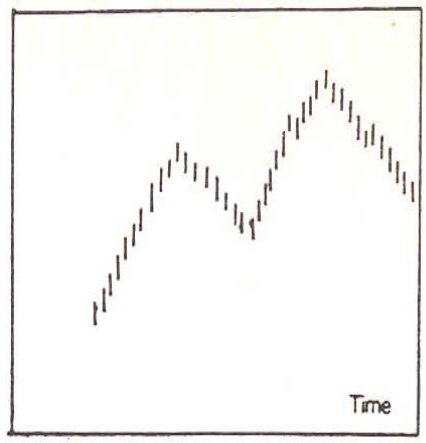
TRIANGLE OR COIL



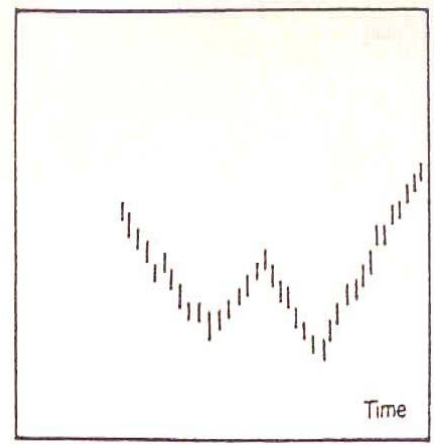
FLAG & PENNANT

(f) Double Top Form: This form represents a bearish development, signals that price is expected to fall.

(g) Double Bottom Form: This form represents bullish development signaling price is expected to rise.



DOUBLE TOP



DOUBLE BOTTOM

(h) Gap : A gap is the difference between the opening price on a trading day and the closing price of the previous trading day. The wider the gap the stronger the signal for a continuation of the observed trend. On a rising market, if the opening price is considerably higher than the previous closing price, it indicates that investors are willing to pay a much higher price to acquire the scrip. Similarly, a gap in a falling market is an indicator of extreme selling pressure.

2.9 Decision Using Data Analysis

Technical analysts have developed rules based on simple statistical analysis of price data. Moving Averages is one of the more popular methods of data analysis for decision making.

(a) Moving Averages: Moving averages are frequently plotted with prices to make buy and sell decisions. The two types of moving averages used by chartists are the Arithmetic Moving Average (AMA) and the Exponential Moving Average (EMA). An *n*-period AMA, at period *t*, is nothing but the simple average of the last *n* period prices.

$$AMA_{n,t} = 1/n[P_t + P_{t-1} + \ldots + P_{t-(n-1)}]$$

To identify trend, technical analysts use moving average analysis:

(i) A 200 day's moving average of daily prices or a 30 week moving of weekly price for identifying a long term trend.

(ii) A 60 day's moving average of daily price to discern an intermediate term trend.

(iii) A 10 day's moving average of daily price to detect a short term trend.

For example Moving Average is calculated by considering the most recent observation for which the closing price of a stock on '10' successive trading days are taken into account for the calculation of a 5 -day moving average of daily closing prices.

Trading day	*Closing prices*	*Sum of 5 most recent closing price*	*Two-item Centered Total*	*Moving Average*
1	25.00			
2	26.00			
3	25.50			
4	24.50			
5	26.00	127.00		
6	26.00	128.00	255.00	25.50
7	26.50	128.50	256.50	25.65
8	26.50	129.50	258.00	25.80
9	26.00	131.00	260.50	26.05
10	27.00	132.00	263.00	26.30

Buy and Sell Signals Provided by Moving Average Analysis

Buy Signal	*Sell Signal*
(a) Stock price line rise through the moving average line when graph of the moving average line is flattering out.	(a) Stock price line falls through moving average line when graph of the moving average line is flattering out.
(b) Stock price line falls below moving average line which is rising.	(b) Stock price line rises above moving average line which is falling.
(c) Stock price line which is above moving average line falls but begins to rise again before reaching the moving average line	(c) Stock price line which is slow moving average line rises but begins to fall again before reaching the moving average line.

(b) Exponential Moving Average: Unlike the AMA, which assigns equal weight of 1/*n* to each of the n prices used for computing the average, the Exponential Moving Average (EMA) assigns decreasing weights, with the highest weight being assigned to the latest price. The weights decrease exponentially, according to a scheme specified by the exponential smoothing constant, also known as the exponent, a.

$EMA_t = aP_t + (1-a)(EMA_{t-1})$

Where, a (exponent) = $\frac{2}{n+1}$

P_t = Price of today

EMA_{t-1} = Previous day's EMA

Or

EMA_t = (Closing Price of the day – EMA of Previous Day) x Exponent + Previous day EMA

2.10 Evaluation of Technical Analysis

Technical Analysis has several supporters as well several critics. The advocates of technical analysis offer the following interrelated argument in their favour:

(a) Under influence of crowd psychology trend persist for some time. Tools of technical analysis help in identifying these trends early and help in investment decision making.

(b) Shift in demand and supply are gradual rather then instantaneous. Technical analysis helps in detecting this shift rather early and hence provides clues to future price movements.

(c) Fundamental information about a company is observed and assimilated by the market over a period of time. Hence price movement tends to continue more or less in same direction till the information is fully assimilated in the stock price.

Detractors of technical analysis believe that it is an useless exercise; their arguments are as follows:

(a) Most technical analysts are not able to offer a convincing explanation for the tools employed by them.

(b) Empirical evidence in support of random walk hypothesis cast its shadow over the useful ness of technical analysis.

(c) By the time an up trend and down trend may have been signalled by technical analysis it may already have taken place.

(d) Ultimately technical analysis must be self defeating proposition. With more and more people employing it, the value of such analysis tends to decline.

In a nutshell, it may be concluded that in a rational, well ordered and efficient market, technical analysis may not work very well. However with imperfection, inefficiency and irrationalities that

characterizes the real world market, technical analysis may be helpful. If technical analysis is used in conjunction with fundamental analysis, it might be useful in providing proper guidance to investment decision makers.

3. DIFFERENCES BETWEEN FUNDAMENTAL ANALYSIS AND TECHNICAL ANALYSIS

Although a successful investor uses both Fundamental and Technical Analysis but following are some major differences between them:

S. No.	*Basis*	*Fundamental Analysis*	*Technical Analysis*
1	Method	Prospects are measured by analyzing economy's macro factors such as Country's GDP, Inflation Rate, Interest Rate, Growth Rate etc. and company's micro factors like its Sales, Profitability, Solvency, Asset & Liabilities and Cash position etc.	Predicts future prices and their direction using purely historical market data and information such as their Price Movements, Volume, Open Interest etc.
2	Rule	Prices of a share discounts everything.	Price captures everything
3	Usefulness	For Long-Term Investing	For Short-term Investing

4. EFFICIENT MARKET THEORY (EFFICIENT MARKET HYPOTHESIS)

Efficient Market Theory was developed by University of Chicago professor Eugen Fama in the 1960s. As per this theory, at any given time, all available price sensitive information is fully reflected in securities' prices. Thus this theory implies that no investor can consistently outperform the market as every stock is appropriately priced based on available information.

Stating otherwise theory states that no none can "beat the market" hence making it impossible for investors to either purchase undervalued stocks or sell stocks for inflated prices as stocks are always traded at their fair value on stock exchanges. Hence it is impossible to outperform the overall market through expert stock selection or market timing and that the only way an investor can possibly obtain higher returns is by purchasing riskier investments.

4.1 Search for Theory

When empirical evidence in favour of Random walk hypothesis seemed overwhelming, researchers wanted to know about the Economic processes that produced a Random walk. They concluded that randomness of stock price was a result of efficient market that led to the following view points:

- Information is freely and instantaneously available to all market participants.
- Keen competition among the market participants more or less ensures that market will reflect intrinsic values. This means that they will fully impound all available information.
- Price change only response to new information that is unrelated to previous information and therefore unpredictable.

4.2 Misconception about Efficient Market Theory

Efficient Market Theory implies that market prices factor in all available information and as such it is not possible for any investor to earn consistent long term returns from market operations.

Although price tends to fluctuate they cannot reflect fair value. This is because the future is uncertain. The market springs surprises continually and as prices reflect the surprises they fluctuate.

Inability of institutional portfolio managers to achieve superior investment performance implies that they lack competence in an efficient market. It is not possible to achieve superior investment performance since market efficiency exists due to portfolio mangers doing this job well in a competitive setting.

The random movement of stock prices suggests that stock market is irrational. Randomness and irrationality are two different things, if investors are rational and competitive, price changes are bound to be random.

4.3 Level of Market Efficiency

That price reflects all available information, the highest order of market efficiency. According to FAMA, there exist three levels of market efficiency:-

(i) *Weak form efficiency* – Price reflect all information found in the record of past prices and volumes.

(ii) *Semi – Strong efficiency* – Price reflect not only all information found in the record of past prices and volumes but also all other publicly available information.

(iii) *Strong form efficiency* – Price reflect all available information public as well as private.

4.4 Empirical Evidence on Weak form of Efficient Market Theory

According to the Weak form Efficient Market Theory current price of a stock reflect all information found in the record of past prices and volumes. This means that there is no relationship between the past and future price movements.

Three types of tests have been employed to empirically verify the weak form of Efficient Market Theory- Serial Correlation Test, Run Test and Filter Rule Test.

(a) *Serial Correlation Test*: To test for randomness in stock price changes, one has to look at serial correlation. For this purpose, price change in one period has to be correlated with price change in some other period. Price changes are considered to be serially independent. Serial correlation

studies employing different stocks, different time lags and different time period have been conducted to detect serial correlation but no significant serial correlation could be discovered. These studies were carried on short term trends viz. daily, weekly, fortnightly and monthly and not in long term trends in stock prices as in such cases. Stock prices tend to move upwards.

(b) *Run Test*: Given a series of stock price changes each price change is designated + if it represents an increase and – if it represents a decrease. The resulting series may be -,+, - , -, - , +, +.

A run occurs when there is no difference between the sign of two changes. When the sign of change differs, the run ends and new run begins.

$$\underset{1}{++}/\underset{2}{---}/\underset{3}{+}/\underset{4}{-}/\underset{5}{+}/\underset{6}{--}\ \underset{1}{++}/\underset{2}{---}/\underset{3}{+}/\underset{4}{-}/\underset{5}{+}/\underset{6}{--}$$

To test a series of price change for independence, the number of runs in that series is compared with a number of runs in a purely random series of the size and in the process determines whether it is statistically different. By and large, the result of these studies strongly supports the Random Walk Model.

(c) *Filter Rules Test*: If the price of stock increases by at least N% buy and hold it until its price decreases by at least N% from a subsequent high. When the price decreases at least N% or more, sell it. If the behaviour of stock price changes is random, filter rules should not apply in such a buy and hold strategy. By and large, studies suggest that filter rules do not out perform a single buy and hold strategy particular after considering commission on transaction.

4.5 Empirical Evidence on Semi-strong Efficient Market Theory

Semi-strong form efficient market theory holds that stock prices adjust rapidly to all publicly available information. By using publicly available information, investors will not be able to earn above normal rates of return after considering the risk factor. To test semi-strong form efficient market theory, a number of studies was conducted which lead to the following queries: Whether it was possible to earn on the above normal rate of return after adjustment for risk, using only publicly available information and how rapidly prices adjust to public announcement with regard to earnings, dividends, mergers, acquisitions, stock-splits?

Several studies support the Semi-strong form Efficient Market Theory. Fama, Fisher, Jensen and Roll in their adjustment of stock prices to new information examined the effect of stock split on return of 940 stock splits in New York Stock Exchange during the period 1957-1959 They found that prior to the split, stock earns higher returns than predicted by any market model.

Boll and Brown in an empirical evaluation of accounting income numbers studied the effect of annual earnings announcements. They divided the firms into two groups. First group consisted of firms whose earnings increased in relation to the average corporate earnings while second group consists of firms whose earnings decreased in relation to the average corporate earnings. They found that before the announcement of earnings, stock in the first group earned positive abnormal returns while

stock in the second group earned negative abnormal returns after the announcement of earnings. Stock in both the groups earned normal returns.

There have been studies which have been empirically documented showing the following inefficiencies and anomalies:

- Stock price adjust gradually not rapidly to announcements of unanticipated changes in quarterly earnings.
- Small firms' portfolio seemed to outperform large firms' portfolio.
- Low price earning multiple stock tend to outperform large price earning multiple stock.
- Monday's return is lower than return for the other days of the week.

4.6 Empirical Evidence on Strong form of Efficient Market Theory

According to the Efficient Market Theory, all available information, public or private, is reflected in the stock prices. This represents an extreme hypothesis.

To test this theory, the researcher analysed returns earned by certain groups viz. corporate insiders, specialists on stock exchanges, mutual fund managers who have access to internal information (not publicly available), or posses greater resource or ability to intensively analyse information in the public domain. They suggested that corporate insiders (having access to internal information) and stock exchange specialists (having monopolistic exposure) earn superior rate of return after adjustment of risk.

Mutual Fund managers do not on an average earn a superior rate of return. No scientific evidence has been formulated to indicate that investment performance of professionally managed portfolios as a group has been any better than that of randomly selected portfolios. This was the finding of Burton Malkiel in his Random Walk Down Wall Street, New York.

4.7 Challenges to the Efficient Market Theory

Information inadequacy – Information is neither freely available nor rapidly transmitted to all participants in the stock market. There is a calculated attempt by many companies to circulate misinformation.

(a) Limited information processing capabilities – Human information processing capabilities are sharply limited. According to Herbert Simon every human organism lives in an environment which generates millions of new bits of information every second but the bottle necks of the perceptual apparatus does not admit more than thousand bits per seconds and possibly much less.

David Dreman maintained that under conditions of anxiety and uncertainty, with a vast interacting information grid, the market can become a giant.

(b) Irrational Behaviour – It is generally believed that investors' rationality will ensure a close correspondence between market prices and intrinsic values. But in practice this is not true. J. M.

Keynes argued that all sorts of consideration enter into the market valuation which is in no way relevant to the prospective yield. This was confirmed by L. C. Gupta who found that the market evaluation processes work haphazardly almost like a blind man firing a gun. The market seems to function largely on hit or miss tactics rather than on the basis of informed beliefs about the long term prospects of individual enterprises.

(c) Monopolistic Influence – A market is regarded as highly competitive. No single buyer or seller is supposed to have undue influence over prices. In practice, powerful institutions and big operators wield grate influence over the market. The monopolistic power enjoyed by them diminishes the competitiveness of the market.

TEST YOUR KNOWLEDGE

Theoretical Questions

1. Explain the Efficient Market Theory in and what are major misconceptions about this theory?
2. Explain Dow Jones theory.
3. Explain the Elliot Theory of technical analysis.
4. Explain the various indicators that can be used to assess the performance of an economy.

Practical Questions

1. Closing values of BSE Sensex from 6th to 17th day of the month of January of the year 200X were as follows:

Days	Date	Day	Sensex
1	6	THU	14522
2	7	FRI	14925
3	8	SAT	No Trading
4	9	SUN	No Trading
5	10	MON	15222
6	11	TUE	16000
7	12	WED	16400
8	13	THU	17000
9	14	FRI	No Trading
10	15	SAT	No Trading

11	16	SUN	No Trading
12	17	MON	18000

Calculate Exponential Moving Average (EMA) of Sensex during the above period. The previous day exponential moving average of Sensex can be assumed as 15,000. The value of exponent for 31 days EMA is 0.062.

Give detailed analysis on the basis of your calculations.

2. The closing value of Sensex for the month of October, 2007 is given below:

Date Closing	Sensex Value
1.10.07	2800
3.10.07	2780
4.10.07	2795
5.10.07	2830
8.10.07	2760
9.10.07	2790
10.10.07	2880
11.10.07	2960
12.10.07	2990
15.10.07	3200
16.10.07	3300
17.10.07	3450
19.10.07	3360
22.10.07	3290
23.10.07	3360
24.10.07	3340
25.10.07	3290
29.10.07	3240
30.10.07	3140
31.10.07	3260

You are required to test the weak form of efficient market hypothesis by applying the run test at 5% and 10% level of significance.

Following value can be used :

Value of t at 5% is 2.101 at 18 degrees of freedom

Value of t at 10% is 1.734 at 18 degrees of freedom

Value of t at 5% is 2.086 at 20 degrees of freedom.

Value of t at 10% is 1.725 at 20 degrees of freedom.

Answers to Theoretical Questions

1. Please refer paragraph 4
2. Please refer paragraph 2.4.1
3. Please refer paragraph 2.4.2
4. Please refer paragraph 1.2.2

Answers to the Practical Questions

1.

Date	1 Sensex	2 EMA for Previous day	3 1-2	4 3×0.062	5 EMA 2 ± 4
6	14522	15000	(478)	(29.636)	14970.364
7	14925	14970.364	(45.364)	(2.812)	14967.55
10	15222	14967.55	254.45	15.776	14983.32
11	16000	14983.32	1016.68	63.034	15046.354
12	16400	15046.354	1353.646	83.926	15130.28
13	17000	15130.28	1869.72	115.922	15246.202
17	18000	15246.202	2753.798	170.735	15416.937

Conclusion – The market is bullish. The market is likely to remain bullish for short term to medium term if other factors remain the same. On the basis of this indicator (EMA) the investors/brokers can take long position.

2.

Date	Closing Sensex	Sign of Price Charge
1.10.07	2800	

3.10.07	2780	-
4.10.07	2795	+
5.10.07	2830	+
8.10.07	2760	-
9.10.07	2790	+
10.10.07	2880	+
11.10.07	2960	+
12.10.07	2990	+
15.10.07	3200	+
16.10.07	3300	+
17.10.07	3450	+
19.10.07	3360	-
22.10.07	3290	-
23.10.07	3360	+
24.10.07	3340	-
25.10.07	3290	-
29.10.07	3240	-
30.10.07	3140	-
31.10.07	3260	+

Total of sign of price changes (r) = 8

No of Positive changes = n_1 = 11

No. of Negative changes = n_2 = 8

$$\mu_r = \frac{2n_1n_2}{n_1+n_2}+1$$

$$\mu = \frac{2\times11\times8}{11+8}+1 = 176/19 + 1 = 10.26$$

$$\hat{\sigma}_r = \sqrt{\frac{2n_1n_2(2n_1n_2-n_1-n_2)}{(n_1+n_2)^2(n_1+n_2-1)}}$$

$$\hat{\sigma}_r = \sqrt{\frac{(2\times11\times8)(2\times11\times8-11-8)}{(11+8)^2(11+8-1)}} = \sqrt{\frac{176\times157}{(19)^2(18)}} = \sqrt{4.252} = 2.06$$

Since too few runs in the case would indicate that the movement of prices is not random. We employ a two- tailed test the randomness of prices.
Test at 5% level of significance at 18 degrees of freedom using t- table

The lower limit

$= \mu - t \times \hat{\sigma}_r = 10.26 - 2.101 \times 2.06 = 5.932$

Upper limit

$= \mu + t \times \hat{\sigma}_r = 10.26 + 2.101 \times 2.06 = 14.588$

At 10% level of significance at 18 degrees of freedom

Lower limit

$= 10.26 - 1.734 \times 2.06 = 6.688$

Upper limit

$= 10.26 + 1.734 \times 2.06 = 13.832$

As seen r lies between these limits. Hence, the market exhibits weak form of efficiency.

*For a sample of size n, the t distribution will have n-1 degrees of freedom.

CHAPTER 4

SECURITY VALUATION

LEARNING OUTCOMES

After reading this chapter student shall be able to understand:

- Theory of Valuation
- Return Concepts
- Equity Risk Premium
- Required Return on Equity
- Discount Rate Selection in Relation to Cash Flows
- Approaches to Valuation of Equity Shares
- Valuation of Preference Shares
- Valuation of Debentures/ Bonds
- Arbitrage Pricing Theory

1. OVERVIEW OF VALUATION

The definition of an investment is a fund commitment to obtain a return that would pay off the investor for the time during which the funds are invested or locked, for the expected rate of inflation over the investment horizon, and for the uncertainty involved. Most investments are expected to have cash flows and a stated market price (e.g., common stock), and one must estimate a value for the investment to determine if its current market price is consistent with his estimated intrinsic value. Investment returns can take many forms, including earnings, cash flows, dividends, interest payments, or capital gains (increases in value) during an investment horizon.

Knowing what an asset is worth and what determines its value is a pre-requisite for making intelligent decisions while choosing investments for a portfolio or in deciding an appropriate price to pay or receive in a business takeover and in making investment, financing and dividend choices when running a business. We can make reasonable estimates of value for most assets, and that the fundamental principles determining the values of all types of assets whether real or financial, are the same. While some assets are easier to value than others, for different assets, the details of valuation and the uncertainty associated with value estimates may vary. However, the core principles of valuation always remain the same.

2. RETURN CONCEPTS

A sound investment decision depends on the correct use and evaluation of the rate of return. Some of the different concepts of return are given as below:

2.1 Required Rate of Return

Required rate of return is the minimum rate of return that the investor is expected to receive while making an investment in an asset over a specified period of time. This is also called opportunity cost or cost of capital because it is the highest level of expected return forgone which is available elsewhere from investment of similar risks. Many times, required rate of return and expected return are used interchangeably. But, that is not the case. Expected return reflects the perception of investors. If the investors expect a return of a particular share higher than the required return, then the share is undervalued. The reason is that the share will sell for less than its intrinsic value. On the other hand, if the investors expect a return of a particular share lower than its required rate of return, then the share is overvalued. The reason is that it will sell for a higher price than its intrinsic value.

The difference between expected return and required return is called expected alpha, and the difference between actual holding period return and contemporaneous required return is called realized alpha. The source of expected alpha is mispricing. If true mispricing is present in any security, the price of the security will eventually converge to its intrinsic value, thus expected alpha will be realized. We can derive expected return given what we know about required return and mispricing. Thus, expected return equals the sum of required return plus return from convergence of the price over the period of time:

$$E(R_t) = r_t + \frac{V_0 - P_0}{P_0}$$

where $E(R_t)$ is expected return, r_t is required return, V_0 is the intrinsic value and P_0 is the day's market price.The second term in this equation represents a return from the price convergence over the holding period; thus, adding this with the required return for holding period, we obtain the expected return on asset.

Example: Suppose that the current price of the shares of ABC Ltd. is ₹30 per share. The investor estimated the intrinsic value of ABC Ltd.'s share to be ₹35 per share with required return of 8% per annum. Estimate the expected return on ABC Ltd.

Answer: Intel's expected convergence return is (35 - 30)/30 * 100 = 16.67%, and let's suppose that the convergence happens over one year. Thus, adding this return with the 8% required return, we obtain an expected return of 24.67%.

Explanation: The intrinsic value estimate of ₹35 and required return of 8% imply that you expect the share price to rise to ₹37.80, which is up by 26.00% (rough estimate of 24.67%) from the current price of 30.

2.2 Discount Rate

Discount Rate is the rate at which present value of future cash flows is determined. Discount rate depends on the risk free rate and risk premium of an investment. Actually, each cash flow stream can be discounted at a different discount rate. This is because of variation in expected inflation rate and risk premium at different maturity levels.This can be explained with the help of term structure of interest rates. For instance, in upward sloping term structure of interest rates, interest rates increase with the maturity. It means longer maturity period have higher interest rates.
However, in practice, one discount rate is used to determine present value of a stream of cash flows. But, this is not illogical. When a single discount rate is applied instead of many discount rates, many individual interest rates can be replaced with anequivalent single interest rate which eventually gives the same present value.

Example: Cash flows and discount rates for each year of cash flows at different maturitieshave been given as below:-

	1st year	2nd year	3rd year	4th year	5th year
Cash flows	₹100	₹200	₹300	₹400	₹500
Discount rates	2.0%	3.2%	3.6%	4.8%	5.0%

The present value of this stream of cash flows, by discounting each cash flow with the respective discount rate, is ₹1,278.99.

The single discount rate equates the present value of the stream of cash flows to approximately ₹1278.99 at 4.4861% (any difference is due to rounding).

2.3 Internal Rate of Return

Internal Rate of Returnis defined as the discount rate which equates the present value of future cash flows to its market price. The IRR is viewed as the average annual rate of return that investors earn over their investment time period assuming that the cash flows are reinvested at the IRR. This can be explained with the help of an example:

Suppose you are recommended to invest $20,000 now in an asset that offers a cash flow $3000 one year from now and $23,000 two years from now. You want to estimate the IRR of the investment. For this purpose you must find the discount rate that equates the present value of cash inflows to $20,000, the value of the initial investment.

	Time 0	1st year	2nd year
Cash flows	$20,000	$3,000	$23,000

We solve the following equation for r which denotes IRR, and get 15%.

$20000 = 3000/(1+r) + 23000/(1+r)^2$

$\Rightarrow r = 15\%$

Thus our IRR is 15%, which implies that we earn 15% IRR on the investment per annum. Now let's assume that when we receive $3000, we reinvest it at 10% for one year and after one year we receive total $26300, $3300 of which is attributable to reinvestment of $3000. Since we receive total cash $26300 we can estimate the IRR of the investment.

$(26300/20000)^{1/2} – 1 = 0.1467$ or 14.67%

Annual return is now at 14.67% if reinvested at 10%, which is actually less than what was expected to be earned before investment. The reason is that the cash flow was reinvested at a rate (10%) which is less than our expected IRR (15%).

If we had a chance to reinvest $3000 at 15%, we would receive $26450 at the end of 2nd year, and the IRR of the investment would be equal to exactly 15% as calculated below:

$(26450/20,000)^{1/2} – 1 = 0.15$ or 15%

3. EQUITY RISK PREMIUM

Equity risk premium is the excess return that investment in equity shares provides over a risk free rate, such as return from tax free government bonds. This excess return compensates investors for taking on the relatively higher risk of investing in equity shares of a company. The size of the premium will change depending upon the level of risk in a particular portfolio and will also change over time as market risk fluctuates.Generally, high-risk investments are compensated with a higher premium.

The equity risk premium is based on the idea of the risk-reward tradeoff. However, equity risk premium is a theoretical concept because it is very difficult to predict that how a particular stock or the stock market as a whole will perform in the future. It can only be estimated by observing stock market and government bond market over a specified period of time, for instance from 1990 to the present period. Further, estimates may vary depending on the time frame and method of calculation.

3.1 Explanation of Equity Risk Premium

Investment in equity shares of a company is a high risk investment. If an investor is providing money to invest in equity shares of a company, he wants some premium over the risk free investment avenues such as government bonds. For example, if an investor could earn a 7% return on a government bond (which is generally considered as risk free investment), a company's share should earn 7% return plus an additional return (the equity risk premium) in order to attract the investor.

Equity investors try to achieve a balance between risk and return. If a company wants to pursue investors to put their money into its stock, it must provide a stimulus in the form of a premium to attract the equity investors. If the stock gives a 15% return, in the example mentioned in the previous paragraph, the equity risk premium would be 8% (15% - 7% risk free rate). However, practically, the price of a stock, including the equity risk premium, moves with the market. Therefore, the investors use the equity risk premium to look at historical values, risks, and returns on investments.

3.2 Calculating the Equity Risk Premium

To calculate the equity risk premium, we can begin with the capital asset pricing model (CAPM), which is usually written:

$R_x = R_f + \beta_1 (R_m - R_f)$

Where:

R_1 = expected return on investment in "x"(company x)

R_f = risk-free rate of return

β_x = beta of "x"

R_m = expected return of market

As indicated above in the context of the equity risk premium, x is an investment in the equity shares of company x, such as 10000 shares of a blue-chip company. Now, if we assume that (x = m), then $R_x = R_m$. Beta is a measure of a stock's volatility to that of the market; the market's volatility is set to 1, so if x = m, then $\beta_x = \beta_m = 1$. Whereas $R_m - R_f$ is known as the market premium; $R_x - R_f$ is the risk premium of a particular stock only. If x is an equity investment, then $R_x - R_f$ is the equity risk premium; if x = m, then the market premium and the equity risk premium are the same.

Therefore, the equity risk premiumis basically a remodeling of the CAPM model:

Equity Risk Premium = $R_x - R_f = \beta_x (R_m - R_f)$

4. REQUIRED RETURN ON EQUITY

If equity risk premium is calculated as indicated above, required rate of return can be easily calculated with the help of Capital Asset Pricing Model (CAPM). The main insight of the model is that the investors evaluate the risk of an asset in terms of the asset's contribution to the systematic risk (cannot be reduced by portfolio diversification) of their total portfolio. CAPM model provides a relatively objective procedure for required return estimation; it has been widely used in valuation.

So, the required return on the share of particular company can be computed as below:

Return on share 'A' = Risk free return + β x Market Risk Premium

Example:

Risk free rate	5%,
β	1.5
and, Market risk premium	4.5%

Calculate Required return on equity.

Solution

Required return on share A = Risk free return + β x Market Risk Premium

= 0.05 +1.5 (0.045)

= 0.1175 or 11.75%

5. DISCOUNT RATE SELECTION IN RELATION TO CASH FLOWS

Cash flows are discounted at a suitable rate to arrive at the present value of cash flows which will be available in the future. Cash flows are required by any organization to settle their debt claims and taxes. Whatever amount remains are the cash flows available to equity shareholders. When cashflows to be available to equity shareholders are discounted, the required rate of return is an appropriate discount rate. Further, when cash flows are available to meet the claims of all of company's equity shareholders, then the cost of capital is the appropriate discount rate.

5.1 Concept of Nominal Cash Flow and Real Cash Flow

Nominal cash flow is the amount of future revenues the company expects to receive and expenses it expects to pay out, without any adjustments for inflation. For instance, a company which wants to invest in a utility plant wants to forecast its future revenues and expenses it has to incur while earning its income (i.e. wages to labour, electricity, water, gas pipeline etc).

On the other hand, Real cash flow shows a company's cash flow with adjustments for inflation. Since inflation reduces the spending power of money over time, the real cash flow shows the effects of inflation on a company's cash flow.

In the short term and under conditions of low inflation, the nominal and real cash flows are almost identical. However, in conditions of high inflation rates, the nominal cash flow will be higher than the real cash flow.

5.2 Discount rate selection in Equity Valuation

From the above discussion, it can be concluded that cash flows can be nominal or real. When cash flows are stated in real terms, then they are adjusted for inflation. However, in case of nominal cash flow, inflation is not adjusted.

For nominal cash flow, nominal rate of discount is used. And, for real cash flow, real rate of discount is used. While valuing equity shares, only nominal cash flows are considered. Therefore, only nominal discount rate is considered. The reason is that the tax applying to corporate earnings is generally stated in nominal terms. Therefore, using nominal cash flow in equity valuation is the right approach because it reflects taxes accurately.

Moreover, when the cash flows are available to equity shareholders only, nominal discount rate is used. And, the nominal after tax weighted average cost of capital is used when the cash flows are available to all the company's capital providers.

6. VALUATION OF EQUITY SHARES

In order to undertake equity valuations, an analyst can use different approaches, some of which are classified as follows:

(1) Dividend Based Models

(2) Earning Based Models

(3) Cash Flows Based Model

6.1 Dividend Based Models

As we know that dividend is the reward for the provider of equity capital, the same can be used to value equity shares. Valuation of equity shares based on dividend are based on the following assumptions:

a. Dividend to be paid annually.

b. Payment of first dividend shall occur at the end of first year.

c. Sale of equity shares occur at the end of the first year and that to at ex-dividend price.

The value of any asset depends on the discounted value of cash streams expected from the same asset. Accordingly, the value of equity shares can be determined on the basis of stream of dividend expected at required rate of return or opportunity cost i.e. K_e (cost of equity).

Value of equity share can be determined based on holding period as follows:

(1) Valuation Based holding period of One Year : If an investor holds the share for one year then the value of equity share is computed as follows:

$$P_0 = \frac{D_1}{(1+Ke)^1} + \frac{P_1}{(1+Ke)^1}$$

Example: Share of X Ltd. is expected to be sold at Rs. 36 with a dividend of Rs. 6 after one year. If required rate of return is 20% then what will be the share price.

Answer

The expected share price shall be computed as follows:

$$P_0 = \frac{6}{(1+0.20)^1} + \frac{36}{(1+0.20)^1} = \text{Rs. } 35$$

(2) Valuation Based on Multi Holding Period: In this type of holding following three types of dividend pattern can be analyzed.

(i) Zero Growth: Also, called as No Growth Model, as dividend amount remains same over the years infinitely. The value of equity can be found as follows:

$$P_0 = \frac{D}{(Ke)}$$

(ii) Constant Growth: Constant Dividend assumption is quite unrealistic assumption. Accordingly, one very common model is based on Constant Growth in dividend. In such situation, the value of equity shared can be found by using following formula:

$$P_0 = \frac{D_1}{Ke-g} \text{ or } \frac{D_0(1+g)}{(Ke-g)}$$

It is important to observe that the above formula is based on Gordon Growth Model of Calculation of Cost of Capital.

(iii) Variable Growth in Dividend: Just like the constant growth assumption this assumption also appears to be unrealistic. Accordingly, valuation of equity shares can also be done on the basis of variable growth in dividends. It should however be noted that though we can assume multiple growth rates but when one growth rate shall be assumed to be for infinity only then we can find value of equity shares.

Although stages of Company's growth fall into following categories such as Growth, Transition and Maturity Phase but for Valuation the multiple dividend growth can be divided into following two categories.

(a) Two Stage Dividend Discount Model: While simple two stage model assumes extraordinary growth (or supernormal growth) shall continue for finite number of years he normal growth shall prevail for infinite period. Accordingly, the formula for computation of Share Price or equity value shall be as follows:

$$P_0 = \left[\frac{D_0(1+g_1)}{(1+Ke)^1} + \frac{D_0(1+g_1)^2}{(1+Ke)^1} ..... + \frac{D_0(1+g_1)^n}{(1+Ke)^n} \right] + \frac{P_n}{(1+Ke)^n}$$

$$P_n = \frac{D(1+g_1)(1+g_2)}{(Ke-g_2)}$$

Where, D_0 = Dividend Just Paid

g_1 = Finite or Super Growth Rate

g_2 = Normal Growth Rate

Ke = Required Rate of Return on Equity

P_n = Price of share at the end of Super Growth i.e. beginning of Normal Growth Period

(b) Three Stage Dividend Discount Model: As per one version there are three phases for valuations: explicit growth period, transition period and stable growth period.

In the initial phase, a firm grows at an extraordinarily y high rate, after which its advantage gets depleted due to competition leading to a gradual decline in its growth rate. This phase is the transition phase, which is followed by the phase of a stable growth rate.

Accordingly, the value of equity share shall be computed, as in case of two stage growth mode by adding discounted value of Dividends for two growth periods and finally discounted value of share price at the beginning of sustainable or stable growth period.

There is another version of three stage growth model called H Model. In the first stage dividend grows at high growth rate for a constant period, then in second stage it declines for some constant period and finally grow at sustainable growth rate.

H Model is based on the assumption that before extraordinary growth rate reach to normal growth it declines lineally for period 2H.

Though the situation is complex but the formula for calculation of equity share shall be as follows which is sum of value on the normal growth rate and premium due to abnormal growth rate:

$$P_0 = \frac{D_0(1+g_n)}{r-g_n} + \frac{D_0 H_1(g_c - g_n)}{r-g_n}$$

Where g_n= Normal Growth Rate Long Run

g_c= Current Growth Rate i.e. initial short term growth rate

H_1= Half-life of high growth period

These variants of models can also be applied to Free Cash Flow to Equity Model discussed later.

6.2 Earning Based Models

Above mentioned models are based on Dividends. However, nowadays an investor might be willing to forego cash dividend in lieu of higher earnings on retained earning ultimately leading to higher growth in dividend.

Hence, these investors may be interested in determination of value of equity share based on Earning rather than Dividend. The different models based on earnings are as follows:

(a) Gordon's Model: This model is based on following broad assumptions:

(i) Return on Retained earnings remains the same.

(ii) Retention Ratio remains the same.

Valuation as per this model shall be

$$\frac{EPS_1(1-b)}{Ke-br}$$

Where, r = Return on Retained Earnings

b = Retention Ratio

(b) Walter's Approach: This approach is based on Walter Model discussed at Intermediated Level in the Financial Management Paper. As per this model, the value of equity share shall be:

$$\frac{D+(E-D)\frac{r}{Ke}}{Ke}$$

(c) Price Earning Ratio or Multiplier Approach: This is one of the common valuation approaches followed. Since, Price Earning (PE) Ration is based on the ratio of Share Price and EPS, with a given PE Ratio and EPS, the share price or value can simply be determined as follows:

Value = EPS X PE Ratio

Now, the question arises how to estimate the PE Ratio. This ratio can be estimated for a similar type of company or of industry after making suitable adjustment in light of specific features pertaining to the company under consideration. It should further be noted that EPS should be of equity shares. Accordingly, it should be computed after payment of preference dividend as follows:

$$\text{EPS} = \frac{\text{Profit after tax} - \text{Preference Dividend}}{\text{Number of Equity Shares}}$$

6.3 Cash Flow Based Models

In the case of dividend discounting valuation model (DDM) the cash flows are dividend which is to be distributed to equity shareholders. This cash flow does not take into consideration the cash flows which can be utilised by the business to meet its long term capital expenditure requirements and short term working capital requirement. Hence dividend discount model does not reflect the true free cash flow available to a firm or the equity shareholders after adjusting for its capex and working capital requirement.

Free cash flow valuation models discount the cash flows available to a firm and equity shareholders after meeting its long term and short term capital requirements. Based on the perspective from which valuations are done, the free cash flow valuation models are classified as:

- Free Cash Flow to Firm Model (FCFF)
- Free Cash Flow to Equity Model (FCFE)

In the case of FCFF model, the discounting factor is the cost of capital (K_o) whereas in the case of FCFE model the cost of equity (K_e) is used as the discounting factor.

FCFE along with DDM is used for valuation of the equity whereas FCFF model is used to find out the overall value of the firm.

6.3.1 Calculation of Free Cash Flow to Firm (FCFF):

FCFF can be calculated as follows:

(a) Based on its Net Income:

FCFF= Net Income + Interest expense *(1-tax) + Depreciation -/+ Capital Expenditure –/+ Change in Non-Cash Working Capital

(b) Based on Operating Income or Earnings Before Interest and Tax (EBIT):

FCFF= EBIT *(1 - tax rate) + Depreciation -/+ Capital Expenditure –/+ Change in Non-Cash Working Capital

(c) Based on Earnings before Interest, Tax , Depreciation and Amortisation (EBITDA):

FCFF = EBITDA* (1-Tax) +Depreciation* (Tax Rate) -/+ Capital Expenditure – /+Change in Non-Cash Working Capital

(d) Based on Free Cash Flow to Equity (FCFE):

FCFF = FCFE + Interest* (1-t) + Principal Prepaid – New Debt Issued + Preferred Dividend

(e) Based on Cash Flows:

FCFF = Cash Flow from Operations (CFO) + Interest (1-t) -/+ Capital Expenditure

Capital Expenditure or Capex for a single year is calculated as Purchase of Fixed Asset current year - Sale of Fixed Asset current year taken from Cash Flow from Investing Activities.

Change in Non- Cash Working Capital is calculated as:

Step 1: Calculate Working Capital for the current year: Working Capital =Current Asset-Current Liability

Step 2: Calculate Non-Cash Working Capital for the current year: Working Capital – Cash and Bank Balance

Step 3: In a similar way calculate Working Capital for the previous year

Step 4: Calculate change in Non-Cash Working Capital as: Non-Cash Working Capital for the current year- Non-Cash Working Capital for the previous year

Step 5: If change in Non-Cash Working Capital is positive, it means an increase in the working capital requirement of a firm and hence is reduced to derive at free cash flow to a firm.

Based on the type of model discussed above the value of Firm can be calculated as follows:

(a) For one stage Model: Intrinsic Value = Present Value of Stable Period Free Cash Flows to Firm

(b) For two stage Model: Intrinsic Value = Present value of Explicit Period Free Cash Flows to Firm + Present Value of Stable Period Free Cash Flows to a Firm, or

Intrinsic Value = Present Value of Transition Period Free Cash Flows to Firm + Present Value of Stable Period Free Cash Flows to a Firm

(c) For three stage Model: Intrinsic Value=Present value of Explicit Period Free Cash Flows to Firm + Present Value of Transition Period Free Cash Flows to Firm + Present Value of Stable Period Free Cash Flows to Firm

6.3.2 Calculation of Free Cash Flow to Equity (FCFE): Free Cash flow to equity is used for measuring the intrinsic value of the stock for equity shareholders. The cash that is available for equity shareholders after meeting all operating expenses, interest, net debt obligations and re-investment requirements such as working capital and capital expenditure. It is computed as:

Free Cash Flow to Equity (FCFE) = Net Income - Capital Expenditures +Depreciation - Change in Non-cash Working Capital + New Debt Issued - Debt Repayments

or

FCFE = Net Profit + depreciation - ΔNWC - CAPEX + New Debt - Debt Repayment.

ΔNWC = changes in Net Working Capital.

CAPEX = Addition in fixed assets to sustain the basis.

FCFE can also be used to value share as per multistage growth model approach.

6.4 Dividend Discount Model versus Free Cash Flow to Equity Model

In the dividend discount model the analyst considers the stream of expected dividends to value the company's stock. It is assumed that the company follows a consistent dividend payout ratio which can be less than the actual cash available with the firm.

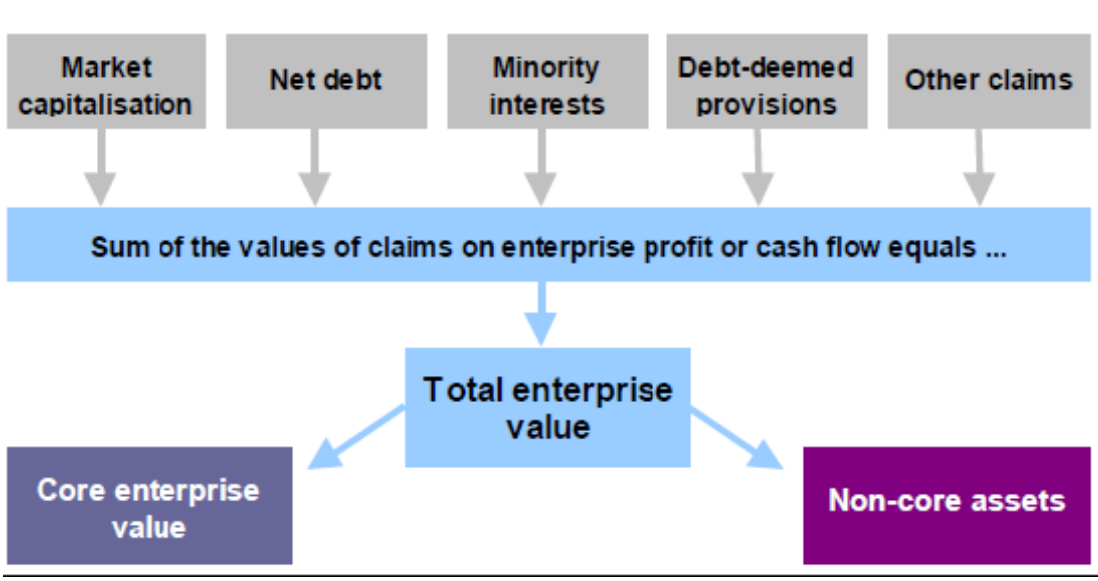
Dividend discount model values a stock based on the cash paid to shareholders as dividend.

A stock's intrinsic value based on the dividend discount model may not represent the fair value for the shareholders because dividends are distributed from cash. In case the company is maintaining healthy cash in its balance sheet then dividend pay-outs will be low which could result in undervaluation of the stock.

In the case of free cash flow to equity model a stock is valued on the cash flow available for distribution after all the reinvestment needs of capex and incremental working capital are met. Thus using the free cash flow to equity valuation model provides a better measure for valuations in comparison to the dividend discount model.

6.5 Enterprise Value

Enterprise value is the true economic value of a company. It is calculated by adding market capitalization, Long term Debt, Minority Interest minus cash and cash equivalents. (Also Minus like Equity investments like affiliates, investment in any company and also Long term investments.



Enterprise value is of three types: total, operating and core EV. Total enterprise value is the value of all the business activities; it is the summation of market capitalization, Debt (Interest Bearing), Minority Interest "minus "cash. The operating Enterprise value is the value of all operating activities, and to get this we have to deduct "market value of non- operating assets" which includes Investments and shares (in associates) from the total enterprise value.

Core enterprise value is the value which does not include the value of operations (which are not the part of activities). To get this we deduct the value of non-core assets from the operating enterprise value.

Enterprise value measures the business as a whole and gives its true economic value. It is more comprehensive than equity multiples. Enterprise value considers both equity and debt in its valuation of the firm, and is least affected by its capital structure. Enterprise multiples are more reliable than equity multiples because Equity multiples focus only on equity claim.

There are different enterprise value multiples which can be calculated as per the requirement (which requirement). If we take the EV as numerator then the denominator must represent the claims of all the claimholders on enterprise cash flow.

6.5.1 Enterprise Value to Sales: This multiple is suitable for the corporates who maintain negative cash flows or negative earnings as cyclical firms. Corporate like technological firms generally use this multiple. Sales are the least manipulative top line(?) any business and least affected by accounting policies.

6.5.2 Enterprise Value to EBITDA: EBITDA, which is commonly known as the proxy of cash flow, is the amount available to debt and equity holders of a company. This multiple is used for valuing capital intensive companies, which generally have substantial depreciation and amortization expenses. This multiple is used for acquisitions as it incorporates debts as well equity of the business. An analyst prefers this multiple because it is not affected by depreciation policy and changes in capital structure. The inverse of this multiple explains cash return on total investment.

6.6 Valuation of Rights

As we know that company offers right shares to the existing shareholders. Immediately after the right issue, the price of share is called Ex Right Price or Theoretical Ex-Right Price (TERP) which is computed as follows:

$$\frac{nP_o + S}{n + n_1}$$

n = No. of existing equity shares

P_0 = Price of Share Pre-Right Issue

S = Subscription amount raised from Right Issue

n_1 = No. of new shares offered

However, theoretical value of a right can be calculated as follows:

$$P_o - S$$

Value of Per Shareholding = $\frac{P_o - S}{n}$

7. VALUATION OF PREFERENCE SHARES

Preference shares, like debentures, are usually subject to fixed rate of dividend. In case of non-redeemable preference shares, their valuation is similar to perpetual bonds.

Valuation of Redeemable preference share

The value of redeemable preference share is the present value of all the future expected dividend payments and the maturity value, discounted at the required return on preference shares. Therefore,

Value of Redeemable Preference Share

$$= \frac{\text{Dividend}_1}{(1+r)^1} + \frac{\text{Dividend}_2}{(1+r)^2} + \ldots\ldots\ldots + \frac{(\text{Dividend}_n + \text{Maturity value})}{(1+r)^n}$$

Value of Non-Redeemable Preference Share

$$\text{Irredeemable Preference share value} = \frac{\text{Dividend}}{\text{Required return on Preference share}}$$

Example:

The face value of the preference share is 10000 and the stated dividend rate is 10%. The shares are redeemable after 3 years period. Calculate the value of preference shares if the required rate of return is 12%.

Annual dividend = ₹10000 x 10% = ₹1000

Redeemable Preference share value

$$= \frac{1,000}{(1+0.12)} + \frac{1,000}{(1+0.12)^2} + \frac{1,000+10000}{(1+0.12)^3}$$

$$= \frac{1,000}{(1.12)} + \frac{1,000}{(1.12)^2} + \frac{11,000}{(1.12)^3}$$

= 892.86 + 797.19 + 7829.18

= 9519.23

Solving the above equation, we get the value of the preference shares as ₹9519.23

8. VALUATION OF DEBENTURES AND BONDS

8.1 Some Basics of a Bond

(a) **Par Value:** Value stated on the face of the bond. of maturity.

(b) Coupon Rate and Frequency of Payment: A bond carries a specific interest rate known as the coupon rate.

(c) Maturity Period: Total time till maturity.

(d) Redemption: Bullet i.e. one shot repayment of principal at par or premium.

8.2 Bond Valuation Model

The value of a bond is:

$$V = \sum_{t=1}^{n} \frac{I}{(1+k_d)^t} + \frac{F}{(1+k_d)^n}$$

$$V = I\,(PVIFA_{k_d,n}) + F(PVIF_{k_d,n})$$

Where,

V = value of the bond

I = annual interest payable on the bond

F = principal amount (par value) of the bond repayable at the time of maturity

N = maturity period of the bond.

8.3 Bond Value Theorems

Some basic rules which should be remembered with regard to bonds are:

CAUSE	EFFECT
Required rate of return = coupon rate	Bond sells at par value
Required rate of return > coupon rate	Bond sells at a discount
Required rate of return < coupon rate	Bond sells at a premium
Longer the maturity of a bond	Greater the bond price change with a given change in the required rate of return.

8.4 Yield to Maturity (YTM)

The YTM is defined as that value of the discount rate ("k_d") for which the Intrinsic Value of the Bond equals its Market Price.

8.5 Bond Values with Semi-Annual Interest

The basic bond valuation equation thus becomes:

$$V = {}^{2n}\sum_{t=1} [(I/2) / \{(1+k_d/2)^t\}] + [F / (1+k_d/2)^{2n}]$$

$$= I/2(PVIFA_{kd/2,2n}) + F(PVIF_{kd/2,2n})$$

Where,

V = Value of the bond

I/2 = Semi-annual interest payment

$K_d/2$ = Discount rate applicable to a half-year period

F = Par value of the bond repayable at maturity

2n = Maturity period expressed in terms of half-yearly periods.

8.6 Price Yield Relationship

- A basic property of a bond is that its price varies inversely with yield.
- The reason is simple. As the required yield increases, the present value of the cash flow decreases; hence the price decreases and vice versa.

8.7 Relationship between Bond Price and Time

Since the price of a bond must equal its par value at maturity (assuming that there is no risk of default), bond prices change with time.

8.8 Duration of Bond

The concept of duration is straightforward. Duration is nothing but the average time taken by an investor to collect his/her investment. If an investor receives a part of his/her investment over the time on specific intervals before maturity, the investment will offer him the duration which would be lesser than the maturity of the instrument. Higher the coupon rate, lesser would be the duration.

It measures how quickly a bond will repay its true cost. The longer the time it takes the greater exposure the bond has to changes in the interest rate environment. Following are some of factors that affect bond's duration:

(i) **Time to maturity:** The shorter-maturity bond would have a lower duration and less price risk and vice versa.

(ii) **Coupon rate:** Coupon payment is a key factor in calculation of duration of bonds. The higher the coupon, the lower is the duration and vice versa.

Although there are many formulae to calculate the duration. However, following are commonly used methods:

(a) **Macaulay Duration:** This formula measures the number of years required to recover the true cost of a bond, considering the present value of all coupon and principal payments received in the future. The formula for Macaulay duration is as follows:

$$\text{Macaulay Duration} = \frac{\sum_{t=1}^{n} \frac{t*c}{(1+i)^t} + \frac{n*M}{(1+i)^n}}{P}$$

Where,

n = Number of cash flows

t = Time to maturity

C = Cash flows

i = Required yield

M = Maturity (par) value

P = Bond price

(b) Modified Duration: This is a modified version of Macaulay duration which takes into account the interest rate changes because the changes in interest rates affect duration as the yield gets affected each time the interest rate varies.

The formula for modified duration is as follows:

$$\text{Modified Duration} = \left[\frac{\text{Macaulay Duration}}{\left(1+\frac{\text{YTM}}{n}\right)} \right]$$

Where

n = Number of compounding periods per year

YTM = Yield to Maturity

Some of the terms associated with Bond Valuation are as follows:

8.9 Immunization

We know that when interest rate goes up although return on investment improves but value of bond falls and vice versa. Thus, the price of Bond is subject to following two risk:

(a) Price Risk (b) Reinvestment Rate Risk

Further, with change in interest rates these two risks move in opposite direction. Through the process of immunization selection of bonds shall be in such manner that the effect of above two risks shall offset each other.

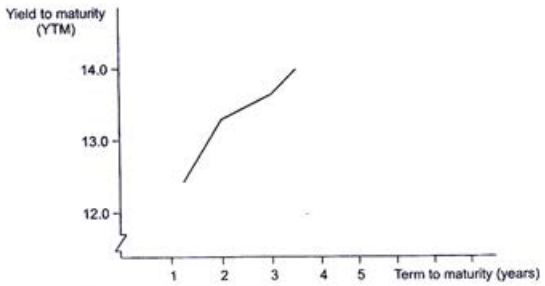
8.10 Yield Curve

The term structure of interest rates, popularly known as Yield Curve, shows how yield to maturity is related to term to maturity for bonds that are similar in all respects, except maturity.

Consider the following data for Government securities:

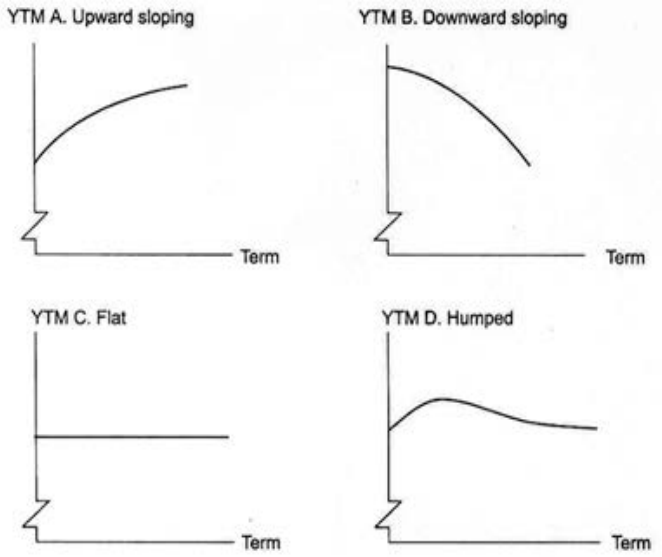
Face Value	*Interest Rate*	*Maturity (years)*	*Current Price*	*Yield to Maturity*
10,000	0	1	8,897	12.40
10,000	12.75	2	9,937	13.13
10,000	13.50	3	10,035	13.35
10,000	13.50	4	9,971	13.60
10,000	13.75	5	9,948	13.90

The yield curve for the above bonds is shown in the diagram. It slopes upwards indicating that long-term rates are greater than short-term rates.



Yield curves, however, do not have to necessarily slope upwards. They may follow any pattern. Four patterns are depicted in the given diagram:

Types of Yield Curve



Another perspective on the term structure of interest rates is provided by the forward interest rates, viz., the interest rates applicable to bonds in the future.

To get forward interest rates, begin with the one-year Treasury bill:

$$8,897 = 10,000 / (1 + r_1)$$

Where,

r_1 is the one-year spot rate i.e. the discount rate applicable to a risk less cash flow receivable a year hence.

Solving for r_1, we get $r_1 = 0.124$.

Next, consider the two-year government security and split its benefits into two parts, the interest of ₹ 1,275 receivable at the end of year 1 and ₹ 11,275 (representing the interest and principal repayment) receivable at the end of year 2. The present value of the first part is:

$$\frac{1275}{(1+r_1)} = \frac{1275}{1.124} = 1,134$$

To get the present value of the second year's cash flow of ₹ 11,275, discount it twice at r_1 (the discount rate for year 1) and r_2 (the discount rate for year 2)

$$\frac{1,275}{(1+r_1)(1+r_2)} = \frac{1,275}{1.124(1+r_2)}$$

r_2 is called the 'forward rate' for year two, i.e., the current estimate of the next year's one-year spot interest rate. Since r_1, the market price of the bond, and the cash flow associated with the bond are known the following equation can be set up:

$$9,937 = \frac{1,275}{(1.124)} + \frac{11,275}{(1.124)(1+r_2)}$$

$9,937(1.124)(1 + r_2) = 1,275\ (1 + r_2) + 11,275$

$11,169 + 11,169\ r_2 = 1,275 + 1,275\ r_2 + 11,275$

$11,169\ r_2 – 1,275\ r_2 = 11,275 – 11,169 + 1,275$

$9,894\ r_2 = 1,381$

$$r_2 = \frac{1,381}{9,894} = 0.1396$$

212,750 t

Thus solving this equation we get $r_2 = 0.1396$

To get the forward rate for year 3(r_3), set up the equation for the value of the three year bond:

$$10,035 = \frac{1,350}{(1+r_1)} + \frac{1,350}{(1+r_1)(1+r_2)} + \frac{11,350}{(1+r_1)(1+r_2)(1+r_3)}$$

$$10,035 = \frac{1,350}{(1.124)} + \frac{1,350}{(1.124)(1.140)} + \frac{11,350}{(1.124)(1.140)(1+r_3)}$$

$$10,035 = \frac{1,350}{1.124} + \frac{1,350}{1.28136} + \frac{11,350}{1.28136(1+r_3)}$$

$$10,035 = 1,201 + 1,054 + \frac{11,350}{1.28136(1+r_3)}$$

$$7781 = \frac{11,350}{1.28136(1+r_3)}$$

$$1+r_3 = 1.134845$$

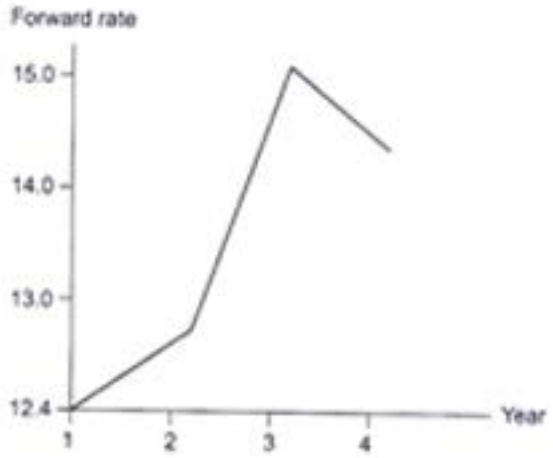
$$r_3 = 0.13845$$

Solving this equation we get r_3=0.13845. This is the forward rate for year three. Continuing in a similar fashion, set up the equation for the value of the four-year bond:

$$9,971 = \frac{1,350}{(1+r_1)} + \frac{1,350}{(1+r_1)(1+r_2)} + \frac{1,350}{(1+r_1)(1+r_2)(1+r_3)} + \frac{11,350}{(1+r_1)(1+r_2)(1+r_3)(1+r_4)}$$

Solving this equation we get r_4 = 0.1458. The following diagram plots the one-year spot rate and forward rates r_2, r_3, r_4. It can be noticed that while the current spot rate and forward rates are known, the future spot rates are not known – they will be revealed as the future unfolds.

Forward Rates



Thus on the basis of above it can be said that though YTM and Forward Rates are two distinct measures but used equivalent way of evaluating a riskless cash flows.

Discount at the yield to maturity : (R_t) $PV\,[CF(t)] = \frac{CF(t)}{(1+R_t)^t}$

Discount by the product of a spot rate plus the forward rates

$$PV\,[CF(t)] = \frac{CF(t)}{(1+r_1)(1+r_2)\ldots(1+r_t)}$$

8.11 Term Structure Theories

The term structure theories explains the relationship between interest rates or bond yields and different terms or maturities. The different term structures theories are as follows:

(a) Unbiased Expectation Theory: As per this theory the long-term interest rates can be used to forecast short-term interest rates in the future on the basis of rolling the sum invested for more than one period.

(b) Liquidity Preference Theory: As per this theory forward rates reflect investors' expectations of future spot rates plus a liquidity premium to compensate them for exposure to interest rate risk. Positive slope may be a result of liquidity premium.

(c) Preferred Habitat Theory: Premiums are related to supply and demand for funds at various maturities – not the term to maturity and hence this theory can be used to explain almost any yield curve shape.

8.12 Convexity Adjustment

As mentioned above duration is a good approximation of the percentage of price change for a small change in interest rate. However, the change cannot be estimated so accurately of convexity effect as duration base estimation assumes a linear relationship.

This estimation can be improved by adjustment on account of 'convexity'. The formula for convexity is as follows:

$C^* \times (\Delta y)^2 \times 100$

Δy = Change in Yield

$$C^* = \frac{V_+ + V_- - 2V_0}{2V_0(\Delta^2)}$$

V_0 = Initial Price

V_+ = price of Bond if yield increases by Δy

V_- = price of Bond if yield decreases by Δy

8.13 Convertible Debentures

Convertible Debentures are those debentures which are converted in equity shares after certain period of time. The equity shares for each convertible debenture are called Conversion Ratio and price paid for the equity share is called 'Conversion Price'.

Further, conversion value of debenture is equal to Price per Equity Share x Converted No. of Shares per Debenture.

8.14 Valuation of Warrants

A warrant is a right that entitles a holder to subscribe equity shares during a specific period at a stated price. These are generally issued to sweeten the debenture issue.

Although both convertible Debentures and Warrants appeared to one and same thing but following are major differences.

(i) In warrant, option of conversion is detachable while in convertible it is not so. Due to this reason, warrants can be separately traded.

(ii) Warrants are exercisable for cash payment while convertible debenture does not involve any such cash payment. Theoretical value of warrant can be found as follows:

$$(Mp - E) \times n$$

MP = Current Market Price of Share

E = Exercise Price of Warrant

n = No. of equity shares convertible with one warrant

8.15 Zero Coupon Bond

As name indicates these bonds do not pay interest during the life of the bonds. Instead, zero coupon bonds are issued at discounted price to their face value, which is the amount a bond will be worth when it matures or comes due. When a zero coupon bond matures, the investor will receive one lump sum (face value) equal to the initial investment plus interest that has been accrued on the investment made. The maturity dates on zero coupon bonds are usually long term. These maturity dates allow an investor for a long range planning. Zero coupon bonds issued by banks, government and private sector companies. However, bonds issued by corporate sector carry a potentially higher degree of risk, depending on the financial strength of the issuer and longer maturity period, but they also provide an opportunity to achieve a higher return.

9. ARBITRAGE PRICING THEORY

Arbitrage pricing theory (APT) is used as an alternative to Capital Assets Pricing Model (CAPM). While the CAPM formula helps to calculate the market's expected return, APT uses the risky asset's expected return and the risk premium of a number of macroeconomic factors.

In the 1970's Mr. Stephen Alan Ross, professor and economist, introduced the concept of 'multiple factors' that can influence the risk component – motley of 'macro-economic factors'. So, the basic idea is to breakdown risks into individual identifiable elements that influence the overall risk in a proportion (called 'factor'), and each factor gets assigned its own beta; and the sum total of all the assets' 'sensitivities' to 'n' factors will give the 'expected rate of return for the asset'.

In a simplistic way, if a particular asset, say a stock, has its major influencers as the 'interest rate fluctuations' and the 'sectoral growth rate', then the stocks' return would be calculated by using the Arbitrage Pricing Theory (APT) in the following manner:

(a) Calculate the risk premium for both these two risk factors (beta for the risk factor 1 – interest rate, and beta of the risk factor 2 – sector growth rate; and,

(b) Adding the risk free rate of return.

Thus, the formula for APT is represented as –

$R(f) + B_1(RP_1) + B_2(RP_2) + \ldots. B_j(RPn)$

It is thereby clear that APT strives to model E(R) as 'a linear function of various macro-economic factors' where sensitivity to changes in each factor is represented by a factor-specific beta coefficient. Note that the APT by itself doesn't provide for the macro-economic factors that will be needed to be tested for its sensitivity – however these have to be judicially developed by the financial analysts keeping in mind the economy they are put in.

TEST YOUR KNOWLEDGE

Theoretical Questions

1. Why should the duration of a coupon carrying bond always be less than the time to its maturity?

2. Write short notes on Zero coupon bonds.

Practical Questions

1. A company has a book value per share of ₹ 137.80. Its return on equity is 15% and it follows a policy of retaining 60% of its earnings. If the Opportunity Cost of Capital is 18%, what is the price of the share today?

2. ABC Limited's shares are currently selling at ₹ 13 per share. There are 10,00,000 shares outstanding. The firm is planning to raise ₹ 20 lakhs to Finance a new project.

Required:

What are the ex-right price of shares and the value of a right, if

(i) The firm offers one right share for every two shares held.

(ii) The firm offers one right share for every four shares held.

(iii) How does the shareholders' wealth change from (i) to (ii)? How does right issue increases shareholders' wealth?

3. On the basis of the following information:

Current dividend (Do)	=	₹ 2.50
Discount rate (k)	=	10.5%
Growth rate (g)	=	2%

(i) Calculate the present value of stock of ABC Ltd.

(ii) Is its stock overvalued if stock price is ₹ 35, ROE = 9% and EPS = ₹ 2.25? Show detailed calculation.

4. Piyush Loonker and Associates presently pay a dividend of Re. 1.00 per share and has a share price of ₹ 20.00.

(i) If this dividend were expected to grow at a rate of 12% per annum forever, what is the firm's expected or required return on equity using a dividend-discount model approach?

(ii) Instead of this situation in part (i), suppose that the dividends were expected to grow at a rate of 20% per annum for 5 years and 10% per year thereafter. Now what is the firm's expected, or required, return on equity?

5. Capital structure of Sun Ltd., as at 31.3.2003 was as under:

	(₹ in lakhs)
Equity share capital	80
8% Preference share capital	40
12% Debentures	64
Reserves	32

Sun Ltd., earns a profit of ₹ 32 lakhs annually on an average before deduction of income-tax, which works out to 35%, and interest on debentures.

Normal return on equity shares of companies similarly placed is 9.6% provided:

(a) Profit after tax covers fixed interest and fixed dividends at least 3 times.

(b) Capital gearing ratio is 0.75.

(c) Yield on share is calculated at 50% of profits distributed and at 5% on undistributed profits.

Sun Ltd., has been regularly paying equity dividend of 8%.

Compute the value per equity share of the company.

6. A Company pays a dividend of ₹ 2.00 per share with a growth rate of 7%. The risk free rate is 9% and the market rate of return is 13%. The Company has a beta factor of 1.50. However, due to a decision of the Finance Manager, beta is likely to increase to 1.75. Find out the present as well as the likely value of the share after the decision.

7. Shares of Voyage Ltd. are being quoted at a price-earning ratio of 8 times. The company retains 45% of its earnings which are ₹ 5 per share.

   You are required to compute

   (1) The cost of equity to the company if the market expects a growth rate of 15% p.a.

   (2) If the anticipated growth rate is 16% per annum, calculate the indicative market price with the same cost of capital.

   (3) If the company's cost of capital is 20% p.a. & the anticipated growth rate is 19% p.a., calculate the market price per share.

8. M/s X Ltd. has paid a dividend of ₹ 2.5 per share on a face value of ₹ 10 in the financial year ending on 31st March, 2009. The details are as follows:

Current market price of share	₹ 60
Growth rate of earnings and dividends	10%
Beta of share	0.75
Average market return	15%
Risk free rate of return	9%

   Calculate the intrinsic value of the share.

9. Saranam Ltd. has issued convertible debentures with coupon rate 12%. Each debenture has an option to convert to 20 equity shares at any time until the date of maturity. Debentures will be redeemed at ₹ 100 on maturity of 5 years. An investor generally requires a rate of return of 8% p.a. on a 5-year security. As an investor when will you exercise conversion for given market prices of the equity share of (i) ₹ 4, (ii) ₹ 5 and (iii) ₹ 6.

Cumulative PV factor for 8% for 5 years	:	3.993
PV factor for 8% for year 5	:	0.681

10. ABC Ltd. has ₹ 300 million, 12 per cent bonds outstanding with six years remaining to maturity. Since interest rates are falling, ABC Ltd. is contemplating of refunding these bonds with a ₹ 300 million issue of 6 year bonds carrying a coupon rate of 10 per cent. Issue cost of the new bond will be ₹ 6 million and the call premium is 4 per cent. ₹ 9 million

being the unamortized portion of issue cost of old bonds can be written off no sooner the old bonds are called off. Marginal tax rate of ABC Ltd. is 30 per cent. You are required to analyse the bond refunding decision.

ANSWERS/SOLUTIONS

Answers to Theoretical Questions

1. Please refer paragraph 8.9

2. Please refer paragraph 8.16

Answers to the Practical Questions

1. The company earnings and dividend per share after a year are expected to be:

EPS = ₹ 137.8 × 0.15 = ₹ 20.67

Dividend = 0.40 × 20.67 = ₹ 8.27

The growth in dividend would be:

g = 0.6 × 0.15 = 0.09

$$\text{Perpetual growth model Formula}: P_0 = \frac{\text{Dividend}}{K_e - g}$$

$$P_0 = \frac{8.27}{0.18 - 0.09}$$

P_0 = ₹ 91.89

Alternative Solution:

However, in case a student follows Walter's approach as against continuous growth model given in previous solution the answer of the question works out to be different. This can be shown as follow:

Given data:

Book value per share	= ₹ 137.80
Return on equity	= 15%
Dividend Payout	= 40%
Cost of capital	= 18%
∴ EPS	= ₹ 137.80 × 15%
	= ₹ 20.67

∴ Dividend = ₹ 20.67 × 40% = ₹ 8.27

Walter's approach showing relationship between dividend and share price can be expressed by the following formula

$$V_c = \frac{D + \frac{R_a}{R_c}(E - D)}{R_c}$$

Where,

V_c = Market Price of the ordinary share of the company.

R_a = Return on internal retention i.e. the rate company earns on retained profits.

R_c = Capitalisation rate i.e. the rate expected by investors by way of return from particular category of shares.

E = Earnings per share.

D = Dividend per share.

Hence,

$$V_c = \frac{8.27 + \frac{.15}{.18}(20.67 - 8.27)}{.18} = \frac{18.60}{.18}$$

= ₹ 103.35

2. **(i)** Number of shares to be issued : 5,00,000

Subscription price ₹ 20,00,000 / 5,00,000 = ₹ 4

$$\text{Ex-right Price} = \frac{₹\ 1,30,00,000 + ₹\ 20,00,000}{15,00,000} = ₹\ 10$$

Value of a Right = ₹ 10 – ₹ 4 = ₹ 6

$$\text{Value of a Right Per Share Basis} = \frac{₹10 - ₹4}{2}$$

(ii) Subscription price ₹ 20,00,000 / 2,50,000 = ₹ 8

$$\text{Ex-right Price} = \frac{₹\ 1,30,00,000 + ₹\ 20,00,000}{12,50,000} = ₹\ 12$$

Value of a Right = ₹ 12 – ₹ 8 = ₹ 4

$$\text{Value of a Right Per Share} = \frac{₹12 - ₹8}{4}$$

(iii) Calculation of effect of right issue on wealth of Shareholder's wealth who is holding, say 100 shares.

(a) When firm offers one share for two shares held.

Value of Shares after right issue	(150 X ₹ 10)	₹ 1,500
Less: Amount paid to acquire right shares	(50X₹4)	₹ 200
		₹1,300

(b) When firm offers one share for every four shares held.

Value of Shares after right issue	(125 X ₹ 12)	₹ 1,500
Less: Amount paid to acquire right shares	(25X₹8)	₹ 200
		₹1,300

(c) Wealth of Shareholders before Right Issue ₹1,300

Thus, there will be no change in the wealth of shareholders from (i) and (ii).

3. (i) Present Value of the stock of ABC Ltd. Is:-

$$Vo = \frac{2.50(1.02)}{0.105 - 0.02} = ₹30/-.$$

(ii) Value of stock under the PE Multiple Approach

Particulars	
Actual Stock Price	₹ 35.00
Return on equity	9%
EPS	₹ 2.25
PE Multiple (1/Return on Equity) = 1/9%	11.11
Market Price per Share	₹ 25.00

Since, Actual Stock Price is higher, hence it is overvalued.

(iii) Value of the Stock under the Earnings Growth Model

Particulars	
Actual Stock Price	₹ 35.00
Return on equity	9%
EPS	₹ 2.25
Growth Rate	2%
Market Price per Share $[EPS \times (1+g)]/(K_e - g)$ = ₹ 2.25 × 1.02/0.07	₹ 32.79

Since, Actual Stock Price is higher, hence it is overvalued.

4. (i) Firm's Expected or Required Return On Equity (Using a dividend discount model approach)

According to Dividend discount model approach the firm's expected or required return on equity is computed as follows:

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

Where,

K_e = Cost of equity share capital or (Firm's expected or required return on equity share capital)

D_1 = Expected dividend at the end of year 1

P_0 = Current market price of the share.

g = Expected growth rate of dividend.

Now, $D_1 = D_0 (1 + g)$ or ₹ 1 (1 + 0.12) or ₹ 1.12, P_0 = ₹ 20 and g = 12% per annum

$$\text{Therefore, } K_e = \frac{₹\,1.12}{₹\,20} + 12\%$$

Or, K_e = ₹ 17.6%

(ii) Firm's Expected or Required Return on Equity

(If dividends were expected to grow at a rate of 20% per annum for 5 years and 10% per year thereafter)

Since in this situation if dividends are expected to grow at a super normal growth rate g_s, for n years and thereafter, at a normal, perpetual growth rate of g_n beginning in the year n + 1, then the cost of equity can be determined by using the following formula:

$$P_0 = \sum_{t=1}^{n} \frac{Div_0 (1+g_s)^t}{(1+K_e)^t} + \frac{Div_{n+1}}{K_e - g_n} \times \frac{1}{(1+K_e)^n}$$

Where,

g_s = Rate of growth in earlier years.

g_n = Rate of constant growth in later years.

P_0 = Discounted value of dividend stream.

K_e = Firm's expected, required return on equity (cost of equity capital).

Now,

g_s = 20% for 5 years, g_n = 10%

Therefore,

$$P_0 = \sum_{t=1}^{n} \frac{D_0 (1+0.20)^t}{(1+K_e)^t} + \frac{Div_{5+1}}{K_e - 0.10} \times \frac{1}{(1+K_e)^t}$$

$$_0 = \frac{1.20}{(1+\ )^1} + \frac{1.44}{(1+\ )^2} + \frac{1.73}{(1+\ )^3} + \frac{2.07}{(1+\ )^4} + \frac{2.49}{(1+\ )^5} + \frac{2.49(1+0.10)}{-0.10} \times \frac{1}{(1+\ )^5}$$

or P_0 = ₹ 1.20 (PVF_1, K_e) + ₹ 1.44 (PVF_2, K_e) + ₹ 1.73 (PVF_3, K_e) + ₹ 2.07 (PVF_4, K_e) + ₹ 2.49 (PVF_5, K_e) + $\frac{\text{Rs. } 2.74 (PVF_5, K_e)}{K_e - 0.10}$

By trial and error we are required to find out K_e

Now, assume K_e = 18% then we will have

P_0 = ₹ 1.20 (0.8475) + ₹ 1.44 (0.7182) + ₹ 1.73 (0.6086) + ₹ 2.07 (0.5158) + ₹ 2.49 (0.4371) + ₹ 2.74 (0.4371) $\times \frac{1}{0.18 - 0.10}$

= ₹ 1.017 + ₹ 1.034 + ₹ 1.053 + ₹ 1.068 + ₹ 1.09 + ₹ 14.97= ₹ 20.23

Since the present value of dividend stream is more than required it indicates that Ke is greater than 18%.

Now, assume K_e = 19% we will have

P_0 = ₹ 1.20 (0.8403) + ₹ 1.44 (0.7061) + ₹ 1.73 (0.5934) + ₹ 2.07 (0.4986) + ₹ 2.49 (0.4190) + ₹ 2.74 (0.4190) $\times \frac{1}{0.19 - 0.10}$

= ₹ 1.008 + ₹ 1.017 + ₹ 1.026+ ₹ 1.032 + ₹ 1.043 + ₹ 12.76

= ₹ 17.89

Since the market price of share (expected value of dividend stream) is ₹ 20. Therefore, the discount rate is closer to 18% than it is to 19%, we can get the exact rate by interpolation by using the following formula:

$$K_e = LR + \frac{\text{NPV at LR}}{\text{NPV at LR} - \text{NPV at HR}} \times \Delta r$$

Where,

LR = Lower Rate

NPV at LR = Present value of share at LR

NPV at HR = Present value of share at Higher Rate

Δr = Difference in rates

$$K = 18\% + \frac{(₹\ 20.23 - ₹\ 20)}{₹\ 20.23 - ₹\ 17.89} \times 1\%$$

$$= 18\% + \frac{₹\ 0.23}{₹ 2.34} \times 1\% = 18\% + 0.10\% = 18.10\%$$

Therefore, the firm's expected, or required, return on equity is 18.10%. At this rate the present discounted value of dividend stream is equal to the market price of the share.

5. (a) Calculation of Profit after tax (PAT)

		₹
Profit before interest and tax (PBIT)		32,00,000
Less: Debenture interest (₹ 64,00,000 × 12/100)		7,68,000
Profit before tax (PBT)		24,32,000
Less: Tax @ 35%		8,51,200
Profit after tax (PAT)		15,80,800
Less: Preference Dividend		
(₹ 40,00,000 × 8/100)	3,20,000	
Equity Dividend (₹ 80,00,000 × 8/100)	6,40,000	9,60,000
Retained earnings (Undistributed profit)		6,20,800

Calculation of Interest and Fixed Dividend Coverage

$$= \frac{\text{PAT + Debenture interest}}{\text{Debenture interest + Preference dividend}} \text{ or } \frac{\text{PAT + Debenture Interest Net of Tax}}{\text{Debenture interest + Preference dividend}}$$

$$= \frac{15,80,800 + 7,68,000}{7,68,000 + 3,20,000} \text{ or } \frac{15,80,800 + 4,99,200}{7,68,000 + 3,20,000}$$

$$= \frac{23,48,800}{10,88,000} \text{ or } \frac{20,80,000}{10,88,000} = 2.16 \text{ times or } 1.91 \text{ times}$$

(b) Calculation of Capital Gearing Ratio

$$\text{Capital Gearing Ratio} = \frac{\text{Fixed interest bearing funds}}{\text{Equity shareholders' funds}}$$

$$= \frac{\text{Preference Share Capital} + \text{Debentures}}{\text{Equity Share Capital} + \text{Reserves}} = \frac{40,00,000 + 64,00,000}{80,00,000 + 32,00,000} = \frac{1,04,00,000}{1,12,00,000} = 0.93$$

(c) Calculation of Yield on Equity Shares:

Yield on equity shares is calculated at 50% of profits distributed and 5% on undistributed profits:

	(₹)
50% on distributed profits (₹ 6,40,000 × 50/100)	3,20,000
5% on undistributed profits (₹ 6,20,800 × 5/100)	31,040
Yield on equity shares	3,51,040

$$\text{Yield on equity shares \%} = \frac{\text{Yield on shares}}{\text{Equity share capital}} \times 100$$

$$= \frac{3,51,040}{80,00,000} \times 100 = 4.39\% \text{ or, } 4.388\%.$$

Calculation of Expected Yield on Equity shares

Note: There is a scope for assumptions regarding the rates (in terms of percentage for every one time of difference between Sun Ltd. and Industry Average) of risk premium involved with respect to Interest and Fixed Dividend Coverage and Capital Gearing Ratio. The below solution has been worked out by assuming the risk premium as:

(i) 1% for every one time of difference for Interest and Fixed Dividend Coverage.

(ii) 2% for every one time of difference for Capital Gearing Ratio.

(a) Interest and fixed dividend coverage of Sun Ltd. is 2.16 times but the industry average is 3 times. Therefore, risk premium is added to Sun Ltd. Shares @ 1% for every 1 time of difference.

Risk Premium = 3.00 – 2.16 (1%) = 0.84 (1%) = 0.84%

(b) Capital Gearing ratio of Sun Ltd. is 0.93 but the industry average is 0.75 times. Therefore, risk premium is added to Sun Ltd. shares @ 2% for every 1 time of difference.

Risk Premium = (0.75 – 0.93) (2%)

= 0.18 (2%) = 0.36%

	(%)
Normal return expected	9.60
Add: Risk premium for low interest and fixed dividend coverage	0.84
Add: Risk premium for high interest gearing ratio	0.36
	10.80

Value of Equity Share

$$= \frac{\text{Actual yield}}{\text{Expected yield}} \times \text{Paid-up value of share} = \frac{4.39}{10.80} \times 100 = ₹\ 40.65$$

6. In order to find out the value of a share with constant growth model, the value of K_e should be ascertained with the help of 'CAPM' model as follows:

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

Where,

K_e = Cost of equity

R_f = Risk free rate of return

β = Portfolio Beta i.e. market sensitivity index

K_m = Expected return on market portfolio

By substituting the figures, we get

$K_e = 0.09 + 1.5\ (0.13 - 0.09) = 0.15$ or 15%

and the value of the share as per constant growth model is

$$P_0 = \frac{D_1}{(k_e - g)}$$

Where,

P_0 = Price of a share

D_1 = Dividend at the end of the year 1

K_e = Cost of equity

G = growth

$$P_0 = \frac{2.00}{(k_e - g)}$$

$$P_0 = \frac{2.00}{0.15 - 0.07} = ₹\ 25.00$$

Alternatively it can also be found as follows:

$$\frac{2.00\ (1.07)}{0.15 - 0.07} = ₹\ 26.75$$

However, if the decision of finance manager is implemented, the beta (β) factor is likely to increase to 1.75 therefore, K_e would be

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

$= 0.09 + 1.75\ (0.13 - 0.09) = 0.16$ or 16%

The value of share is

$$P_0 = \frac{D_1}{(k_e - g)}$$

$$P_0 = \frac{2.00}{0.16 - 0.07} = ₹\ 22.22$$

Alternatively it can also be found as follows:

$$\frac{2.00\ (1.07)}{0.16 - 0.07} = ₹\ 23.78$$

7. **(1) Cost of Capital**

Retained earnings (45%)	₹ 5 per share
Dividend (55%)	₹ 6.11 per share
EPS (100%)	₹ 11.11 per share
P/E Ratio	8 times
Market price	₹ 11.11 × 8 = ₹ 88.88

Cost of equity capital

$$= \left(\frac{\text{Div}}{\text{Price}} \times 100\right) + \text{Growth \%} = \frac{₹\ 6.11}{₹\ 88.88} \times 100 + 15\% = 21.87\%$$

(2) Market Price $= \left(\frac{\text{Dividend}}{\text{Cost of Capital(\%) - Growth Rate(\%)}}\right)$

$$= \frac{₹\ 6.11}{(21.87-16)\%} = ₹\ 104.08 \text{ per share}$$

(3) Market Price $= \frac{₹ 6.11}{(20-19)\%} = ₹\ 611.00$ per share

Alternative Solution

As in the question the sentence "The company retains 45% of its earnings which are ₹ 5 per share" amenable to two interpretations i.e. one is ₹ 5 as retained earnings (45%) and another is ₹ 5 is EPS (100%). Alternative solution is as follows:

(1) Cost of capital

EPS (100%)	₹ 5 per share
Retained earnings (45%)	₹ 2.25 per share
Dividend (55%)	₹ 2.75 per share
P/E Ratio	8 times
Market Price	₹ 5 × 8 = ₹ 40

Cost of equity capital

$$= \left(\frac{\text{Div}}{\text{Price}} \times 100\right) + \text{Growth \%} = \frac{₹\ 2.75}{₹\ 40.00} \times 100 + 15\% = 21.87\%$$

(2) Market Price $= \left(\frac{\text{Dividend}}{\text{Cost of Capital(\%)} - \text{Growth Rate(\%)}}\right) = \frac{₹\ 2.75}{(21.87 - 16)\%}$

= ₹ 46.85 per share

(3) Market Price $= \frac{₹\ 2.75}{(20 - 19)\%}$ = ₹ 275.00 per share

8. Intrinsic Value $P_0 = \frac{D1}{k - g}$

Using CAPM

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

R_f = Risk Free Rate

β = Beta of Security

R_m = Market Return

= 9% + 0.75 (15% - 9%) = 13.5%

$$P = \frac{2.5 \times 1.1}{0.135 - 0.10} = \frac{2.75}{0.035} = ₹\ 78.57$$

9. If Debentures are not converted its value is as under: -

	PVF @ 8 %	₹
Interest - ₹ 12 for 5 years	3.993	47.916
Redemption - ₹ 100 in 5th year	0.681	68.100
		116.016

Value of equity shares:-

Market Price	No.	Total
₹ 4	20	₹ 80
₹ 5	20	₹ 100
₹ 6	20	₹ 120

Hence, unless the market price is ₹ 6 conversion should not be exercised.

10. 1. Calculation of initial outlay:-

		₹ (million)
a.	Face value	300
	Add:-Call premium	12
	Cost of calling old bonds	312
b.	Gross proceed of new issue	300
	Less: Issue costs	6
	Net proceeds of new issue	294
c.	Tax savings on call premium and unamortized cost 0.30 (12 + 9)	6.3

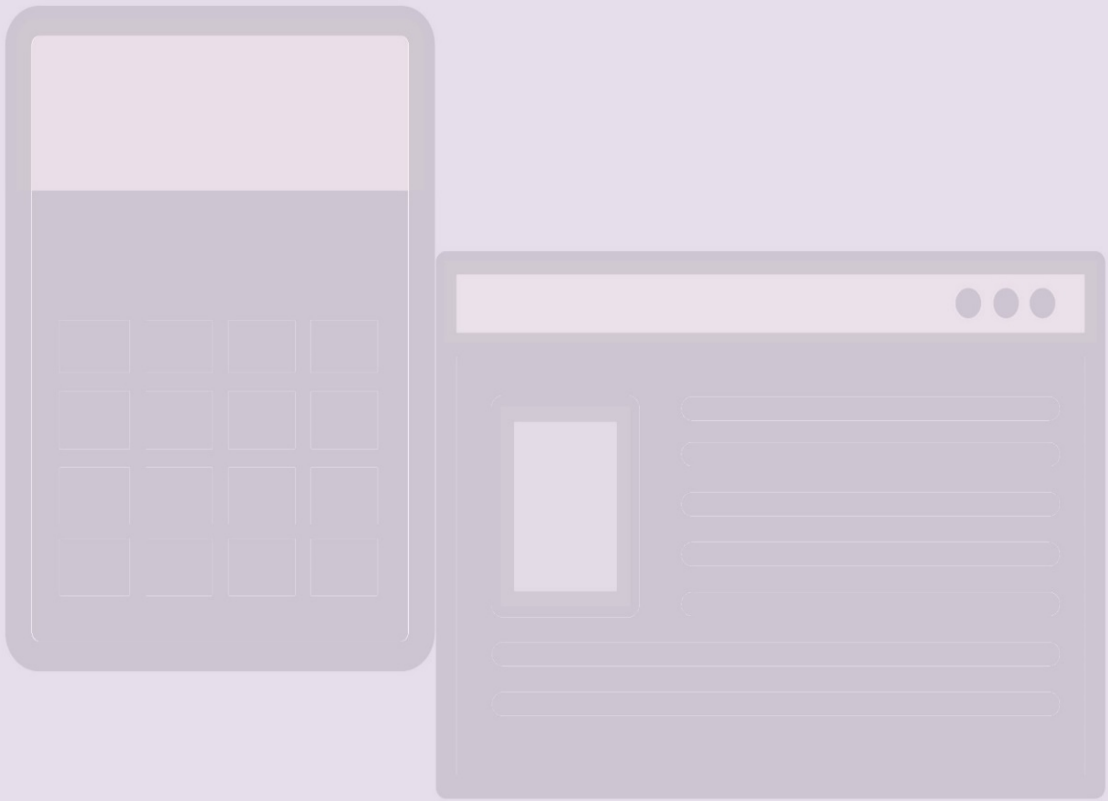
∴ Initial outlay = ₹ 312 million – ₹ 294 million – ₹ 6.3 million = ₹ 11.7 million

2. Calculation of net present value of refunding the bond:-

Saving in annual interest expenses	₹ (million)
[300 x (0.12 – 0.10)]	6.00
Less:- Tax saving on interest and amortization	
0.30 x [6 + (9-6)/6]	1.95
Annual net cash saving	4.05

PVIFA (7%, 6 years)	4.766
∴ Present value of net annual cash saving	₹ 19.30 million
Less:- Initial outlay	₹ 11.70 million
Net present value of refunding the bond	₹ 7.60 million

Decision: The bonds should be refunded



CHAPTER 5

PORTFOLIO MANAGEMENT

LEARNING OUTCOMES

After going through the chapter student shall be able to understand

- Activities in Portfolio Management
- Objectives of Portfolio Management
- Phases of Portfolio Management
  - (1) Security Analysis
  - (2) Portfolio Analysis
  - (3) Portfolio Selection
  - (4) Portfolio Revision
  - (5) Portfolio Evaluation
- Portfolio Theories
  - (1) Traditional Approach
  - (2) Modern Approach (Markowitz Model or Risk-Return Optimization)
- Risk Analysis
  - (1) Elements of Risk
  - (2) Diversion of Risk
  - (3) Risk & Return

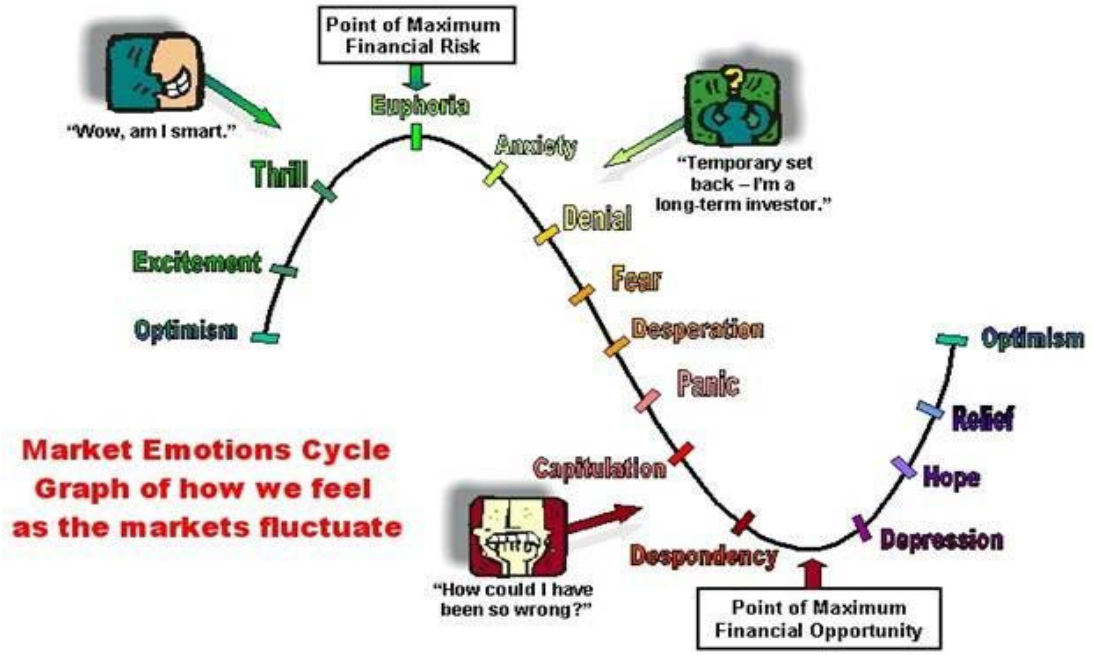
- (4) Portfolio Analysis
- ❑ Markowitz Model of Risk-Return Optimization
- ❑ Capital Asset Pricing Model (CAPM)
- ❑ Arbitrage Pricing Theory Model (APT)
- ❑ Sharpe Index Model
  - (1) Single Index Model
  - (2) Sharpe's Optimal Portfolio
- ❑ Formulation of Portfolio Strategy
  - (1) Active Portfolio Strategy (APS)
  - (2) Passive Portfolio Strategy
  - (3) Selection of Securities
- ❑ Asset Allocation Strategies
- ❑ Random Walk Theory
- ❑ Efficient Market Theory

1. INTRODUCTION

Investment in the securities such as bonds, debentures and shares etc. is lucrative as well as exciting for the investors. Though investment in these securities may be rewarding, it is also fraught with risk. Therefore, investment in these securities requires a good amount of scientific and analytical skill. As per the famous principle of not putting all eggs in the same basket, an investor never invests his entire investable funds in one security. He invests in a well diversified portfolio of a number of securities which will optimize the overall risk-return profile. Investment in a portfolio can reduce risk without diluting the returns. An investor, who is expert in portfolio analysis, may be able to generate trading profits on a sustained basis.

Every investment is characterized by return and risk. The concept of risk is intuitively understood by investors. In general, it refers to the possibility of the rate of return from a security or a portfolio of securities deviating from the corresponding expected/average rate and can be measured by the standard deviation/variance of the rate of return.

How different type of Investors react in different situations



Source: www.missiassaugahsale.com

1.1 Activities in Portfolio Management

The following three major activities are involved in the formation of an Optimal Portfolio suitable for any given investor:

(a) Selection of securities.

(b) Construction of all Feasible Portfolios with the help of the selected securities.

(c) Deciding the weights/proportions of the different constituent securities in the portfolio so that it is an Optimal Portfolio for the concerned investor.

The activities are directed to achieve an Optimal Portfolio of investments commensurate with the risk appetite of the investor.

1.2 Objectives of Portfolio Management

Some of the important objectives of portfolio management are:

(i) ***Security/Safety of Principal*:** Security not only involves keeping the principal sum intact but also its purchasing power.

(ii) ***Stability of Income*:** To facilitate planning more accurately and systematically the reinvestment or consumption of income.

(iii) ***Capital Growth*:** It can be attained by reinvesting in growth securities or through purchase of growth securities.

(iv) ***Marketability i.e. the case with which a security can be bought or sold*:** This is essential for providing flexibility to investment portfolio.

(v) ***Liquidity i.e. nearness to money*:** It is desirable for the investor so as to take advantage of attractive opportunities upcoming in the market.

(vi) ***Diversification*:** The basic objective of building a portfolio is to reduce the risk of loss of capital and/or income by investing in various types of securities and over a wide range of industries.

(vii) ***Favourable Tax Status*:** The effective yield an investor gets from his investment depends on tax to which it is subjected to. By minimising the tax burden, yield can be effectively improved.

2. PHASES OF PORTFOLIO MANAGEMENT

Portfolio management is a process and broadly it involves following five phases and each phase is an integral part of the whole process and the success of portfolio management depends upon the efficiency in carrying out each of these phases.

2.1 Security Analysis

The securities available to an investor for investment are numerous in number and of various types. The securities are normally classified on the basis of ownership of securities such as equity shares, preference shares, debentures and bonds, In recent times a number of new securities with innovative features are available in the market e.g. Convertible Debentures, Deep Discount Bonds, Zero Coupon Bonds, Flexi Bonds, Floating Rate Bonds, Global Depository Receipts, Euro-currency Bonds, etc. are some examples of these new securities. Among this vast group of securities, an investor has to choose those ones which he considers worthwhile to be included in his investment portfolio. This requires a detailed analysis of the all securities available for making investment.

Security analysis constitutes the initial phase of the portfolio formation process and consists in examining the risk-return characteristics of individual securities and also the correlation among them. A simple strategy in securities investment is to buy underpriced securities and sell overpriced securities. But the basic problem is how to identify underpriced and overpriced securities and this is what security analysis is all about.

As discussed in the chapter of Security Analysis, there are two alternative approaches to analyse any security viz. fundamental analysis and technical analysis. They are based on different premises

and follow different techniques. Fundamental analysis, the older of the two approaches, concentrates on the fundamental factors affecting the company such as

- the EPS of the company,
- the dividend pay-out ratio,
- the competition faced by the company,
- the market share, quality of management, etc.
- fundamental factors affecting the industry to which the company belongs.

The fundamental analyst compares this intrinsic value (true worth of a security based on its fundamentals) with the current market price. If the current market price is higher than the intrinsic value, the share is said to be overpriced and vice versa. This mispricing of securities gives an opportunity to the investor to acquire the share or sell off the share profitably. An intelligent investor would buy those securities which are underpriced and sell those securities which are overpriced. Thus it can be said that fundamental analysis helps to identify fundamentally strong companies whose shares are worthy to be included in the investor's portfolio.

The second approach to security analysis is 'Technical Analysis'. As per this approach the share price movements are systematic and exhibit certain consistent patterns. Therefore, properly studied past movements in the prices of shares help to identify trends and patterns in security prices and efforts are made to predict the future price movements by looking at the patterns of the immediate past. Thus Technical analyst concentrates more on price movements and ignores the fundamentals of the shares.

In order to construct well diversified portfolios, so that Unsystematic Risk can be eliminated or substantially mitigated, an investor will like to select securities across diverse industry sectors which should not have strong positive correlation among themselves.

The efficient market hypothesis holds that-share price movements are random and not systematic. Consequently, neither fundamental analysis nor technical analysis is of value in generating trading gains on a sustained basis. The EMH thus does not subscribe to the belief that it is possible to book gains in the long term on a sustained basis from trading in the stock market. Markets, though becoming increasingly efficient everywhere with the passage of time, are never perfectly efficient. So, there are opportunities all the time although their durations are decreasing and only the smart investors can look forward to booking gains consistently out of stock market deals.

2.2 Portfolio Analysis

Once the securities for investment have been identified, the next step is to combine these to form a suitable portfolio. Each such portfolio has its own specific risk and return characteristics which are not just the aggregates of the characteristics of the individual securities constituting it. The return

and risk of each portfolio can be computed mathematically based on the risk-return profiles for the constituent securities and the pair-wise correlations among them.

From any chosen set of securities, an indefinitely large number of portfolios can be constructed by varying the fractions of the total investable resources allocated to each one of them. All such portfolios that can be constructed out of the set of chosen securities are termed as Feasible Portfolios.

2.3 Portfolio Selection

The goal of a rational investor is to identify the Efficient Portfolios out of the whole set of Feasible Portfolios mentioned above and then to zero in on the Optimal Portfolio suiting his risk appetite. An Efficient Portfolio has the highest return among all Feasible Portfolios having identical Risk and has the lowest Risk among all Feasible Portfolios having identical Return. Harry Markowitz's portfolio theory (Modern Portfolio Theory) outlines the methodology for locating the Optimal Portfolio for an investor (unlike the CAPM, the Optimal Portfolio as per Markowitz Theory is investor specific).

2.4 Portfolio Revision

Once an optimal portfolio has been constructed, it becomes necessary for the investor to constantly monitor the portfolio to ensure that it does not lose it optimality. Since the economy and financial markets are dynamic in nature, changes take place in these variables almost on a daily basis and securities which were once attractive may cease to be so with the passage of time. New securities with expectations of high returns and low risk may emerge. In light of these developments in the market, the investor now has to revise his portfolio. This revision leads to addition (purchase) of some new securities and deletion (sale) of some of the existing securities from the portfolio. The nature of securities and their proportion in the portfolio changes as a result of the revision.

This portfolio revision may also be necessitated by some investor-related changes such as availability of additional funds for investment, change in risk appetite, need of cash for other alternative use, etc.

Portfolio revision is not a casual process to be taken lightly and needs to be carried out with care, scientifically and objectively so as to ensure the optimality of the revised portfolio. Hence, in the entire process of portfolio management, portfolio revision is as important as portfolio analysis and selection.

2.5 Portfolio Evaluation

This process is concerned with assessing the performance of the portfolio over a selected period of time in terms of return and risk and it involves quantitative measurement of actual return realized and the risk borne by the portfolio over the period of investment. The objective of constructing a portfolio and revising it periodically is to maintain its optimal risk return characteristics. Various types of alternative measures of performance evaluation have been developed for use by investors and portfolio managers.

This step provides a mechanism for identifying weaknesses in the investment process and for improving these deficient areas.

It should however be noted that the portfolio management process is an ongoing process. It starts with security analysis, proceeds to portfolio construction, and continues with portfolio -revision and end with portfolio evaluation. Superior performance is achieved through continual refinement of portfolio management skill.

Following three ratios are used to evaluate the portfolio:

2.5.1 Sharpe Ratio

Sharpe Ratio measures the Risk Premium per unit of Total Risk for a security or a portfolio of securities. The formula is as follows:

$$\frac{R_i - R_f}{\sigma_i}$$

Example: Let's assume that we look at a one year period of time where an index fund earned 11%

Treasury bills earned 6%

The standard deviation of the index fund was 20%

Therefore S = 11-6/.20 = 25%

The Sharpe ratio is an appropriate measure of performance for an overall portfolio particularly when it is compared to another portfolio, or another index such as the S&P 500, Small Cap index, etc.

That said however, it is not often provided in most rating services.

Example: Consider two Portfolios A and B. Let return of A be 30% and that of B be 25%. On the outset, it appears that A has performed better than B. Let us now incorporate the risk factor and find out the Sharpe ratios for the portfolios. Let risk of A and B be 11% and 5% respectively. This means that the standard deviation of returns - or the volatility of returns of A is much higher than that of B.

If risk free rate is assumed to be 8%,

Sharpe ratio for portfolio A= (30-8)/11=2% and

Sharpe ratio for portfolio B= (25-8)/5=3.4%

Higher the Sharpe Ratio, better is the portfolio on a risk adjusted return metric. Hence, our primary judgment based solely on returns was erroneous. Portfolio B provides better risk adjusted returns than Portfolio A and hence is the preferred investment. Producing healthy returns with low volatility is generally preferred by most investors to high returns with high volatility. Sharpe ratio is a good tool to use to determine a portfolio that is suitable to such investors.

2.5.2 Treynor Ratio

This ratio is same as Sharpe ratio with only difference that it measures the Risk Premium per unit of Systematic Risk (β) for a security or a portfolio of securities. The formula is as follows:

$$\frac{R_i - R_f}{\beta_i}$$

Where,

R_i = Expected return on stock i

R_f = Return on a risk less asset

σ_i = Standard Deviation of the rates of return for the i Security or Portfolio

β_i = Expected change in the rate of return on stock i associated with one unit change in the market return (Beta)

Treynor ratio is based on the premise that unsystematic or specific risk can be diversified and hence, only incorporates the systematic risk (beta) to gauge the portfolio's performance. It measures the returns earned in excess of those that could have been earned on a riskless investment per unit of market risk assumed.

In above example if beta of Portfolio A and B are 1.5 and 1.1 respectively,

Treynor ratio for Portfolio A= (30-8)/1.5=14.67%

Treynor ratio for Portfolio B= (25-8)/1.1= 15.45%

The results are in sync with the Sharpe ratio results.

Both Sharpe ratio and Treynor ratio measure risk adjusted returns. The difference lies in how risk is defined in either case. In Sharpe ratio, risk is determined as the degree of volatility in returns - the variability in month-on-month or period-on-period returns - which is expressed through the standard deviation of the stream of returns numbers you are considering. In Treynor ratio, you look at the beta of the portfolio - the degree of "momentum" that has been built into the portfolio by the fund manager in order to derive his excess returns. High momentum - or high beta (where beta is > 1) implies that the portfolio will move faster (up as well as down) than the market.

While Sharpe ratio measures total risk (as the degree of volatility in returns captures all elements of risk - systematic as well as unsystemic), the Treynor ratio captures only the systematic risk in its computation.

When one has to evaluate the funds which are sector specific, Sharpe ratio would be more meaningful. This is due to the fact that unsystematic risk would be present in sector specific funds. Hence, a truer measure of evaluation would be to judge the returns based on the total risk.

On the contrary, if we consider diversified equity funds, the element of unsystematic risk would be very negligible as these funds are expected to be well diversified by virtue of their nature. Hence, Treynor ratio would me more apt here.

It is widely found that both ratios usually give similar rankings. This is based on the fact that most of the portfolios are fully diversified. To summarize, we can say that when the fund is not fully diversified, Sharpe ratio would be a better measure of performance and when the portfolio is fully diversified, Treynor ratio would better justify the performance of a fund.

Example: In 2005 - 06 where Fidelity Magellan had earned about 18%. Many bond funds had earned 13 %. Which is better? In absolute numbers, 18% beats 13%. But if we then state that the bond funds had about half the market risk, now which is better? We don't even need to do the formula for that analysis. But that is missing in almost all reviews by all brokers. For clarification, we do not suggest they put all the money into either one- just that they need to be aware of the implications.

2.5.3 Jensen Alpha

This is the difference between a portfolio's actual return and those that could have been made on a benchmark portfolio with the same risk- i.e. beta. It measures the ability of active management to increase returns above those that are purely a reward for bearing market risk. Caveats apply however since it will only produce meaningful results if it is used to compare two portfolios which have similar betas.

Assume Two Portfolios

	A	B	Market Return
Return	12	14	12
Beta	0.7	1.2	1.0

Risk Free Rate = 9%

The return expected = Risk Free Return + Beta portfolio (Return of Market - Risk Free Return)

Using Portfolio A, the expected return = 0 .09 + 0.7 (0.12 - 0.09) = 0.09 + 0.021 = 0.111

Alpha = Return of Portfolio- Expected Return= 0.12 - 0.111 = 0.009

As long as "apples are compared to apples"- in other words a computer sector fund A to computer sector fund b- it is a viable number. But if taken out of context, it loses meaning. Alphas are found in many rating services but are not always developed the same way- so you can't compare an alpha from one service to another. However, we have usually found that their relative position in the particular rating service is to be viable. Short-term alphas are not valid. Minimum time frames are one year- three year is more preferable.

3. PORTFOLIO THEORIES

Portfolio theory forms the basis for portfolio management. Portfolio management deals with the selection of securities and their continuous shifting in the portfolio to optimise returns to suit the objectives of an investor. This, however, requires financial expertise in selecting the right mix of securities in changing market conditions to get the best out of the stock market. In India as well as in a number of Western countries, portfolio management service has assumed the role of a specialised service and a number of professional investment bankers/fund managers compete aggressively to provide the best options to high net-worth clients, who have little time to manage their own investments. The idea is catching on with the growth of the capital market and an increasing number of people want to earn profits by investing their hard-earned savings in a planned manner.

A portfolio theory guides investors about the method of selecting and combining securities that will provide the highest expected rate of return for any given degree of risk or that will expose the investor to the lowest degree of risk for a given expected rate of return. Portfolio theory can be discussed under the following heads:

3.1 Traditional Approach

The traditional approach to portfolio management concerns itself with the investor, definition of portfolio objectives, investment strategy, diversification and selection of individual investment as detailed below:

(i) Investor's study includes an insight into his – (a) age, health, responsibilities, other assets, portfolio needs; (b) need for income, capital maintenance, liquidity; (c) attitude towards risk; and (d) taxation status;

(ii) Portfolio objectives are defined with reference to maximising the investors' wealth which is subject to risk. The higher the level of risk borne, the more the expected returns.

(iii) Investment strategy covers examining a number of aspects including:

- (a) Balancing fixed interest securities against equities;
- (b) Balancing high dividend payout companies against high earning growth companies as required by investor;
- (c) Finding the income of the growth portfolio;
- (d) Balancing income tax payable against capital gains tax;
- (e) Balancing transaction cost against capital gains from rapid switching; and
- (f) Retaining some liquidity to seize upon bargains.

(iv) Diversification reduces volatility of returns and risks and thus adequate equity diversification is sought. Balancing of equities against fixed interest bearing securities is also sought.

(v) Selection of individual investments is made on the basis of the following principles:

(a) Methods for selecting sound investments by calculating the true or intrinsic value of a share and comparing that value with the current market value (i.e. by following the fundamental analysis) or trying to predict future share prices from past price movements (i.e., following the technical analysis);

(b) Expert advice is sought besides study of published accounts to predict intrinsic value;

(c) Inside information is sought and relied upon to move to diversified growth companies, switch quickly to winners than loser companies;

(d) Newspaper tipsters about good track record of companies are followed closely;

(e) Companies with good asset backing, dividend growth, good earning record, high quality management with appropriate dividend paying policies and leverage policies are traced out constantly for making selection of portfolio holdings.

In India, most of the share and stock brokers follow the above traditional approach for selecting a portfolio for their clients.

3.2 Modern Approach (Markowitz Model or Risk-Return Optimization)

Originally developed by Harry Markowitz in the early 1950's, Portfolio Theory - sometimes referred to as Modern Portfolio Theory - provides a logical/mathematical framework in which investors can optimise their risk and return. The central plank of the theory is that diversification through portfolio formation can reduce risk, and return is a function of expected risk.

Harry Markowitz is regarded as the father of Modern Portfolio Theory. According to him, investors are mainly concerned with two properties of an asset: risk and return. The essence of his theory is that risk of an individual asset hardly matters to an investor. What really matters is the contribution it makes to the investor's overall risk. By turning his principle into a useful technique for selecting the right portfolio from a range of different assets, he developed the 'Mean Variance Analysis' in 1952.

We shall discuss this theory in greater detail later in this chapter.

4. RISK ANALYSIS

Before proceeding further it will be better if the concept of risk and return is discussed. A person makes an investment in the expectation of getting some return in the future. But, the future is uncertain and so is the future expected return. It is this uncertainty associated with the returns from an investment that introduces risk for an investor.

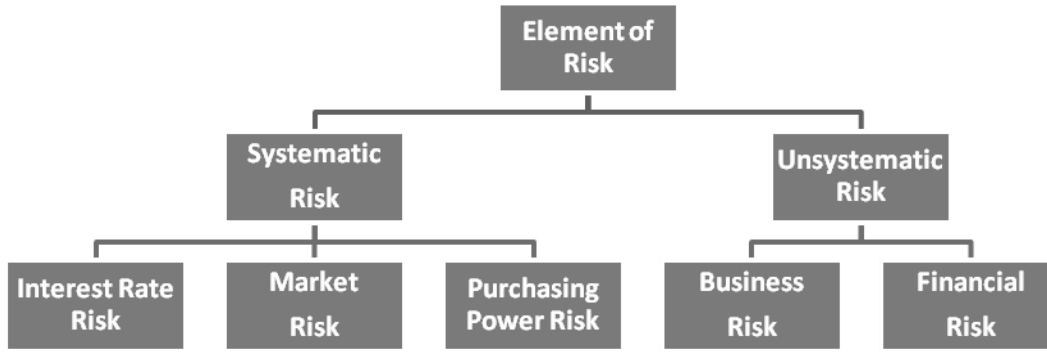
It is important here to distinguish between the expected return and the realized return from an investment. The expected future return is what an investor expects to get from his investment and is uncertain. On the other hand, the realized return is what an investor actually obtains from his investment at the end of the investment period. The investor makes the investment decision based on the expected return from the investment. However, the actual return realized from the investment may not correspond to the expected return. This possible variation of the actual return from the expected return is termed as risk. If actual realizations correspond to expectations exactly, there would be no risk. Risk arises where there is a possibility of variation between expectations and realizations with regard to an investment.

Thus, risk arises from the variability in returns. An investment whose returns are fairly stable is considered to be a low-risk investment, whereas an investment whose returns fluctuate significantly is considered to be a highly risky investment. Government securities whose returns are fairly stable and which are free from default are considered to possess low risk whereas equity shares whose returns are likely to fluctuate widely around their mean are considered risky investments.

The essence of risk in an investment is the variation in its returns. This variation in returns is caused by a number of factors. These factors which produce variations in the returns from an investment constitute the elements of risk.

4.1 Elements of Risk

Let us consider the risk in holding securities, such as shares, debentures, etc. The elements of risk may be broadly classified into two groups as shown in the following diagram.



The first group i.e. systematic risk comprises factors that are external to a company (macro in nature) and affect a large number of securities simultaneously. These are mostly uncontrollable in nature. The second group i.e. unsystematic risk includes those factors which are internal to companies (micro in nature) and affect only those particular companies. These are controllable to a great extent.

The total variability in returns of a security is due to the total risk of that security. Hence,

Total risk = Systematic risk + Unsystematic risk

4.1.1 Systematic Risk

Due to dynamic nature of society the changes occur in the economic, political and social systems constantly. These changes have an influence on the performance of companies and thereby on their stock prices but in varying degrees. For example, economic and political instability adversely affects all industries and companies. When an economy moves into recession, corporate profits will shift downwards, and stock prices of most companies may decline. Thus, the impact of economic, political and social changes is system-wide and that portion of total variability in security returns caused by such system-wide factors is referred to as systematic risk. Systematic risk can be further subdivided into interest rate risk, market risk and purchasing power risk.

(i) **Interest Rate Risk:** This arises due to variability in the interest rates from time to time and particularly affects debts securities like bonds and debentures as they carry fixed coupon rate of interest. A change in the interest rates establishes an inverse relationship in the price of security i.e. price of securities tends to move inversely with change in rate of interest, long term securities show greater variability in the price with respect to interest rate changes than short term securities. While cash equivalents are less vulnerable to interest rate risk the long term bonds are more vulnerable to interest rate risk.

(ii) **Purchasing Power Risk:** It is also known as inflation risk, as it also emanates from the very fact that inflation affects the purchasing power adversely. Nominal return contains both the real return component and an inflation premium in a transaction involving risk of the above type to compensate for inflation over an investment holding period. Inflation rates vary over time and investors are caught unaware when rate of inflation changes unexpectedly causing erosion in the value of realised rate of return and expected return.

Purchasing power risk is more in inflationary conditions especially in respect of bonds and fixed income securities. It is not desirable to invest in such securities during inflationary periods. Purchasing power risk is however, less in flexible income securities like equity shares or common stock where rise in dividend income off-sets increase in the rate of inflation and provides advantage of capital gains.

(iii) **Market risk:** This is a type of systematic risk that affects prices of any particular share move up or down consistently for some time periods in line with other shares in the market. A general rise in share prices is referred to as a bullish trend, whereas a general fall in share prices is referred to as a bearish trend. In other words, the share market moves between the bullish phase and the bearish phase. The market movements can be easily seen in the movement of share price indices such as the BSE Sensitive Index, BSE National Index, NSE Index etc.

4.1.2 Unsystematic Risk

Sometimes the return from a security of any company may vary because of certain factors particular to this company. Variability in returns of the security on account of these factors (micro in nature), it is known as unsystematic risk. It should be noted that this risk is in addition to the systematic risk

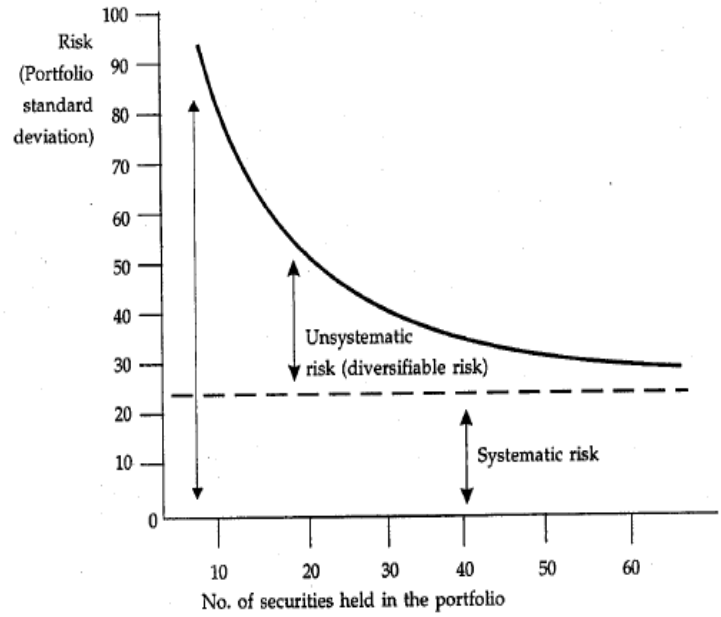
affecting all the companies. Unsystematic risk can be further subdivided into business risk and financial risk.

(i) **Business Risk:** Business risk emanates from sale and purchase of securities affected by business cycles, technological changes etc. Business cycles affect all types of securities viz. there is cheerful movement in boom due to bullish trend in stock prices whereas bearish trend in depression brings down fall in the prices of all types of securities. Flexible income securities are more affected than fixed rate securities during depression due to decline in their market price.

(ii) **Financial Risk:** It arises due to changes in the capital structure of the company. It is also known as leveraged risk and expressed in terms of debt-equity ratio. Excess of debt vis-à-vis equity in the capital structure indicates that the company is highly geared. Although a leveraged company's earnings per share are more but dependence on borrowings exposes it to the risk of winding-up for its inability to honour its commitments towards lenders/creditors. This risk is known as leveraged or financial risk of which investors should be aware of and portfolio managers should be very careful.

4.2 Diversion of Risk

As discussed above the total risk of an individual security consists of two risks systematic risk and unsystematic risk. It should be noted that by combining many securities in a portfolio the unsystematic risk can be avoided or cancelled out which is attached to any particular security. The following diagram depicts how the risk can be reduced with the increase in the number of securities.



From the above diagram it can be seen that total risk is reducing with the increase in the number of securities in the portfolio. However, ultimately when the size of the portfolio reaches certain limit, it will contain only the systematic risk of securities included in the portfolio.

4.3 Risk & Return

It is very common that an intelligent investor would attempt to anticipate the kind of risk that he/she is likely to face and would also attempt to estimate the extent of risk associated with different investment proposals. In other words an attempt is made by him/her to measure or quantify the risk of each investment under consideration before making the final selection. Thus quantification of risk is necessary for analysis of any investment.

As risk is attached with return its risk cannot be measured without reference to return. The return, in turn, depends on the cash inflows to be received from the investment. Let us take an example of purchase of a share. With an investment in an equity share, an investor expects to receive future dividends declared by the company. In addition, he expects to receive capital gain in the form of difference between the selling price and purchase price, when the share is finally sold.

Suppose a share of X Ltd. is currently selling at ₹ 12.00. An investor who is interested in the share anticipates that the company will pay a dividend of ₹ 0.50 in the next year. Moreover, he expects to sell the share at ₹ 17.50 after one year. The expected return from the investment in share will be as follows:

$$R = \frac{\text{Forecasted dividend} + \text{Forecasted end of the period stock price}}{\text{Initial investment}} - 1$$

$$R = \frac{₹\ 0.50 + ₹\ 17.50}{₹\ 12.00} - 1 = 0.5 \text{ or } 50 \text{ per cent}$$

It is important to note that here the investor expects to get a return of 50 per cent in the future, which is uncertain. It might be possible that the dividend declared by the company may turn out to be either more or less than the figure anticipated by the investor. Similarly, the selling price of the share may be less than the price expected by the investor at the time of investment. It may sometimes be even more. Hence, there is a possibility that the future return may be more than 50 per cent or less than 50 per cent. Since the future is uncertain the investor has to consider the probability of several other possible returns. The expected returns may be 20 per cent, 30 per cent, 50 per cent, 60 per cent or 70 per cent. The investor now has to assign the probability of occurrence of these possible alternative returns as given below:

Possible returns (in per cent) X_i	*Probability of occurrence* $p(X_i)$
20	0.20
30	0.20
50	0.40
60	0.10
70	0.10

The above table gives the probability distribution of possible returns from an investment in shares. Such distribution can be developed by the investor with the help of analysis of past data and modifying it appropriately for the changes he expects to occur in a future period of time.

With the help of available probability distribution two statistical measures one expected return and the other risk of the investment can be calculated.

4.3.1 Expected Return

The expected return of the investment is the probability weighted average of all the possible returns. If the possible returns are denoted by X_i and the related probabilities are $p(X_i)$ the expected return may be represented as $\overline{X}$ and can be calculated as:

$$\overline{X} = \sum_{i=1}^{n} x_i \, p(X_i)$$

It is the sum of the products of possible returns with their respective probabilities.

The expected return of the share in the example given above can be calculated as shown below:

Calculation of Expected Return

Possible returns(%) X_i	*Probability* $p(X_i)$	$X_i \, p(X_i)$
20	0.20	4.00
30	0.20	6.00
40	0.40	16.00
50	0.10	5.00
60	0.10	6.00
	$\sum_{i=1}^{n} x_i \, p(X_i)$	37.00

Hence the expected return is 37 per cent

4.3.2 Risk

As risk is attached with every return hence calculation of only expected return is not sufficient for decision making. Therefore risk aspect should also be considered along with the expected return. The most popular measure of risk is the variance or standard deviation of the probability distribution of possible returns.

Variance of each security is generally denoted by σ^2 and is calculated by using the following formula:

$$\sum_{i=1}^{n} [(X_i - \bar{X})^2 \, p(X_i)]$$

Continuing our earlier example the following table provides calculations required to calculate the risk i.e. Variance or Standard Deviation (SD).

Possible returns X_i (%)	*Probability $p(X_j)$*	*Deviation $(X_i - \bar{X})$*	*Deviation squared $(X_i - \bar{X})^2$*	Product $(X_i - \bar{X})^2 \, p(X_j)$
20	0.20	-17.00	289.00	57.80
30	0.20	-7.00	49.00	9.80
40	0.40	3.00	9.00	3.60
50	0.10	13.00	169.00	16.90
60	0.10	23.00	529.00	52.90
			Var (σ^2)	141.00

Variance = 141 per cent

Standard Deviation of the return will be the positive square root of the variance and is generally represented by σ. Accordingly, the standard deviation of return in the above example will be $\sqrt{141}$ = 11.87%.

The basic purpose to calculate the variance and standard deviation is to measure the extent of variability of possible returns from the expected return. Several other measures such as range, semi-variance and mean absolute deviation can also be used to measure risk, but standard deviation has been the most popularly accepted measure.

The method described above is widely used for assessing risk and is also known as the mean variance approach.

The standard deviation or variance, however, provides a measure of the total risk associated with a security. As we know, the total risk comprises two components, namely systematic risk and unsystematic risk. Unsystematic risk is the risk specific or unique to a company. Unsystematic risk associated with the security of a particular company can be eliminated/reduced by combining it with another security having negative correlation. This process is known as diversification of unsystematic risk. As a means of diversification the investment is spread over a group of securities with different characteristics. This collection of diverse securities is called a portfolio.

As unsystematic risk can be reduced or eliminated through diversification, it is not very important for an investor to consider. The risk that is relevant in investment decisions is the systematic risk

because it is not diversifiable. Hence, the main interest of the investor lies in the measurement of systematic risk of a security.

4.3.3 Measurement of Systematic Risk

As discussed earlier, systematic risk is the variability in security returns caused by changes in the economy or the market and all securities are affected by such changes to some extent. Some securities exhibit greater variability in response to market changes and some may exhibit less response. Securities that are more sensitive to changes in factors are said to have higher systematic risk. The average effect of a change in the economy can be represented by the change in the stock market index. The systematic risk of a security can be measured by relating that security's variability vis-à-vis variability in the stock market index. A higher variability would indicate higher systematic risk and vice versa.

The systematic risk of a security is measured by a statistical measure which is called Beta The main input data required for the calculation of beta of any security are the historical data of returns of the individual security and corresponding return of a representative market return (stock market index). There are two statistical methods i.e. correlation method and the regression method, which can be used for the calculation *of* Beta.

4.3.3.1 Correlation Method : Using this method beta (β) can be calculated from the historical data of returns by the following formula:

$$\beta_i = \frac{r_{im}\sigma_i\sigma_m}{\sigma_m^2}$$

Where

r_{im} = Correlation coefficient between the returns of the stock i and the returns of the market index.

σ_i = Standard deviation *of* returns of stock *i*

σ_m = Standard deviation of returns of the market index.

σ_m^2 = Variance of the market returns

4.3.3.2 Regression Method : The regression model is based on the postulation that there exists a linear relationship between a dependent variable and an independent variable. The model helps to calculate the values of two constants, namely alfa (*α)* and beta (*β).* β measures the change in the dependent variable in response to unit change in the independent variable, while *α* measures the value *of* the dependent variable even when the independent variable has zero value. The formula of the regression equation is as follows:

$$Y = \alpha + \beta X$$

where

Y = Dependent variable

X = Independent variable

α and β are constants.

$$\alpha = Y - \beta X$$

The formula used for the calculation of α and β are given below.

$$\beta = \frac{n\sum XY - (\sum X)(\sum Y)}{n\sum X^2 \quad (\sum X)^2}$$

where

n = Number of items.

Y = Dependent variable scores.

X = Independent variable scores.

For the purpose of calculation of β, the return of the individual security is taken as the dependent variable and the return of the market index is taken as the independent variable. The regression equation is represented as follows:

$R_i = \alpha + \beta_i R_m$

where

R_i = Return of the individual security.

R_m = Retum of the market index.

α = Estimated return of the security when the market is stationary.

β_i = Change in the return of the individual security in response to unit change in the return of the market index. It is, thus, the measure of systematic risk of a security.

Here it is very important to note that a security can have betas that are positive, negative or zero.

- Positive Beta- indicates that security's return is dependent on the market return and moves in the direction in which market moves.
- Negative Beta- indicates that security's return is dependent on the market return but moves in the opposite direction in which market moves.
- Zero Beta- indicates that security's return is independent of the market return.

Further as beta measures the volatility of a security's returns relative to the market, the larger the beta, the more volatile the security. A beta of 1.0 indicates a security of average risk. A stock with

beta greater than 1.0 has above average risk i.e. its returns would be more volatile than the market returns. For example, when market returns move up by 6%, a stock with beta of 2 would find its returns moving up by 12% (i.e. 6% x 2). Similarly, decline in market returns by 6% would produce a decline of 12% (i.e. 6% x 2) in the return of that security.

A stock with beta less than 1.0 would have below average risk. Variability in its returns would be less than the market variability.

Beta is calculated from historical data of returns to measure the systematic risk of a security. It is a historical measure of systematic risk. In using this beta for investment decision making, the investor is assuming that the relationship between the security variability and market variability will continue to remain the same in future also.

4.4 Portfolio Analysis

Till now we have discussed the risk and return of a single security. Let us now discuss the return and risk of a portfolio of securities.

4.4.1 Portfolio Return

For a portfolio analysis an investor first needs to specify the list of securities eligible for selection or inclusion in the portfolio. Then he has to generate the risk-return expectations for these securities. The expected return for the portfolio is expressed as the mean of its rates of return over the time horizon under consideration and risk for the portfolio is the variance or standard deviation of these rates of return around the mean return.

The expected return of a portfolio of assets is simply the weighted average of the returns of the individual securities constituting the portfolio. The weights to be applied for calculation of the portfolio return are the fractions of the portfolio invested in such securities.

Let us consider a portfolio of two equity shares A and B with expected returns of 16 per cent and 22 per cent respectively.

The formula for the calculation of expected portfolio return may be expressed as shown below:

$$\bar{r}_p = \sum_{i=1}^{n} x_i \bar{r}_i$$

$\bar{r}_p$ = Expected return of the portfolio.

X_i = Proportion of funds invested in security

$\bar{r}_i$ = Expected return of security i.

n = Number of securities in the portfolio.

If 40 per cent of the total funds is invested in share A and the remaining 60 per cent in share B, then the expected portfolio return will be:

(0.40 x 16) + (0.60 x 22) = 19.6 per cent

4.4.2 Portfolio Risk

As discussed earlier, the variance of return and standard deviation of return are statistical measures that are used for measuring risk in investment. The variance of a portfolio can be written down as the sum of 2 terms, one containing the aggregate of the weighted variances of the constituent securities and the other containing the weighted co-variances among different pairs of securities.

Covariance (a statistical measure) between two securities or two portfolios or a security and a portfolio indicates how the rates of return for the two concerned entities behave relative to each other.

The covariance between two securities A and B may be calculated using the following formula:

$$COV_{AB} = \frac{\sum [R_A - \overline{R_A}][R_B - \overline{R_B}]}{N}$$

At the beginning please add the summation sign in the numerator

where

COV_{AB} = Covariance between *x* and y.

R_A = Return of security *x*.

R_B = Return of security *y*.

$\overline{R_A}$ = Expected or mean return of security *x*.

$\overline{R_B}$ = Expected or mean return of security *y*.

N = Number of observations.

The calculation of covariance can be understood with the help of following table:

Calculation of Covariance

Year	R_X	Deviation $Rx - \overline{R_x}$	R_Y	Deviation $R_Y - \overline{R_Y}$	$[R_x - \overline{R_x}][R_y - \overline{R_y}]$
1	11	-4	18	5	-20
2	13	-2	14	1	-2
3	17	2	11	-2	-4
4	19	4	9	-4	-16
	$\overline{R_x}$ = 15		$\overline{R_y}$ =13		-42

$$Cov_{xy} = \frac{\sum_{i=1}^{n} [R_x - \overline{R_x}][R_y - \overline{R_y}]}{n} = \frac{-42}{4} = -10.5$$

From the above table it can be seen that the covariance is a measure of how returns of two securities move together. In case the returns of the two securities move in the same direction consistently the covariance is said to be positive (+). Contrarily, if the returns of the two securities move in opposite directions consistently the covariance would be negative (-). If the movements of returns are independent of each other, covariance would be close to zero (0).

The coefficient of correlation is expressed as:

$$r_{AB} = \frac{Cov_{AB}}{\sigma_A \sigma_B}$$

where

r_{AB} = Coefficient of correlation between x and y.

Cov_{AB} = Covariance between A and B.

σ_A= Standard deviation of A.

σ_B = Standard deviation of B.

It may be noted on the basis of above formula the covariance can be expressed as the product of correlation between the securities and the standard deviation of each of the securities as shown below:

$$Cov_{AB} = \sigma_A \sigma_B r_{AB}$$

It is very important to note that the correlation coefficients may range from -1 to 1. A value of -1 indicates perfect negative correlation between the two securities' returns, while a value of +1 indicates a perfect positive correlation between them. A value of zero indicates that the returns are independent.

The calculation of the variance (or risk) of a portfolio is not simply a weighted average of the variances of the individual securities in the portfolio as in the calculation of the return of portfolio. The variance of a portfolio with only two securities in it can be calculated with the following formula.

$$\sigma_p^2 = x_1^2\sigma_1^2 + x_2^2\sigma_2^2 + 2x_1x_2(r_{12}\sigma_1\sigma_2)$$

where

σ_p^2 = Portfolio variance.

x_1 = Proportion of funds invested in the first security.

x_2 = Proportion of funds invested in the second security ($x_1+x_2 = 1$).

σ_1^2 = Variance of first security.

σ_2^2 = Variance of second security.

σ_1 = Standard deviation of first security.

σ_2 = Standard deviation of second security.

r_{12} = Correlation coefficient between the returns of the first and second securities.

As the standard deviation is the square root of the variance the portfolio standard deviation can be obtained by taking the square root of portfolio variance.

Let us take an example to understand the calculation of portfolio variance and portfolio standard deviation. Two securities A and B generate the following sets of expected returns, standard deviations and correlation coefficient:

	A	B
$\bar{r}$ =	20%	25%
σ =	50%	30%
r_{ab}=		-0.60

Now suppose a portfolio is constructed with 40 per cent of funds invested in A and the remaining 60 per cent of funds in B (i.e. P = 0.4A + 0.6B).

Using the formula of portfolio return the expected return of the portfolio will be:

R_P= (0.40 x 20) + (0.60 x 25) = 23%

And the Variance and Standard Deviation of the portfolio will be:

Variance

$\sigma_p^2 = (0.40)^2 (50)^2 + (0.60)^2 (30)^2 + 2(0.40)(0.60)(- 0.60)(50)(30) = 400 + 324 - 432 = 292$

Standard deviation

$\sigma_p = \sqrt{292} = 17.09$ per cent.

The return and risk of a portfolio depends on following two sets of factors:

(a) Returns and risks of individual securities and the covariance between securities forming the portfolio

(b) Proportion of investment in each of securities.

As the first set of factors is parametric in nature for the investor in the sense that he has no control over the returns, risks and co-variances of individual securities. The second set of factors is choice factor or variable for the investors in the sense that they can choose the proportions of each security in the portfolio.

4.4.3 Reduction or dilution of Portfolio Risk through Diversification

The process of combining more than one security in to a portfolio is known as diversification. The main purpose of this diversification is to reduce the total risk by eliminating or substantially mitigating the unsystematic risk, without sacrificing portfolio return. As shown in the example mentioned above, diversification has helped to reduce risk. The portfolio standard deviation of 17.09 is lower than the standard deviation of either of the two securities taken separately which were 50 and 30 respectively. Incidentally, such risk reduction is possible even when the two constituent securities are uncorrelated. In case, however, these have the maximum positive correlation between them, no reduction of risk can be achieved.

In order to understand the mechanism and power of diversification, it is necessary to consider the impact of covariance or correlation on portfolio risk more closely. We shall discuss following three cases taking two securities in the portfolio:

(a) Securities' returns are perfectly positively correlated,

(b) Securities' returns are perfectly negatively correlated, and

(c) Securities' returns are not correlated i.e. they are independent.

4.4.3.1 Perfectly Positively Correlated : In case two securities returns are perfectly positively correlated the correlation coefficient between these securities will be +1 and the returns of these securities then move up or down together.

The variance of such portfolio can be calculated by using the following formula:

$$\sigma_p^2 = x_1^2\sigma_1^2 + x_2^2\sigma_2^2 + 2x_1x_2r_{12}\sigma_1\sigma_2$$

As r_{12} = 1, this may be rewritten as:

$$\sigma_p^2 = x_1^2\sigma_1^2 + x_2^2\sigma_2^2 + 2x_1x_2\sigma_1\sigma_2$$

or

$$\sigma_p^2 = (x_1\sigma_1 + x_2\sigma_2)^2$$

Hence Standard Deviation will become

$$\sigma_p = x_1\sigma_1 + x_2\sigma_2$$

In other words this is simply the weighted average of the standard deviations of the individual securities.

Taking the above example we shall now calculate the portfolio standard deviation when correlation coefficient is +1.

Standard deviation of security A = 40

Standard deviation of security B = 25

Proportion of investment in A = 0.4

Proportion of investment in B = 0.6

Correlation coefficient = +1.0

Portfolio standard deviation maybe calculated as:

σ_p = (0.4) (40) + (0.6) (25) = 31

Thus it can be seen that the portfolio standard deviation will lie between the standard deviations of the two individual securities. It will vary between 40 and 25 as the proportion of investment in each security changes.

Now suppose, if the proportion of investment in A and B are changed to 0.75 and 0.25 respectively; portfolio standard deviation of the portfolio will become:

σ_p = (0.75) (40)+ (0.25) (25) = 36.25

It is important to note that when the security returns are perfectly positively correlated, diversification provides only risk averaging and no risk reduction because the portfolio risk cannot be reduced below the individual security risk. Hence, reduction of risk is not achieved when the constituent securities' returns are perfectly positively correlated.

4.4.3.2 Perfectly Negatively Correlated : When two securities' returns are perfectly negatively correlated, two returns always move in exactly opposite directions and correlation coefficient between them becomes -1. The variance of such negatively correlated portfolio may be calculated as:

$$\sigma_p^2 = x_1^2\sigma_1^2 + x_2^2\sigma_2^2 - 2x_1x_2\left(r_{12}\sigma_1\sigma_2\right)$$

As r_{12} = -1, this may be rewritten as:

$$\sigma_p^2 = \left(x_1\sigma_1 - x_2\sigma_2\right)^2$$

Hence Standard Deviation will become

$$\sigma_p = x_1\sigma_1 - x_2\sigma_2$$

Taking the above example we shall now calculate the portfolio standard deviation when correlation coefficient is -1.

$$\sigma_p = (0.4)(40) - (0.6)(25) = 1$$

Thus from above it can be seen that the portfolio risk has become very low in comparison of risk of individual securities. By changing the weights it can even be reduced to zero. For example, if the proportion of investment in A and B are 0.3846 and 0.6154 respectively, portfolio standard deviation becomes:

$$= (0.3846)(40) - (0.6154)(25) = 0$$

Although in above example the portfolio contains two risky assets, the portfolio has no risk at all. Thus, the portfolio may become entirely risk-free when security returns are perfectly negatively correlated. Therefore, diversification can substantially reduce or even eliminate risk when securities are perfectly negatively correlated, . However, in real life it is very rare to find securities that are perfectly negatively correlated.

4.4.3.3 Returns are uncorrelated or independent : When the returns of two securities are entirely uncorrelated, the coefficient of correlation of these two securities would be zero and the formula for portfolio variance will be as follows:

$$\sigma_p^2 = x_1^2\sigma_1^2 + x_2^2\sigma_2^2 + 2x_1x_2r_{12}\sigma_1\sigma_2$$

As $r_{12} = 0$, this may be rewritten as:

$$\sigma_p^2 = x_1^2\sigma_1^2 + x_2^2\sigma_2^2$$

Hence Standard Deviation will become

$$\sigma_p = \sqrt{x_1^2\sigma_1^2 + x_2^2\sigma_2^2}$$

Taking the above example we shall now calculate the portfolio standard deviation when correlation coefficient is 0.

$$\sigma_p = \sqrt{(0.4)^2\,(40)^2 + (0.6)^2(25)^2}$$

$$\sigma_p = \sqrt{256 + 225}$$

$$\sigma_p = 21.93$$

Thus it can be observed that the portfolio standard deviation is less than the standard deviations of individual securities in the portfolio. Therefore, when security returns are uncorrelated, diversification can reduce risk .

We may now tabulate the portfolio standard deviations of our illustrative portfolio having two securities A and B, for different values of correlation coefficients between them. The proportion of investments in A and B are 0.4 and 0.6 respectively. The individual standard deviations of A and B are 40 and 25 respectively.

Portfolio Standard Deviations

Correlation coefficient	*Portfolio Standard Deviation*
1.00	31
0.60	27.73
0	21.93
-0.60	13.89
-1.00	1.00

Summarily it can be concluded that diversification reduces risk in all cases except when the security returns are perfectly positively correlated. With the decline of correlation coefficient from +1 to -1, the portfolio standard deviation also declines. But the risk reduction is greater when the security returns are negatively correlated.

4.4.4 Portfolio with more than two securities

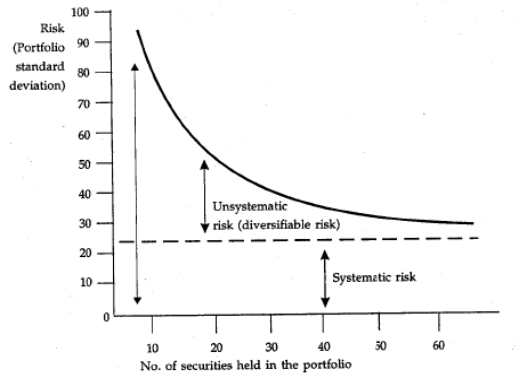
So far we have considered a portfolio with only two securities. The benefits from diversification increase as more and more securities with less than perfectly positively correlated returns are included in the portfolio. As the number of securities added to a portfolio increases, the standard deviation of the portfolio becomes smaller and smaller. Hence, an investor can make the portfolio risk arbitrarily small by including a large number of securities with negative or zero correlation in the portfolio.

But, in reality, no securities show negative or even zero correlation. Typically, securities show some positive correlation, that is above zero but less than the perfectly positive value (+1). As a result, diversification (that is, adding securities to a portfolio) results in some reduction in total portfolio risk but not in complete elimination of risk. Moreover, the effects of diversification are exhausted fairly rapidly. That is, *most* of the reduction in portfolio standard deviation occurs by the time the portfolio size increases to 25 or 30 securities. Adding securities beyond this size brings about only marginal reduction in portfolio standard deviation.

Adding securities to a portfolio reduces risk because securities are not perfectly positively correlated. But the effects of diversification are exhausted rapidly because the securities are still positively correlated to each other though not perfectly correlated. Had they been negatively correlated, the portfolio risk would have continued to decline as portfolio size increased. Thus, in practice, the benefits of diversification are limited.

The total risk of an individual security comprises two components, the market related risk called systematic risk and the unique risk of that particular security called unsystematic risk. By combining securities into a portfolio the unsystematic risk specific to different securities is cancelled out.

Consequently, the risk of the portfolio as a whole is reduced as the size of the portfolio increases. Ultimately when the size of the portfolio reaches a certain limit, it will contain only the systematic risk of securities included in the portfolio. The systematic risk, however, cannot be eliminated. Thus, a fairly large portfolio has only systematic risk and has relatively little unsystematic risk. That is why there is no gain in adding securities to a portfolio beyond a certain portfolio size. Following figure depicts the diversification of risk in a portfolio.



The figure shows the portfolio risk declining as the number of securities in the portfolio increases, but the risk reduction ceases when the unsystematic risk is eliminated.

4.4.5 Calculation of Return and Risk of Portfolio with more than two securities

The expected return of a portfolio is the weighted average of the returns of individual securities in the portfolio, the weights being the proportion of investment in each security. The formula for calculation of expected portfolio return is the same for a portfolio with two securities and for portfolios with more than two securities. The formula is:

$$\bar{r}_p = \sum_{i=1}^{n} x_i \bar{r}_i$$

Where

$\bar{r}_p$ = Expected return of portfolio.

x_i = Proportion of funds invested in each security.

$\bar{r}_i$ = Expected return of each security.

n = Number of securities in the portfolio.

Let us consider a portfolio with four securities having the following characteristics:

Security	*Returns (per cent)*	*Proportion of investment*
P	11	0.3

Q	16	0.2
R	22	0.1
S	20	0.4

The expected return of this portfolio may be calculated using the formula:

$\overline{r_p}$ = (0.3)(11) + (0.2)(16) + (0.1)(22) + (0.4)(20)

= 16.7 per cent

The portfolio variance and standard deviation depend on the proportion of investment in each security as also the variance and covariance of each security included in the portfolio.

The formula for portfolio variance of a portfolio with more than two securities is as follows:

$$\sigma_p^2 = \sum_{i=1}^{n}\sum_{j=1}^{n} x_i x_j \sigma_{ij}$$

where

σ_p^2 = Portfolio variance.

x_i = Proportion of funds invested in security i (the first of a pair of securities).

x_j = Proportion of funds invested in security j (the second of a pair of securities).

σ_{ij} = The covariance between the pair of securities i and j

n = Total number of securities in the portfolio.

or

$$\sigma_p^2 = \sum_{i=1}^{n}\sum_{i=1}^{n} x_i x_j \sigma_i \sigma_j r_{ij}$$

where

σ_p^2 = Portfolio variance.

σ_i = Standard Deviation of security i

σ_j = Standard Deviation of security j

r_{ij} = The co-efficient of correlation between the pair of securities i and j

Let us take the following example to understand how we can compute the risk of multiple asset portfolio.

Security	x_i	σ_i	Correlation Coefficient
X	0.25	16	X and Y = 0.7
Y	0.35	7	X and Z = 0.3
Z	0.40	9	Y and Z = 0.4

It may be noted that correlation coefficient between X and X, Y and Y, Z and Z is 1.

A convenient way to obtain the result is to set up the data required for calculation in the form of a variance-covariance matrix.

As per data given in the example, the first cell in the first row of the matrix represents X and X the second cell in the first row represents securities X and Y, and so on. The variance or covariance in each cell has to be multiplied by the weights of the respective securities represented by that cell. These weights are available in the matrix at the left side of the row and the top of the column containing the cell.

This process may be started from the first cell in the first row and continued for all the cells till the last cell of the last row is reached as shown below:

↓ Weights →		0.25	0.35	0.40
		X	Y	Z
0.25	X	1 x 16 x 16	0.7 x 16 x 7	0.3 x 16 x 9
0.35	Y	0.7 x 7 x 16	1 x 7 x 7	0.4 x 7 x 9
0.40	Z	0.3 x 9 x 16	0.4 x 9 x 7	1 x 9 x 9

Once the variance-covariance matrix is set up, the computation of portfolio variance is a comparatively simple operation. Each cell in the matrix represents a pair of two securities.

When all these products are summed up, the resulting figure is the portfolio variance. The square root *of* this figure gives the portfolio standard deviation.

Thus the variance *of* the portfolio given in the example above can now be calculated.

σ_p^2 = (0.25 x 0.25 x 1 x 16 x 16) + (0.25 x 0.35 x 0.7 x 16 x 7) + (0.25 x 0.40 x 0.3 x 16 x 9) + (0.35 x 0.25 x 0.7 x 7 x 16) + (0.35 x 0.35 x 1 x 7 x 7) + (0.35 x 0.40 x 0.4 x7 x 9) + (0.40 x 0.25 x 0.3 x 9 x 16) + (0.40 x 0.35 x 0.4 x 9 x 7) + (0.40 x 0.40 x 1 x 9 x 9)

= 16+6.86+4.32+6.86+6.0025+3.528+4.32+3.528+12.96 = 64.3785

The portfolio standard deviation is:

$\sigma_p = \sqrt{64.3785} = 8.0236$

Hence, the formula for computing portfolio variance may also be stated as follows:

$$\sigma_p^2 = \sum_{i=1}^{n}\sum_{j=1}^{n} x_i x_j r_{ij} \sigma_i \sigma_j$$

Thus from above discussion it can be said that a portfolio is a combination of assets. *From* a given set of *'n'* securities, any number of portfolios can be created. These portfolios may comprise of *two* securities, three securities, all the way up to *'n'* securities. A portfolio may contain the same securities as another portfolio but with different weights. A new portfolios can be created either by changing the securities in the portfolio or by changing the proportion of investment in the existing securities.

Thus summarily it can be concluded that each portfolio is characterized by its expected return and risk. Determination of expected return and risk (variance or standard deviation) of each portfolio that can be used to create a set of selected securities which is the first step in portfolio management and called portfolio analysis.

5. MARKOWITZ MODEL OF RISK-RETURN OPTIMIZATION

The portfolio selection problem can be divided into two stages, (1) finding the mean-variance efficient portfolios and (2) selecting one such portfolio. Investors do not like risk and the greater the riskiness of returns on an investment, the greater will be the returns expected by investors. There is a tradeoff between risk and return which must be reflected in the required rates of return on investment opportunities. The standard deviation (or variance) of return measures the total risk of an investment. It is not necessary for an investor to accept the total risk of an individual security. Investors can and do diversify to reduce risk. As number of holdings approach larger, a good deal of total risk is removed by diversification.

5.1 Assumptions of the Model

It is a common phenomenon that the diversification of investments in the portfolio leads to reduction in variance of the return, even for the same level of expected return. This model has taken into account risks associated with investments - using variance or standard deviation of the return. This model is based on the following assumptions. :

(i) The return on an investment adequately summarises the outcome of the investment.

(ii) The investors can visualise a probability distribution of rates of return.

(iii) The investors' risk estimates are proportional to the variance of return they perceive for a security or portfolio.

(iv) Investors base their investment decisions on two criteria i.e. expected return and variance of return.

(v) All investors are risk averse. For a given expected return he prefers to take minimum risk, for a given level of risk the investor prefers to get maximum expected return.

(vi) Investors are assumed to be rational in so far as they would prefer greater returns to lesser ones given equal or smaller risk and are risk averse. Risk aversion in this context means merely that, as between two investments with equal expected returns, the investment with the smaller risk would be preferred.

(vii) 'Return' could be any suitable measure of monetary inflows like NPV but yield has been the most commonly used measure of return, so that where the standard deviation of returns is referred to it is meant the standard deviation of yield about its expected value.

5.2 Efficient Frontier

Markowitz has formalised the risk return relationship and developed the concept of efficient frontier. For selection of a portfolio, comparison between combinations of portfolios is essential. As a rule, a portfolio is not efficient if there is another portfolio with:

(a) A higher expected value of return and a lower standard deviation (risk).

(b) A higher expected value of return and the same standard deviation (risk)

(c) The same expected value but a lower standard deviation (risk)

Markowitz has defined the diversification as the process of combining assets that are less than perfectly positively correlated in order to reduce portfolio risk without sacrificing any portfolio returns. If an investors' portfolio is not efficient he may:

(i) Increase the expected value of return without increasing the risk.

(ii) Decrease the risk without decreasing the expected value of return, or

(iii) Obtain some combination of increase of expected return and decrease risk.

This is possible by switching to a portfolio on the efficient frontier.

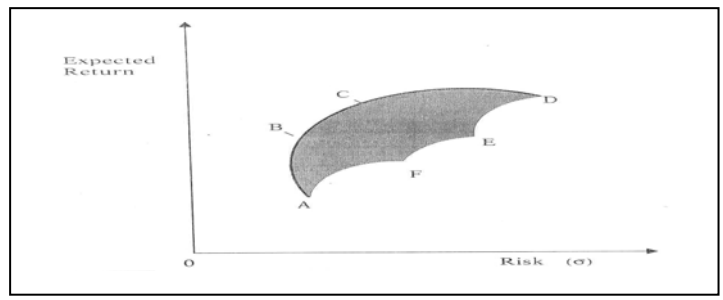


Fig. 1: Markowitz Efficient Frontier

If all the investments are plotted on the risk-return space, individual securities would be dominated by portfolios, and the efficient frontier would be containing all Efficient Portfolios (An Efficient

Portfolio has the highest return among all portfolios with identical risk and the lowest risk among all portfolios with identical return). Fig – 1 depicts the boundary of possible investments in securities, A, B, C, D, E and F; and B, C, D, are lying on the efficient frontier.

The best combination of expected value of return and risk (standard deviation) depends upon the investors' utility function. The individual investor will want to hold that portfolio of securities which places him on the highest indifference curve, choosing from the set of available portfolios. The dark line at the top of the set is the line of efficient combinations, or the efficient frontier. The optimal portfolio for an investor lies at the point where the indifference curve for the concerned investor touches the efficient frontier. This point reflects the risk level acceptable to the investor in order to achieve a desired return and provide maximum return for the bearable level of risk. The concept of efficient frontier and the location of the optimal portfolio are explained with help of Fig-2.

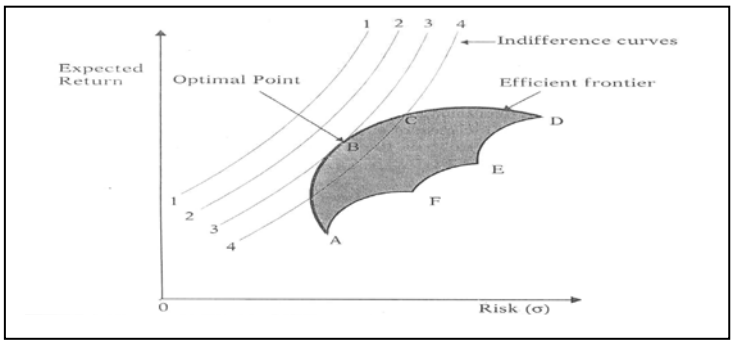


Fig. 2 : Optimal Investment under Markowitz Model

In Fig-2 A, B, C, D, E and F define the boundary of all possible investments out of which investments in B, C and D are the efficient portfolios lying on the efficient frontier. The attractiveness of the investment proposals lying on the efficient frontier depends on the investors' attitude to risk. At point B, the level of risk and return is at optimum level. The returns are highest at point D, but simultaneously it carries higher risk than any other investment.

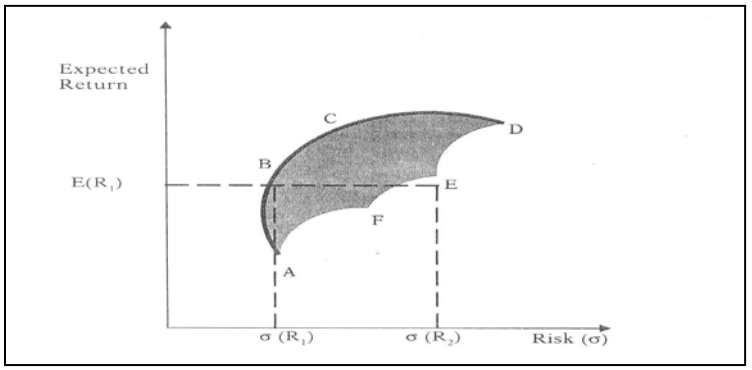


Fig.3 : Selection of Portfolios

The shaded area represents all attainable or feasible portfolios, that is all the combinations of risk and expected return which may be achieved with the available securities. The efficient frontier contains all possible efficient portfolios and any point on the frontier dominates any point to the right of it or below it.

Consider the portfolios represented by points B and E. B and E promise the same expected return E (R_1) but the risk associated with B is σ (R_1) whereas the associated with E is σ (R_2). Investors, therefore, prefer portfolios on the efficient frontier rather than interior portfolios given the assumption of risk aversion; obviously, point A on the frontier represents the portfolio with the least possible risk, whilst D represents the portfolio with the highest possible rate of return with highest risk.

The investor has to select a portfolio from the set of efficient portfolios lying on the efficient frontier. This will depend upon his risk-return preference. As different investors have different preferences, the optimal portfolio of securities will vary from one investor to another.

6. CAPITAL MARKET THEORY

The above figure 2 portrays the relationship between risk and return for efficient portfolio graphically. Point B represents the market portfolio and if a line tangent to this point is drawn and extended upto y-axis the point at it will touch will be the riskless rate of interest.

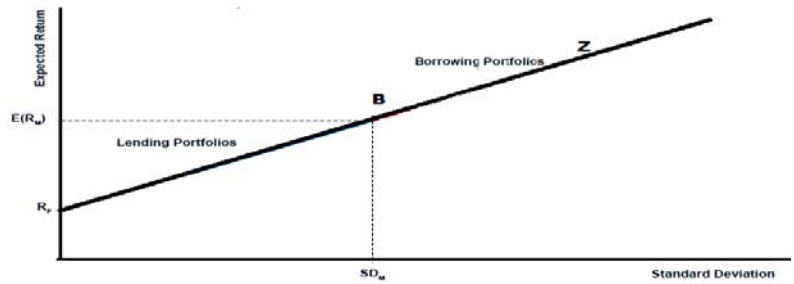


Fig.4 : Selection of Portfolios

Preferred investment strategies plot along line R_fBZ, representing alternative combinations of risk and return obtainable by combining the market portfolio with borrowing or lending. This is known as the Capital Market Line (CML). Portfolio lying on line from R_f to B shall be lending portfolio as it will involve some investment in risk-free securities and some investment in market portfolio. Portfolios lying from B to Z will be borrowing portfolio as it will investment in market portfolio by borrowing some amount.

The slope of the capital market line can be regarded as the reward per unit of risk borne and it is computed as follows:

$$\text{Slope} = \frac{R_M - R_f}{\sigma_M}$$

Where R_M = Market Return

R_f= Risk Free Rate of Return

σ_M = Standard Deviation of Market

From the Capital Market Line the expected return of a portfolio can be found as follows:

$$E(R) = R_f + \frac{R_M - R_f}{\sigma_M} \times \sigma_P$$

Where σ_P = Standard Deviation of Portfolio

7. CAPITAL ASSET PRICING MODEL (CAPM)

The CAPM distinguishes between risk of holding a single asset and holding a portfolio of assets. There is a trade off between risk and return. Modern portfolio theory concentrates on risk and stresses on risk management rather than on return management. Risk may be security risk involving danger of loss of return from an investment in a single financial or capital asset. Security risk differs from portfolio risk, which is the probability of loss from investment in a portfolio of assets. Portfolio risk is comprised of unsystematic risk and systematic risk. Unsystematic risks can be averted through diversification and is related to random variables. Systematic risk is market related component of portfolio risk. It is commonly measured by regression coefficient Beta or the Beta coefficient. Low Beta reflects low risk and high Beta reflects high risk.

As the unsystematic risk can be diversified by building a portfolio, the relevant risk is the non-diversifiable component of the total risk. As mentioned earlier, it can be measured by using Beta (β) a statistical parameter which measures the market sensitivity of returns. The beta for the market is equal to 1.0. Beta explains the systematic relationship between the return on a security and the return on the market by using a simple linear regression equation. The return on a security is taken as a dependent variable and the return on market is taken as independent variable then $R_j = R_f + \beta (R_m – R_f)$. The beta parameter β in this William Sharpe model represents the slope of the above regression relationship and measures the sensitivity or responsiveness of the security returns to the general market returns. The portfolio beta is merely the weighted average of the betas of individual securities included in the portfolio. Portfolio beta $\beta = \sum$ proportion of security × beta for security.

CAPM provides a conceptual framework for evaluating any investment decision where capital is committed with a goal of producing future returns. CAPM is based on certain assumptions to provide conceptual framework for evaluating risk and return. Some of the important assumptions are discussed below:

(i) ***Efficient market:*** It is the first assumption of CAPM. Efficient market refers to the existence of competitive market where financial securities and capital assets are bought and sold with full information of risk and return available to all participants. In an efficient market, the price

of individual assets will reflect a real or intrinsic value of a share as the market prices will adjust quickly to any new situation, John J. Hampton has remarked in "Financial decision making" that although efficient capital market is not much relevant to capital budgeting decisions, but CAPM would be useful to evaluate capital budgeting proposal because the company can compare risk and return to be obtained by investment in machinery with risk and return from investment in securities.

(ii) ***Rational investment goals:*** Investors desire higher return for any acceptable level of risk or the lowest risk for any desired level of return. Such a rational choice is made on logical and consistent ranking of proposals in order of preference for higher good to lower good and this is the scale of the marginal efficiency of capital. Beside, transactive preferences and certainty equivalents are other parameters of rational choice.

(iii) Risk aversion in efficient market is adhered to although at times risk seeking behaviour is adopted for gains.

(iv) CAPM assumes that all assets are divisible and liquid assets.

(v) Investors are able to borrow freely at a risk less rate of interest i.e. borrowings can fetch equal return by investing in safe Government securities.

(vi) Securities can be exchanged without payment of brokerage, commissions or taxes and without any transaction cost.

(vii) Securities or capital assets face no bankruptcy or insolvency.

Based on above assumptions the CAPM is developed with the main goal to formulate the return required by investors from a single investment or a portfolio of assets. The required rate of return is defined as the minimum expected return needed so that investors will purchase and hold an asset.

Risk and return relationship in this model stipulates higher return for higher level of risk and *vice versa*. However, there may be exception to this general rule where markets are not efficient.

Three aspects are worth consideration:

(a) Stock market is not concerned with diversifiable risk

(b) It is not concerned with an investor having a diversified portfolio

(c) Compensation paid is restricted to non-diversifiable risk.

Thus an investor has to look into the non-diversifiable portion of risk on one side and returns on the other side. To establish a link between the two, the required return one expects to get for a given level of risk has been mandated by the Capital Asset Pricing Model.

If the risk free investment R_f is 5%, an investor can earn this return of 5% by investing in risk free investment. Again if the stock market earns a rate of return R_m which is 15% then an investor investing in stocks constituting the stock market index will earn also 15%. Thus the excess return

earned over and above the risk free return is called the risk premium ($R_m - R_f$) ie (15% - 5%) = 10% which is the reward for undertaking risk, So, if an investment is as risky as the stock market, the risk premium to be earned is 10%.

If an investment is 30% riskier than the stock market, it would carry risk premium i.e. 30% more than the risk premium of the stock market i.e. 10% + 30% of 10% = 10% + 3% = 13%. β identifies how much more risky is an investment with reference to the stock market. Hence the risk premium that a stock should earn is β times the risk premium from the market [$\beta \times (R_m - R_f)$]. The total return from an investment is the risk free rate of return plus the risk premium. So the required return from a stock would be $R_j = R_f + [\beta \times (R_m - R_f)]$. In the above example 5% + 1.3 × (15-5) = 18%

The risk premium on a stock varies in direct proportion to its Beta. If the market risk premium is 6% and β of a stock is 1.2 then the risk premium for that stock is 7.2% (6% × 1.2) where ($R_m - R_f$) = 6% and β =1.2

Illustration 1

A company's beta is 1.40. The market return is 14%. The risk free rate is 10% (i) What is the expected return based on CAPM (ii) If the risk premium on the market goes up by 2.5% points, what would be the revised expected return on this stock?

Solution

(i) Computation of expected return based on CAPM

$R_j = R_f + \beta (R_m - R_f)$ = 10% + 1.40 (14% - 10%) = 10% + 5.6% = 15.6%

(ii) Computation of risk premium if the market goes up by 2.5 points

The return from the market goes up by 2.5% i.e. 14% + 2.5% = 16.5%

Expected Return based on CAPM is given by

R_j = 10% + 1.40 (16.5% - 10%) = 10% + 1.40 × 6.5% = 10% + 9.1% = 19.1%

7.1 Security Market Line

A graphical representation of CAPM is the Security Market Line, (SML). This line indicates the rate of return required to compensate at a given level of risk. Plotting required return on Y axis and Beta on the X-axis we get an upward sloping line which is given by ($R_m - R_f$), the risk premium.

The higher the Beta value of a security, higher would be the risk premium relative to the market. This upward sloping line is called the Security Market Line. It measures the relationship between systematic risk and return.

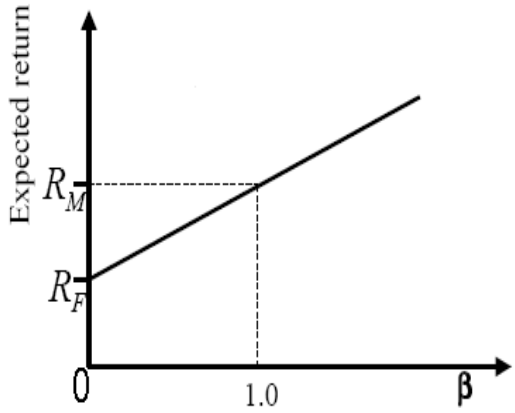


Illustration 2

The risk premium for the market is 10%. Assuming Beta values of 0, 0.25, 0.42, 1.00 and 1.67. Compute the risk premium on Security K.

Solution

Market Risk Premium is 10%

β Value of K	*Risk Premium of K*
0.00	0%
0.25	2.50%
0.42	4.20%
1.00	10.00%
1.67	16.70%

Illustration 3

Treasury Bills give a return of 5%. Market Return is 13% (i) What is the market risk premium (ii) Compute the β Value and required returns for the following combination of investments.

Treasury Bill	100	70	30	0
Market	0	30	70	100

Solution

Risk Premium $R_m – R_f$ = 13% - 5% = 8%

β is the weighted average investing in portfolio consisting of market β = 1 and treasury bills (β = 0)

Portfolio	*Treasury Bills: Market*	*β*	$R_j = R_f + \beta \times (R_m - R_f)$
1	100:0	0	5% + 0(13%-5%)=5%
2	70:30	0.7(0)+0.3(1)=0.3	5%+0.3(13%-5%)=7.40%
3	30:70	0.3(0)+0.7(1)=0.7	5%+0.7(13%-5%)=10.60%
4	0:100	1	5%+1.0(13%-5%)=13%

7.2 Risk free Rate of Return

In CAPM, there is only one risk free rate. It presumes that the returns on a security include both directed payments and capital appreciation. These require to be factored in judging the value of Beta and in computing the required rate of return.

Illustration 4

Pearl Ltd. expects that considering the current market prices, the equity share holders should get a return of at least 15.50% while the current return on the market is 12%. RBI has closed the latest auction for ₹ 2500 crores of 182 day bills for the lowest bid of 4.3% although there were bidders at a higher rate of 4.6% also for lots of less than ₹ 10 crores. What is Pearl Ltd's Beta?

Solution

Determining Risk free rate: Two risk free rates are given. The aggressive approach would be to consider 4.6% while the conservative approach would be to take 4.3%. If we take the moderate value then the simple average of the two i.e. 4.45% would be considered

Application of CAPM

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

$$15.50\% = 4.45\% + \beta (12\% - 4.45\%)$$

$$\beta = \frac{15.50\% - 4.45\%}{12\% - 4.45\%} = \frac{11.05}{7.55}$$

$$= 1.464$$

Illustration 5

The following information is available with respect of Jaykay Ltd.

Year	Jay Kay Limited		Market		Return on Govt. Bonds
	Average Share Price (₹)	DPS (₹)	Average Index	Dividend Yield (%)	
2002	242	20	1812	4	6
2003	279	25	1950	5	5

2004	305	30	2258	6	4
2005	322	35	2220	7	5

Compute Beta Value of the company as at the end of 2005. What is your observation?

Solution

Computation of Beta Value

Calculation of Returns

$$\text{Returns} = \frac{D_1 + (P_1 - P_0)}{P_0} \times 100$$

Year	*Returns*
2002 – 2003	$\frac{25 + (279 - 242)}{242} \times 100 = 25.62\%$
2003 – 2004	$\frac{30 + (305 - 279)}{279} \times 100 = 20.07\%$
2004 – 2005	$\frac{35 + (322 - 305)}{305} \times 100 = 17.05\%$

Calculation of Returns from market Index

Year	*% of Index Appreciation*	*Dividend Yield %*	*Total Return %*
2002 – 2003	$\frac{1950 - 1812}{1812} \times 100 = 7.62\%$	5%	12.62%
2003 – 2004	$\frac{2258 - 1950}{1950} \times 100 = 15.79\%$	6%	21.79%
2004 – 2005	$\frac{2220 - 2258}{2258} \times 100 = (-)1.68\%$	7%	5.32%

Computation of Beta

Year	*X*	*Y*	*XY*	Y^2
2002-2003	25.62	12.62	323.32	159.26
2003-2004	20.07	21.79	437.33	474.80
2004-2005	17.05	5.32	90.71	28.30
	62.74	39.73	851.36	662.36

$$\bar{X} = \frac{62.74}{3} = 20.91,\ \bar{Y} = \frac{39.73}{3} = 13.24$$

$$\beta = \frac{\sum XY - n\bar{X}\bar{Y}}{\sum Y^2 - n\bar{Y}^2}$$

$$= \frac{851.36 - 3(20.91)(13.24)}{662.36 - 3(13.24)^2}$$

$$= \frac{851.36 - 830.55}{662.36 - 525.89} = \frac{20.81}{136.47} = 0.15$$

7.3 Under Valued and Over Valued Stocks

The CAPM model can be practically used to buy, sell or hold stocks. CAPM provides the required rate of return on a stock after considering the risk involved in an investment. Based on current market price or any other judgmental factors (benchmark) one can identify as to what would be the expected return over a period of time. By comparing the required return with the expected return the following investment decisions are available

(a) **When CAPM < Expected Return – Buy:** This is due to the stock being undervalued i.e. the stock gives more return than what it should give.

(b) **When CAPM > Expected Return – Sell:** This is due to the stock being overvalued i.e. the stock gives less return than what it should give.

(c) **When CAPM = Expected Return – Hold:** This is due to the stock being correctly valued i.e. the stock gives same return than what it should give.

From another angle, if the current market price is considered as a basis of CAPM then:

(i) Actual Market Price < CAPM, stock is undervalued

(ii) Actual market Price > CAPM, stock is overvalued

(iii) Actual market Price = CAPM, stock is correctly valued.

Illustration 6

The expected returns and Beta of three stocks are given below

Stock	A	B	C
Expected Return (%)	18	11	15
Beta Factor	1.7	0.6	1.2

If the risk free rate is 9% and the expected rate of return on the market portfolio is 14% which of the above stocks are over, under or correctly valued in the market? What shall be the strategy?

Solution

Required Rate of Return is given by

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

For Stock A, $R_j = 9 + 1.7 (14 - 9) = 17.50\%$

Stock B, $R_j = 9 + 0.6 (14-9) = 12.00\%$

Stock C, $R_j = 9 + 1.2 (14-9) = 15.00\%$

Required Return %	*Expected Return %*	*Valuation*	*Decision*
17.50%	18.00%	Under Valued	Buy
12.00%	11.00%	Over Valued	Sell
15.00%	15.00%	Correctly Valued	Hold

Illustration 7

Information about return on an investment is as follows:

Risk free rate 10% (b) Market Return is 15% (c) Beta is 1.2

(i) What would be the return from this investment?

(ii) If the projected return is 18%, is the investment rightly valued?

(iii) What is your strategy?

Solution

Required rate of Return as per CAPM is given by

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

$$= 10 + 1.2 (15-10) = 16\%$$

If projected return is 18%, the stock is undervalued as CAPM < Expected Return .The Decision should be BUY.

7.4 Modification for leverage

The above mentioned discussions have assumed all equity financing and that the beta used in the equations is an unlevered beta. However, the beta is actually a function of the leverage as well as the business risk .As a company increases the proportion of debt capital in its capital structure, both its beta and the required return increase in a linear manner. Hence in case one wishes to use the CAPM as a model for valuing cost of equity in order to determine financially feasible investments, one needs to take into account the difference of leverage in the proxy company/project and the company/project whose required return is to be computed.

Mathematically

$\beta_j = \beta_{uj}\left[1+\frac{D}{S}(1-T)\right]$ where β_j & β_{uj} are the levered and unlevered betas respectively., D/S is the debt to equity ratio in market value terms and T is the corporate tax rate.

7.5 Advantages and Limitations of CAPM

The advantages of CAPM can be listed as:

(i) *Risk Adjusted Return:* It provides a reasonable basis for estimating the required return on an investment which has risk in built into it. Hence it can be used as Risk Adjusted Discount Rate in Capital Budgeting.

(ii) *No Dividend Company*: It is useful in computing the cost of equity of a company which does not declare dividend.

There are certain limitations of CAPM as well, which are discussed as follows:

(a) *Reliability of Beta*: Statistically reliable Beta might not exist for shares of many firms. It may not be possible to determine the cost of equity of all firms using CAPM. All shortcomings that apply to Beta value applies to CAPM too.

(b) *Other Risks*: By emphasing on systematic risk only, unsystematic risks are of importance to share holders who do not possess a diversified portfolio.

(c) *Information Available*: It is extremely difficult to obtain important information on risk free interest rate and expected return on market portfolio as there is multiple risk free rates for one while for another, markets being volatile it varies over time period.

8. ARBITRAGE PRICING THEORY MODEL (APT)

Unlike the CAPM which is a single factor model, the APT is a multi factor model having a whole set of Beta Values – one for each factor. Arbitrage Pricing Theory states that the expected return on an investment is dependent upon how that investment reacts to a set of individual macro-economic factors (degree of reaction measured by the Betas) and the risk premium associated with each of those macro – economic factors. The APT developed by Ross (1976) holds that there are four factors which explain the risk premium relationship of a particular security. Several factors being identified e.g. inflation and money supply, interest rate, industrial production and personal consumption have aspects of being inter-related.

According to CAPM, $E(R_i) = R_f + \lambda\beta_i$

Where, λ is the average risk premium $[E(R_m) - R_f]$

In APT, $E(R_i) = R_f + \lambda_1\beta_{i_1} + \lambda_2\beta_{i_2} + \lambda_3\beta_{i_3} + \lambda_4\beta_{i_4}$

Where, $\lambda_1, \lambda_2, \lambda_3, \lambda_4$ are average risk premium for each of the four factors in the model and $\beta_{i_1}, \beta_{i_2}, \beta_{i_3}, \beta_{i_4}$ are measures of sensitivity of the particular security i to each of the four factors.

9. SHARPE INDEX MODEL

William Sharpe has developed a simplified variant of Markowitz model that reduces substantially its data and computational requirements.

9.1 Single Index Model

This model assumes that co-movement between stocks is due to change or movement in the market index. Casual observation of the stock prices over a period of time reveals that most of the stock prices move with the market index. When the Sensex increases, stock prices also tend to increase and vice-versa. This indicates that some underlying factors affect the market index as well as the stock prices. Stock prices are related to the market index and this relationship could be used to estimate the return on stock. Towards this purpose, the following equation can be used:

$$R_i = \alpha_i + \beta_i R_m + \in_i$$

Where,

R_i = expected return on security i

α_i = intercept of the straight line or alpha co-efficient

β_i = slope of straight line or beta co-efficient

R_m = the rate of return on market index

$\in_i$ = error term.

According to the equation, the return of a stock can be divided into two components, the return due to the market and the return independent of the market. β_i indicates the sensitiveness of the stock return to the changes in the market return. For example, βi of 1.5 means that the stock return is expected to increase by 1.5 % when the market index return increases by 1 % and vice-versa. Likewise, β_i of 0.5 expresses that the individual stock return would change by 0.5 per cent when there is a change of 1 per cent in the market return. β_i of 1 indicates that the market return and the security return are moving in tandem. The estimates of β_i and α_i are obtained from regression analysis.

The single index model is based on the assumption that stocks vary together because of the common movement in the stock market and there are no effects beyond the market (i.e. any fundamental factor effects) that account the stocks co-movement. The expected return, standard deviation and

co-variance of the single index model represent the joint movement of securities. The mean return is:

$$R_i = \alpha_i + \beta_i R_m + \in_i$$

The variance of security's return:

$$\sigma^2 = \beta^2{}_i \sigma^2{}_m + \sigma^2{}_{\in i}$$

The covariance of returns between securities i and j is:

$$\sigma_{ij} = \beta_i \beta_j \sigma_m^2$$

The variance of the security has two components namely, systematic risk or market risk and unsystematic risk or unique risk. The variance explained by the index is referred to systematic risk. The unexplained variance is called residual variance or unsystematic risk.

The systematic risk can be calculated by using following formula:

Systematic risk $= \beta^2{}_i \times$ variance of market index

$$= \beta^2{}_i \sigma^2{}_m$$

Unsystematic risk = Total variance - Systematic risk.

$\in_i^2$ = σ_i^2 - Systematic risk.

Thus, the total risk = Systematic risk + Unsystematic risk.

$$= \beta_i^2 \ \sigma_m^2 + \in_i^2.$$

From this, the portfolio variance can be derived

$$\sigma_p{}^2 = \left[\left(\sum_{i=1}^{N} X_i \beta_i\right)^2 \sigma_m{}^2\right] + \left[\left(\sum_{i=1}^{N} X_i{}^2 \in_i^2\right)\right]$$

Where,

σ_p^2 = variance of portfolio

σ_m^2 = expected variance of index

$\in_i^2$ = variation in security's return not related to the market index

x_i = the portion of stock i in the portfolio.

β_i = Beta of stock i in the portfolio

Likewise expected return on the portfolio also can be estimated. For each security α_i and β_i should be estimated.

$$R_P = \sum_{i=1}^{N} x_i (\alpha_i + \beta_i R_m)$$

β_i = Value of the beta for security i

x_i = Proportion of the investment on security i

α_i = Value of alpha for security i

N = The number of securities in the portfolio

Portfolio return is the weighted average of the estimated return for each security in the portfolio. The weights are the respective stocks' proportions in the portfolio.

A portfolio's alpha value is a weighted average of the alpha values for its component securities using the proportion of the investment in a security as weight.

$$\alpha_P = \sum_{i=1}^{N} x_i \alpha_i$$

α_P = Value of the alpha for the portfolio

Similarly, a portfolio's beta value is the weighted average of the beta values of its component stocks using relative share of them in the portfolio as weights.

$$\beta_P = \sum_{i=1}^{N} x_i \beta_i$$

Where,

β_P = Value of the beta for the portfolio.

Illustration 8

The following details are given for X and Y companies' stocks and the Bombay Sensex for a period of one year. Calculate the systematic and unsystematic risk for the companies' stocks. If equal amount of money is allocated for the stocks what would be the portfolio risk?

	X Stock	Y Stock	Sensex
Average return	0.15	0.25	0.06
Variance of return	6.30	5.86	2.25
β	0.71	0.685	

Correlation Co-efficient	0.424		
Co-efficient of determination (r^2)	0.18		

Solution

The co-efficient of determination (r^2) gives the percentage of the variation in the security's return that is explained by the variation of the market index return. In the X company stock return, 18 per cent of variation is explained by the variation of the index and 82 per cent is not explained by the index.

According to Sharpe, the variance explained by the index is the systematic risk. The unexplained variance or the residual variance is the unsystematic risk.

Company X:

Systematic risk = $\beta_i^2 \times$ Variance of market index

= $(0.71)^2 \times 2.25 = 1.134$

Unsystematic risk($\in_i^2$) = Total variance of security return - systematic risk

= 6.3 – 1.134

= 5.166 or

= Variance of Security Return $(1-r^2)$

= 6.3 X (1-0.18) = 6.3 X 0.82 = 5.166

Total risk = $\beta_i^2 \times \sigma_m^2 + \in_i^2$

= 1.134 + 5.166 = 6.3

Company Y:

Systematic risk = $\beta_i^2 \times \sigma_m^2$

= $(0.685)^2 \times 2.25 = 1.056$

Unsystematic risk = Total variance of the security return - systematic risk.

= 5.86-1.056 = 4.804

$$\sigma_p^2 = \left[\left(\sum_{i=1}^{N} X_i \beta_i\right)^2 \sigma_m^2\right] + \left[\left(\sum_{i=1}^{N} X_i^2 \in_i^2\right)\right]$$

= $[(0.5 \times 0.71 + 0.5 \times 0.685)^2\ 2.25] + [(0.5)^2(5.166)+(0.5)^2(4.804)]$

= $[(0.355 + 0.3425)^2\ 2.25] + [(1.292 + 1.201)]$

= 1.0946 + 2.493 = 3.5876

9.2 Sharpe's Optimal Portfolio

This model is based on desirability of an investor for excess return of risk free rate of return to beta. Accordingly, the ranking of securities shall be based on the Sharpe Ratio and unique cut off point C^* discussed below.

The steps for finding out the stocks to be included in the optimal portfolio are given below:

(a) Find out the "excess return to beta" ratio for each stock under consideration.

(b) Rank them from the highest to the lowest.

(c) Proceed to calculate C_i for all the stocks according to the ranked order using the following formula:

$$C_i = \frac{\sigma_m^2 \sum_{i=1}^{N} \frac{(R_i - R_f)\beta_i}{\sigma_{ei}^2}}{1 + \sigma_m^2 \sum_{i=1}^{N} \frac{\beta_i^2}{\sigma_{ei}^2}}$$

Where,

σ_m^2 = variance of the market index

σ_{ei}^2 = variance of a stock's movement that is not associated with the movement of market index i.e. stock's unsystematic risk.

(d) Compute the cut-off point which the highest value of C_i and is taken as C*. The stock whose excess-return to risk ratio is above the cut-off ratio are selected and all whose ratios are below are rejected. The main reason for this selection is that since securities are ranked from highest excess return to Beta to lowest, and if particular security belongs to optional portfolio all higher ranked securities also belong to optimal portfolio.

(e) Once we came to know which securities are to be included in the optimum portfolio, we shall calculate the percent to be invested in each security by using the following formula:

$$X_i^o = \frac{Z_i}{\sum_{j=1}^{N} Z_i}$$

where

$$Z_i = \frac{B_i}{\sigma_{ei}^2}\left(\frac{R_i - R_o}{B_i} - C^*\right)$$

The first portion determines the weight each stock and total comes to 1 to ensure that all funds are invested and second portion determines the relative investment in each security.

10. FORMULATION OF PORTFOLIO STRATEGY

Two broad choices are required for the formulation of an appropriate portfolio strategy. They are active portfolio strategy and passive portfolio strategy.

10.1 Active Portfolio Strategy (APS)

An APS is followed by most investment professionals and aggressive investors who strive to earn superior return after adjustment for risk. The vast majority of funds (or schemes) available in India follow an "active" investment approach, wherein fund managers of "active" funds spend a great deal of time on researching individual companies, gathering extensive data about financial performance, business strategies and management characteristics. In other words, "active" fund managers try to identify and invest in stocks of those companies that they think will produce better returns and beat the overall market (or Index).

There are four principles of on active strategy. These are:

(a) ***Market Timing :*** This involves departing from the normal i.e. strategy for long run asset mix to reflect assessment of the prospect of various assets in the near future. Market timing is based on an explicit or implicit forecast of general market movement. A variety of tools are employed for market timing analysis namely business cycle analysis, moving average analysis, advance-decline analysis, Econometric models. The forecast for the general market movement derived with the help of one or more of these tools is tempted by the subjective judgment of the investors. In most cases investor may go largely by its market sense. Those who reveal the fluctuation in the market may be tempted to play the game of market timing but few will succeed in this game. And an investment manager has to forecast the market correctly, 75% of the time just to break even after taking into account the cost of errors and cost of transactions. According to Fisher Black, the market is just as well as on an average when the investor is out of the market as it does when he is in. So he loses money relative to a single buy and sale strategy by being out of the market part of the time.

(b) ***Sector Rotation:*** Sector or group rotation may apply to both stock and bond component of the portfolio. It is used more compulsorily with respect to strategy. The components of the portfolio are used when it involves shifting. The weighting for various industry sectors is based on their asset outlook. If one thinks that steel and pharmaceutical would do well as compared to other sectors in the forthcoming period he may overweigh the sector relative to their position in the market portfolio, with the result that his portfolio will be tilted more towards these sectors in comparison to the market portfolio.

With respect to bond portfolio sector rotation it implies a shift in the composition of the bond portfolio in terms of quality as reflected in credit rating, coupon rate, term of maturity etc. If one anticipates a

rise in the interest rate one may shift for long term bonds to medium and short term. A long term bond is more sensitive to interest rate variation compared to a short term bond.

(c) ***Security Selection:*** Security selection involves a search for under price security. If one has to resort to active stock selection he may employ fundamental / technical analysis to identify stocks which seems to promise superior return and concentrate the stock components of portfolio on them. Such stock will be over weighted relative to their position in the market portfolio. Like wise stock which are perceived to be unattractive will be under weighted relative to their position in the market portfolio.

As far as bonds are concerned security selection calls for choosing bonds which offer the highest yields to maturity and at a given level of risk.

(d) ***Use of Specialised Investment Concept:*** To achieve superior return, one has to employ a specialised concept/philosophy particularly with respect to investment in stocks. The concept which have been exploited successfully are growth stock, neglected or out of favour stocks, asset stocks, technology stocks and cyclical stocks.

The advantage of cultivating a specialized investment concept is that it helps to:

(i) Focus one's effort on a certain kind of investment that reflects one's ability and talent.

(ii) Avoid the distraction of perusing other alternatives.

(iii) Master an approach or style through sustained practice and continual self criticism.

The greatest disadvantage of focusing exclusively on a specialized concept is that it may become obsolete. The changes in the market risk may cast a shadow over the validity of the basic premise underlying the investor philosophy.

10.2 Passive Portfolio Strategy

Active strategy was based on the premise that the capital market is characterized by efficiency which can be exploited by resorting to market timing or sector rotation or security selection or use of special concept or some combination of these sectors.

Passive strategy, on the other hand, rests on the tenet that the capital market is fairly efficient with respect to the available information. Hence they search for superior return. Basically, passive strategy involves adhering to two guidelines. They are:

(a) Create a well diversified portfolio at a predetermined level of risk.

(b) Hold the portfolio relatively unchanged over time unless it became adequately diversified or inconsistent with the investor risk return preference.

A fund which is *passively* managed are called index funds. An Index fund is a mutual fund scheme that invests in the securities of the target Index in the same proportion or weightage. Though it is designed to provide returns that closely track the benchmark Index, an Index Fund carries all the

risks normally associated with the type of asset the fund holds. So, when the overall stock market rises/falls, you can expect the price of shares in the index fund to rise/fall, too. In short, an index fund does not mitigate market risks. Indexing merely ensures that your returns will not stray far from the returns on the Index that the fund mimics. In other words, an index fund is a fund whose daily returns are the same as the daily returns obtained from an index. Thus, it is passively managed in the sense that an index fund manager invests in a portfolio which is exactly the same as the portfolio which makes up an index. For instance, the NSE-50 index (Nifty) is a market index which is made up of 50 companies. A Nifty index fund has all its money invested in the Nifty fifty companies, held in the same weights of the companies which are held in the index.

10.3 Selection of Securities

There are certain criteria which must be kept in mind while selecting securities. The selection criteria for both bonds and equity shares are given as following:

10.3.1 Selection of Bonds

Bonds are fixed income avenues. The following factors have to be evaluated in selecting fixed income avenues:

(a) *Yield to maturity*: The yield to maturity for a fixed income avenues represent the rate of return earned by the investor, if he invests in the fixed income avenues and holds it till its maturity.

(b) *Risk of Default*: To assess such risk on a bond, one has to look at the credit rating of the bond. If no credit rating is available relevant financial ratios of the firm have to be examined such as debt equity, interest coverage, earning power etc and the general prospect of the industry to which the firm belongs have to be assessed.

(c) *Tax Shield:* In the past, several fixed income avenues offers tax shields but at present only a few of them do so.

(d) *Liquidity:* If the fixed income avenues can be converted wholly or substantially into cash at a fairly short notice it possesses a liquidity of a high order.

10.3.2 Selection of Stock (Equity Share)

Three approaches are applied for selection of equity shares- Technical analysis, Fundamental analysis and Random selection analysis.

(a) Technical analysis looks at price behaviours and volume data to determine whether the share will move up or down or remain trend less.

(b) Fundamental analysis focuses on fundamental factors like earning level, growth prospects and risk exposure to establish intrinsic value of a share. The recommendation to buy hold or sell is based on comparison of intrinsic value and prevailing market price.

(c) Random selection analysis is based on the premise that the market is efficient and security is properly priced.

Levels of Market Efficiency And Approach To Security Selection

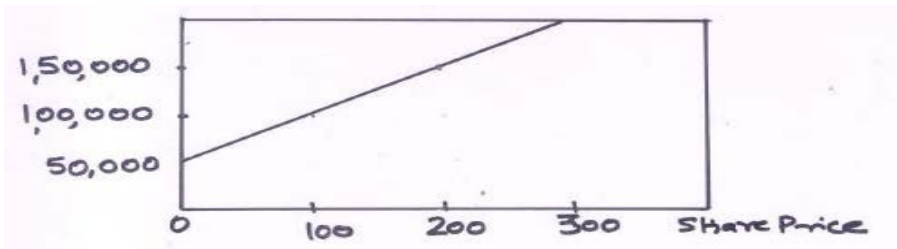
Approach / Levels of Efficiency	Technical Analysis	Fundaments Analysis	Random Selection
1) Inefficiency	Best	Poor	Poor
2) Weak form efficiency	Poor	Best	Poor
3) Semi-strong efficiency	Poor	Good	Fair
4) Strong Form efficiency	Poor	Fair	Best

11. PORTFOLIO REBALANCING

It means the value of portfolio as well as its composition. The relative proportion of bond and stocks may change as stock and bonds fluctuate in response to such changes. Portfolio rebalancing is necessary. There are three policies of portfolio rebalancing- Buy and hold policy, Constant mix policy, and Constant proportion portfolio insurance policy (CPPI). These policies have different pay off under varying market conditions. Under all these policies portfolio consists of investment in stock and bonds.

(a) Buy and Hold Policy: Sometime this policy is also called 'do nothing policy' as under this strategy no balancing is required and therefore investor maintain an exposure to stocks and therefore linearly related to the value of stock in general.

Under this strategy investors set a limit (floor) below which he does not wish the value of portfolio should go. Therefore, he invests an amount equal to floor value in non-fluctuating assets (Bonds). Since the value of portfolio is linearly related to value of stocks the pay-off diagram is a straight line. This can be better understood with the help of an example. Suppose a portfolio consisting of Debt/ Bonds for ₹ 50,000 of and ₹ 50,000 in equity shares currently priced at ₹ 100 per share. If price of the share moves from ₹ 100 to ₹ 200 the value of portfolio shall become ₹ 1,50,000. The pay-off diagram is shown in figure below i.e. a straight line:



This policy is suitable for the investor whose risk tolerance is positively related to portfolio and stock market return but drops to zero of below floor value.

Concluding, it can be said that following are main features of this policy:

(a) The value of portfolio is positively related and linearly dependent on the value of the stock.

(b) The value of portfolio cannot fall below the floor value i.e. investment in Bonds.

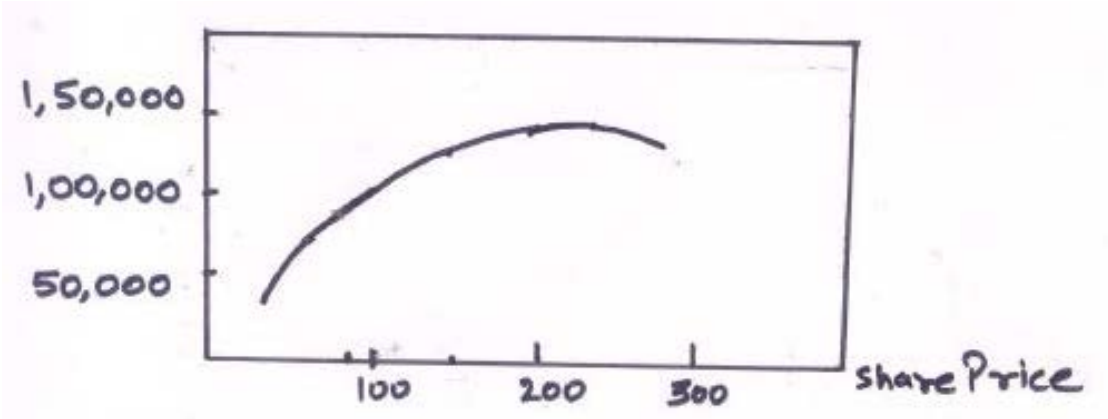
(c) This policy performs better if initial percentage is higher in stock and stock outperform the bond. Reverse will happen if stock under perform in comparison of bond or their prices goes down.

(b) Constant Mix Policy: Contrary to above policy this policy is a 'do something policy'. Under this policy investor maintains an exposure to stock at a constant percentage of total portfolio. This strategy involves periodic rebalancing to required (desired) proportion by purchasing and selling stocks as and when their prices goes down and up respectively. In other words this plan specifies that value of aggressive portfolio to the value of conservative portfolio will be held constant at a pre-determined ratio. However, it is important to this action is taken only there is change in the prices of share at a predetermined percentage.

For example if an investor decided his portfolio shall consist of 60% in equity shares and balance 40% in bonds on upward or downward of 10% in share prices he will strike a balance.

In such situation if the price of share goes down by 10% or more, he will sell the bonds and invest money in equities so that the proportion among the portfolio i.e. 60:40 remains the same. According if the prices of share goes up by 10% or more he will sell equity shares and shall in bonds so that the ratio remains the same i.e. 60:40. This strategy is suitable for the investor whose tolerance varies proportionally with the level of wealth and such investor holds equity at all levels.

The pay-off diagram of this policy shall be as follows:



Accordingly, it gives a concave pay off, tends to do well in flat but fluctuating market.

Continuing above example let us how investor shall rebalance his portfolio under different scenarios as follows:

(a) If price decreases

Share Price		Value of Shares	Value of Bonds	Total	Stock to Bond Switching	Bond to Stock Switching
100	Starting Level	50,000	50,000	1,00,000	-	-
80	Before Rebalancing	40,000	50,000	90,000	-	-
	After Rebalancing	45,000	45,000	90,000	-	5,000
60	Before Rebalancing	33,750	45,000	78,750	-	-
	After Rebalancing	39,360	39,390	78,750	-	5,610

(b) If price increases

Share Price		Value of Shares	Value of Bonds	Total	Stock to Bond Switching	Bond to Stock Switching
100	Starting Level	50,000	50,000	1,00,000	-	-
150	Before Rebalancing	75,000	50,000	1,25,000	-	-
	After Rebalancing	62,400	62,600	1,25,000	12,600	-
200	Before Rebalancing	83,200	62,600	1,45,800	-	-
	After Rebalancing	72,800	73,000	1,45,800	10,400	-

(c) Constant Proportion Insurance Policy : Under this strategy investor sets a floor below which he does not wish his asset to fall called floor, which is invested in some non-fluctuating assets such as Treasury Bills, Bonds etc. The value of portfolio under this strategy shall not fall below this specified floor under normal market conditions. This strategy performs well especially in bull market as the value of shares purchased as cushion increases. In contrast in bearish market losses are avoided by sale of shares. It should however be noted that this strategy performs very poorly in the market hurt by sharp reversals. The following equation is used tp determine equity allocation:

Target Investment in Shares = multiplier (Portfolio Value – Floor Value)

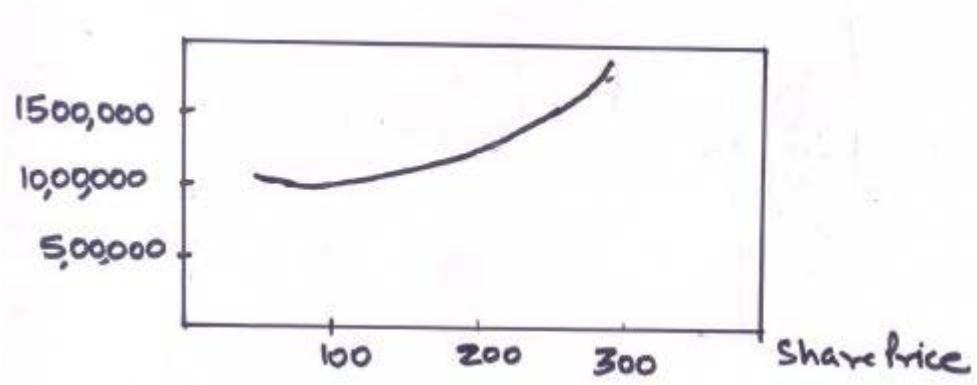
Multiplier is a fixed constant whose value shall be more than 1.

The pay-off under this strategy can be understood better with the help of an example. Suppose wealth of Mr. A is ₹ 10,00,000, a floor value of ₹ 7,50,000 and a multiplier of 2. Since the initial cushion (difference between Portfolio Value and Floor) is ₹ 2,50,000, the initial investment in the share shall be ₹ 5,00,000 (double of the initial cushion). Accordingly, initial portfolio mix shall be consisted of ₹ 5,00,000 in shares and balance ₹ 5,00,000 in Bonds.

Situation 1: Suppose stock market rises from 100 to 150. The value of shares of Mr. A's holding shall rise from ₹ 5,00,000 to ₹ 7,50,000 and value of portfolio shall jump to ₹ 12,50,000 and value of cushion to ₹ 7,50,000. Since the CPPI Policy requires the component of shares should go up to ₹ 10,00,000. This will necessitate the selling of bonds amounting ₹ 2,50,000 and re-investing proceeds in shares.

Situation 2: If stock market falls from 100 to 80, the value of shares of portfolio falls from ₹ 5,00,000 to ₹ 4,00,000 resulting in reduction of value of portfolio to ₹ 9,00,000 and cushion to ₹ 1,50,000. Since as per CPPI the share component should be ₹ 3,00,000 (₹ 1,50,000 x 2), hence shares of ₹ 1,00,000 should be sold and invest in Bonds.

Thus from above it is clear that as per CPPI sell the shares as their prices fall and buy them as their prices rise. This policy is contrary to the Constant Mix Policy and hence pay-off of CPPI shall be convex as shown below:



(d) Comparative Evaluation

Basis	*Buy & Hold Policy*	*Constant Mix Policy*	*Constant Proportion Portfolio Insurance*
Pay-off Line	Straight	Concave	Convex
Protection in Down/Up Markets	Definite in Down market	Not much in Down market but relatively poor in Up market	Good in Down market and performs well in Up market

Performance in flat but fluctuating market	Performs between Constant and CPPI	Tend to do well in flat market.	Performs poorly.

12. ASSET ALLOCATION STRATEGIES

Many portfolios containing equities also contain other asset categories, so the management factors are not limited to equities. There are four asset allocation strategies:

(a) Integrated Asset Allocation: Under this strategy, capital market conditions and investor objectives and constraints are examined and the allocation that best serves the investor's needs while incorporating the capital market forecast is determined.

(b) Strategic Asset Allocation: Under this strategy, optimal portfolio mixes based on returns, risk, and co-variances is generated using historical information and adjusted periodically to restore target allocation within the context of the investor's objectives and constraints.

(c) Tactical Asset Allocation: Under this strategy, investor's risk tolerance is assumed constant and the asset allocation is changed based on expectations about capital market conditions.

(d) Insured Asset Allocation: Under this strategy, risk exposure for changing portfolio values (wealth) is adjusted; more value means more ability to take risk.

13. FIXED INCOME PORTFOLIO

Fixed Income Portfolio is same as equity portfolio with difference that it consist of fixed income securities such as bonds, debentures, money market instruments etc. Since, it mainly consists of bonds, it is also called Bond Portfolio.

13.1 Fixed Income Portfolio Process

Just like other portfolios, following five steps are involved in fixed income portfolio.

1. Setting up objective
2. Drafting guideline for investment policy
3. Selection of Portfolio Strategy - Active and Passive
4. Selection of securities and other assets
5. Evaluation of performance with benchmark

13.2 Calculation of Return on Fixed Income Portfolio

First and foremost step in evaluation of performance of a portfolio is calculation of return. Although there can be many types of measuring returns there can be many types of measuring returns as per requirements but some of are commonly used measures are :

(i) Arithmetic Average Rate of Return

(ii) Time Weighted Rate of Return

(iii) Rupee Weighted Rate of Return

(iv) Annualized Return

13.3 Fixed Income Portfolio Management Strategies

There are two strategies

(i) Passive Strategy

(ii) Active Strategy

13.3.1 Passive Strategy

As mentioned earlier Passive Strategy is based on the premise that securities are fairly priced commensurate with the level of risk. Though investor does not try to outperform the market but it does not imply they remain totally inactive. Common strategies applied by passive investors of fixed income portfolios are as follows:

(i) Buy and Hold Strategy: This technique is do nothing technique and investor continues with initial selection and do not attempt to churn bond portfolio to increase return or reduce the level of risk.

However, sometime to control the interest rate risk, the investor may set the duration of fixed income portfolio equal to benchmarked index.

(ii) Indexation Strategy: This strategy involves replication of a predetermined benchmark well known bond index as closely as possible.

(iii) Immunization:This strategy cannot exactly be termed as purely passive strategy but a hybrid strategy. This strategy is more popular among pension funds. Since pension funds promised to pay fixed amount to retires people in the form of annuities any inverse movement in interest may threaten fund's ability to meet their liability timely. By building an immunized portfolio the interest rate risk can be avoided.

(iv) Matching Cash Flows: Another stable approach to immunize the portfolio is Cash Flow Matching. This approach involves buying of Zero Coupon Bonds to meet the promised payment out of the proceeds realized.

13.3.2 Active Strategy

As mentioned earlier active strategy is usually adopted to outperform the market. Following are some of active strategies:

(1) Forecasting Returns and Interest Rates: This strategy invokes the estimation of return on basis of change in interest rates. Since interest rate and bond values are inversely related if portfolio manager is expecting a fall in interest rate of bonds he/she should buy with longer maturity period. On the contrary, if he/she expected a fall in interest then he/she should sell bonds with longer period.

Based on short term yield movement following three strategies can be adopted:

(a) Bullet Strategies

(b) Barbell Strategies

(c) Ladder Strategies

Further estimation of interest ratio is a daunting task, and quite difficult to ascertain. There are several models available to forecast the expected interest rates which are based on:

(i) Inflation

(ii) Past Trends

(iii) Multi Factor Analysis

It should be noted that these models can be used as estimates only, as it is difficult to calculate the accurate changes.

There is one another techniques of estimating expected change in interest rate called 'Horizon Analysis'. This technique requires that analyst should select a particular holding period and then predict yield curve at the end of that period as with a given period of maturity, a bond yield curve of a selected period can be estimated and its end price can also be calculated.

(2) Bond Swaps: This strategy involves regularly monitoring bond process to identify mispricing and try to exploit this situation. Some of the popular swap techniques are as follows:

(a) Pure Yield Pickup Swap - This strategy involves switch from a lower yield bond to a higher yield bonds of almost identical quantity and maturity. This strategy is suitable for portfolio manager who is willing to assume interest rate risk as in switching from short term bond to long term bonds to earn higher rate of interest, he may suffer a capital loss.

(b) Substitution Swap - This swapping involves swapping with similar type of bonds in terms of coupon rate, maturity period, credit rating, liquidity and call provision but with different prices. This type of differences exits due to temporary imbalance in the market. The risk a portfolio manager carries if some features of swapped bonds may not be truly identical to the swapped one.

(c) International Spread Swap – In this swap portfolio manager is of the belief that yield spreads between two sectors is temporarily out of line and he tries to take benefit of this mismatch. Since the spread depends on many factor and a portfolio manager can anticipate appropriate strategy and can profit from these expected differentials.

(d) Tax Swap – This is based on taking tax advantage by selling existing bond whose price decreased at capital loss and set it off against capital gain in other securities and buying another security which has features like that of disposed one.

(3) *Interest Rate Swap:* Interest Rate Swap is another technique that is used by Portfolio Manager. This technique has been discussed in greater details in the chapter on Derivative.

14. ALTERNATIVE INVESTMENT STRATEGIES IN CONTEXT OF PORTFOLIO MANAGEMENT

Plainly speaking, Alternative Investments (AIs) are Investments other than traditional investments (stock, bond and cash).

Features of Alternative Investments

Though here may be many features of Alternative Investment but following are some common features.

(i) *High Fees* – Being a specific nature product the transaction fees are quite on higher side.

(ii) *Limited Historical Rate* – The data for historic return and risk is verity limited where data for equity market for more than 100 years in available.

(iii) *Illiquidity* – The liquidity of Alternative Investment is not good as next buyer not be easily available due to limited market.

(iv) *Less Transparency* – The level of transparency is not adequate due to limited public information available.

(v) *Extensive Research Required* – Due to limited availability of market information the extensive analysis is required by the Portfolio Managers.

(vi) *Leveraged Buying* – Generally investment in alternative investments is highly leveraged.

Over the time various types of AIs have been evolved but some of the important AIs are as follows:

1. Mutual Funds
2. Real Estates
3. Exchange Traded Funds
4. Private Equity

5. Hedge Funds
6. Closely Held Companies
7. Distressed Securities
8. Commodities
9. Managed Futures
10. Mezzanine Finance

Since, some of the above terms have been covered under the respective chapter in this study, we shall cover other terms hereunder.

14.1 Real Estates

As opposed to financial claims in the form of paper or a dematerialized mode, real estate is a tangible form of assets which can be seen or touched. Real Assets consists of land, buildings, offices, warehouses, shops etc.

Although real investment is like any other investment but it has some special features as every country has their own laws and paper works which makes investment in foreign properties less attractive. However, in recent time due to globalization investment in foreign real estate has been increased.

14.1.1 Valuation Approaches

Comparing to financial instrument the valuation of Real Estate is quite complex as number of transactions or dealings comparing to financial instruments are very small.

Following are some characteristics that make valuation of Real Estate quite complex:

(i) Inefficient market: Information as may not be freely available as in case of financial securities.

(ii) Illiquidity: Real Estates are not as liquid as that of financial instruments.

(iii) Comparison: Real estates are only approximately comparable to other properties.

(iv) High Transaction cost: In comparison to financial instruments, the transaction and management cost of Real Estate is quite high.

(v) No Organized market: There is no such organized exchange or market as for equity shares and bonds.

14.1.2 Valuation of Real Estates

Generally, following four approaches are used in valuation of Real estates:

(1) Sales Comparison Approach – It is like Price Earning Multiplier as in case of equity shares. Benchmark value of similar type of property can be used to value Real Estate.

(2) Income Approach – This approach like value of Perpetual Debenture or unredeemable Preference Shares. In this approach the perpetual cash flow of potential net income (after deducting expense) is discounted at market required rate of return.

(3) Cost Approach – In this approach, the cost is estimated to replace the building in its present form plus estimated value of land. However, adjustment of other factors such as good location, neighborhood is also made in it.

(4) Discounted After Tax Cash Flow Approach – In comparison to NPV technique, PV of expected inflows at required rate of return is reduced by amount of investment.

14.2 Private Equity

Following 3 types of private equity investment shall be discussed here:

14.2.1 Mezzanine Finance

It is a blend or hybrid of long term debt and equity share. It is a kind of equity funding combined with the characteristics of conventional lending as well as equity. This is a highly risky investment and hence mezzanine financer receives higher return.

This type of financing enhances the base of equity as in case of default the debt is converted into equity. Mezzanine financing can be used for financing heavy investments, buyout, temporary arrangement between sanction of heavy loan and its disbursement. However, compared to western world, this type of financing is not so popular in India.

14.2.2 Venture Capital

The History of Venture Capital in India can be traced back to the 70's, when the Government of India, getting aware that an inadequate funding and financial structure was hampering entrepreneurialism and start-ups, appointed a committee to tackle the issue. Approximately ten years later, the first three all- Indian funds were standing: IDBI, ICICI and IFCI.

With the institutionalization of the industry in November 1988, the government announced its guidelines in the "CCI" (Controller of Capital Issues). These focused on a very narrow description of Venture Capital and proved tobe extremely restrictive and encumbering, requiring investment in «innovative technologies started by first generation entrepreneur. This made investment in VC highly risky and unattractive.

At about the same time, the World Bank organized a VC awareness seminar, giving birth to players like: TDICICI, GVFL, Canbank and Pathfinder. Along with the other reforms the government decided to liberalize the VC Industry and abolish the "CCI", while in 1995 Foreign Finance companies were allowed to invest in the country.

Nevertheless, the liberalization was short-spanned,with new calls for regulation being made in 1996. The new guidelines' loopholes created an unequal playing ground that favoured the foreign players and gave no incentives to domestic high net worth individuals to invest in this industry.

VC investing got considerably boosted by the IT revolution in 1997, as the venture capitalists became prominent founders of the growing IT and telecom industry.

Many of these investors later floundered during the dotcom bust and most of the surviving ones shifted their attention to later stage financing, leaving the risky seed and start-up financing to a few daring funds.

14.2.2.1 Structure of fund in India : Three main types of fund structure exist: one for domestic funds and two for offshore ones:

(a) Domestic Funds : Domestic Funds (i.e. one which raises funds domestically) are usually structured as:

i) a domestic vehicle for the pooling of funds from the investor, and

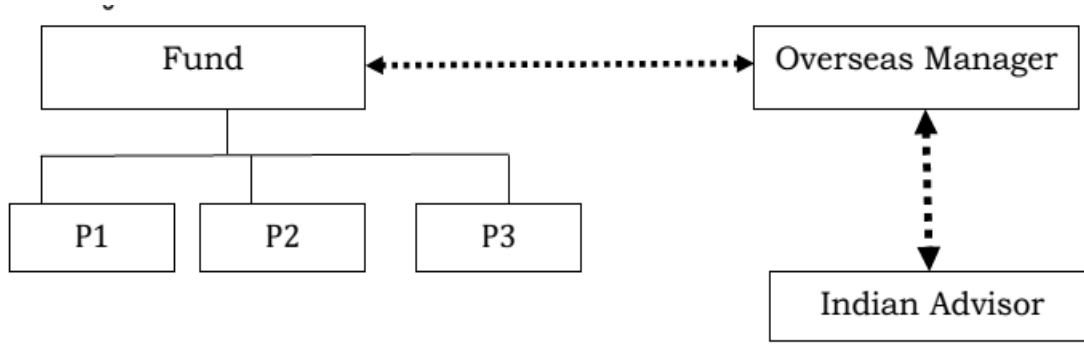
ii) a separate investment adviser that carries those duties of asset manager.

The choice of entity for the pooling vehicle falls between a trust and a company, (India, unlike most developed countries does not recognize a limited partnership), with the trust form prevailing due to its operational flexibility.

(b) Offshore Funds : Two common alternatives available to offshore investors are: the "offshore structure" and the "unified structure".

Offshore structure

Under this structure, an investment vehicle (an LLC or an LP organized in a jurisdiction outside India) makes investments directly into Indian portfolio companies. Typically, the assets are managed by an offshore manager, while the investment advisor in India carries out the due diligence and identifies deals.

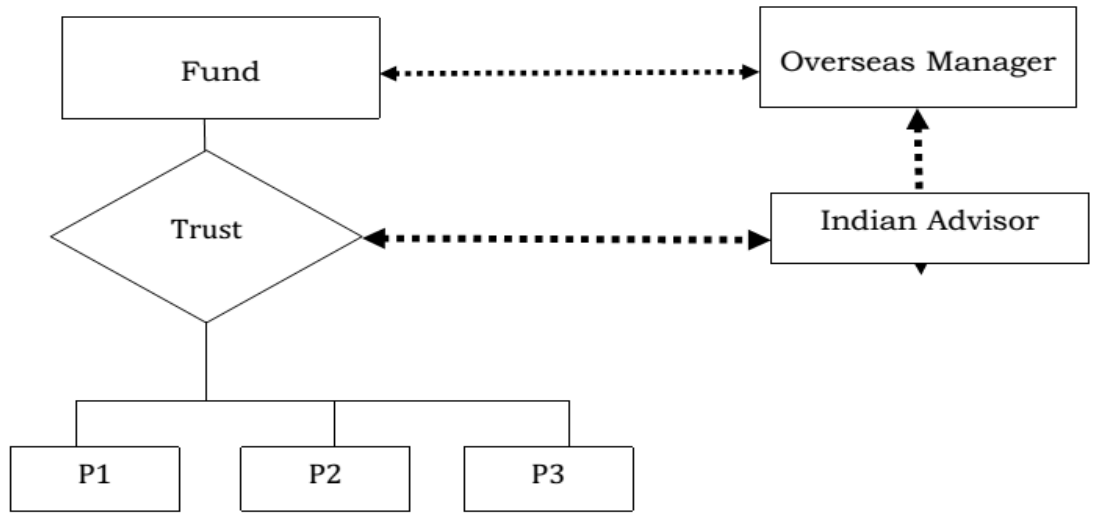


Off shore structure

Unified Structure

When domestic investors are expected to participate in the fund, a unified structure is used. Overseas investors pool their assets in an offshore vehicle that invests in a locally managed trust,

whereas domestic investors directly contribute to the trust. This is later device used to make the local portfolio investments.



Unified Structure

Venture capital means funds made available for startup firms and small businesses with exceptional growth potential. Venture capital is money provided by professionals who alongside management invest in young, rapidly growing companies that have the potential to develop into significant economic contributors.

Venture Capitalists generally:

- Finance new and rapidly growing companies
- Purchase equity securities
- Assist in the development of new products or services
- Add value to the company through active participation.

14.2.2.2 Characteristics : Venture capital follows the following characteristics:

Long time horizon: The fund would invest with a long time horizon in mind. Minimum period of investment would be 3 years and maximum period can be 10 years.

Lack of liquidity: When VC invests, it takes into account the liquidity factor. It assumes that there would be less liquidity on the equity it gets and accordingly it would be investing in that format. they adjust this liquidity premium against the price and required return.

High Risk: VC would not hesitate to take risk. It works on principle of high risk and high return. So higher riskiness would not eliminate the investment choice for a venture capital.

Equity Participation: Most of the time, VC would be investing in the form of equity of a company. This would help the VC participate in the management and help the company grow.

Besides, a lot of board decisions can be supervised by the VC if they participate in the equity of a company.

14.2.2.3 Advantages: Advantages of brining VC in the company:

- It injects long- term equity finance which provides a solid capital base for future growth.
- The venture capitalist is a business partner, sharing both the risks and rewards. Venture capitalists are rewarded with business success and capital gain.
- The venture capitalist is able to provide practical advice and assistance to the company based on past experience with other companies which were in similar situations.
- The venture capitalist also has a network ofcontacts in many areas that can add value to the company.
- The venture capitalist may be capable of providing additional rounds of funding should it be required to finance growth.
- Venture capitalists are experienced in the process of preparing a company for an initial public offering (IPO) of its shares onto the stock exchanges or overseas stock exchange such as NASDAQ.
- They can also facilitate a trade sale.

14.2.2.4 Stages of funding: Stages of funding for VC:

1. Seed Money: Low level financing needed to prove a new idea.
2. Start-up: Early stage firms that need funding for expenses associated with marketing and product development.
3. First-Round: Early sales and manufacturing funds.
4. Second-Round: Working capital for early stage companies that are selling product, but not yet turning in a profit.
5. Third Round: Also called Mezzanine financing, this is expansion money for a newly profitable company
6. Fourth-Round: Also called bridge financing, it is intended to finance the "going public" process

14.2.2.5 Risk matrix : Risk in each stage is different. An indicative Risk matrix is given below:

Financial Stage	Period (Funds locked in years)	Risk Perception	Activity to be financed
Seed Money	7-10	Extreme	For supporting a concept or idea or R&D for product development
Start Up	5-9	Very High	Initializing operations or developing prototypes
First Stage	3-7	High	Start commercials production and marketing
Second Stage	3-5	Sufficiently high	Expand market and growing working capital need
Third Stage	1-3	Medium	Market expansion, acquisition & product development for profit making company
Fourth Stage	1-3	Low	Facilitating public issue

14.2.2.6 VC Investment Process: The entire VC Investment process can be segregated into the following steps:

1. Deal Origination: VC operates directly or through intermediaries. Mainly many practicing Chartered Accountants would work as intermediary and through them VC gets the deal.

Before sourcing the deal, the VC would inform the intermediary or its employees about the following so that the sourcing entity does not waste time:

- Sector focus
- Stages of business focus
- Promoter focus
- Turn over focus

Here the company would give a detailed business plan which consists of business model, financial plan and exit plan . All these aspects are covered in a document which is called Investment Memorandum (IM). A tentative valuation is also carried out in the IM.

2. Screening: Once the deal is sourced the same would be sent for screening by the VC. The screening is generally carried out by a committee consisting of senior level people of the VC. Once the screening happens, it would select the company for further processing.

3 Due Diligence:. The screening decision would take place based on the information provided by the company. Once the decision is taken to proceed further, the VC would now carry out due

diligence. This is mainly the process by which the VC would try to verify the veracity of the documents taken. This is generally handled by external bodies, mainly renowned consultants. The fees of due diligence are generally paid by the VC .

However, in many case this can be shared between the investor (VC) and Investee (the company) depending on the veracity of the document agreement.

4. *Deal Structuring:* Once the case passes through the due diligence it would now go through the deal structuring. The deal is structured in such a way that both parties win. In many cases, the convertible structure is brought in to ensure that the promoter retains the right to buy back the share. Besides, in many structures to facilitate the exit, the VC may put a condition that promoter has also to sell part of its stake along with the VC . Such a clause is called tag- along clause.

5. *Post Investment Activity:* In this section, the VC nominates its nominee in the board of the company. The company has to adhere to certain guidelines like strong MIS, strong budgeting system, strong corporate governance and other covenants of the VC and periodically keep the VC updated about certain mile-stones. If milestone has not been met the company has to give explanation to the VC. Besides, VC would also ensure that professional management is set up in the company.

6. *Exit plan:* At the time of investing , the VC would ask the promoter or company to spell out in detail the exit plan. Mainly, exit happens in two ways: one way is 'sell to third paty(ies)' . This sale can be in the form of IPO or Private Placement to other VCs. The second way to exit is that promoter would give a buy back commitment at a pre- agreed rate (generally between IRR of 18% to 25%) . In case the exit is not happening in the form of IPO or third party sell, the promoter would buy back. In many deals, the promoter buyback is the first refusal method adopted i.e. the promoter would get the first right of buyback.

14.2.3 Distressed securities

It is a kind of purchasing the securities of companies that are in or near bankruptcy. Since these securities are available at very low price, the main purpose of buying such securities is to make efforts to revive the sick company. Further, these securities are suitable for those investors who cannot participate in the market and those who wants to avoid due diligence.

Now, question arises how profit can be earned from distressed securities. We can see by taking long position in debt and short position in equity, how investor can earn arbitrage profit.

(i) In case company's condition improves because of priority, the investor will get his interest payment which shall be more than the dividend on his short position in equity shares.

(ii) If company is condition further deteriorates the value of both share and debenture goes down. He will make good profit from his short position.

Risks Analysis of Investment in Distressed Securities : On the face, investment in distressed securities appears to be a good proposition but following types of risks are need to be analyzed.

(i) Liquidity Risk – These securities may be saleable in the market.

(ii) Event Risk – Any event that particularly effect the company not economy as a whole

(iii) Market Risk – This is another type of risk though it is not important.

(iv) Human Risk – The judge's decision on the company in distress also play a big role.

TEST YOUR KNOWLEDGE

Theoretical Questions

1. Write short note on factors affecting decision of investment in fixed income securities.
2. Briefly explain the objectives of "Portfolio Management".
3. Discuss the Capital Asset Pricing Model (CAPM) and its relevant assumptions.

Practical Questions

1. A stock costing ₹ 120 pays no dividends. The possible prices that the stock might sell for at the end of the year with the respective probabilities are:

Price	Probability
115	0.1
120	0.1
125	0.2
130	0.3
135	0.2
140	0.1

Required:

(i) Calculate the expected return.

(ii) Calculate the Standard deviation of returns.

2. Mr. A is interested to invest ₹ 1,00,000 in the securities market. He selected two securities B and D for this purpose. The risk return profile of these securities are as follows :

Security	Risk (σ)	Expected Return (ER)
B	10%	12%
D	18%	20%

Co-efficient of correlation between B and D is 0.15.

You are required to calculate the portfolio return of the following portfolios of B and D to be considered by A for his investment.

(i) 100 percent investment in B only;

(ii) 50 percent of the fund in B and the rest 50 percent in D;

(iii) 75 percent of the fund in B and the rest 25 percent in D; and

(iv) 100 percent investment in D only.

Also indicate that which portfolio is best for him from risk as well as return point of view?

3. Consider the following information on two stocks, A and B :

Year	Return on A (%)	Return on B (%)
2006	10	12
2007	16	18

You are required to determine:

(i) The expected return on a portfolio containing A and B in the proportion of 40% and 60% respectively.

(ii) The Standard Deviation of return from each of the two stocks.

(iii) The covariance of returns from the two stocks.

(iv) Correlation coefficient between the returns of the two stocks.

(v) The risk of a portfolio containing A and B in the proportion of 40% and 60%.

4. Following is the data regarding six securities:

	A	B	C	D	E	F
Return (%)	8	8	12	4	9	8
Risk (Standard deviation)	4	5	12	4	5	6

(i) Assuming three will have to be selected, state which ones will be picked.

(ii) Assuming perfect correlation, show whether it is preferable to invest 75% in A and 25% in C or to invest 100% in E

5. The distribution of return of security 'F' and the market portfolio 'P' is given below:

Probability	Return %	
	F	P
0.30	30	-10

0.40	20	20
0.30	0	30

You are required to calculate the expected return of security 'F' and the market portfolio 'P', the covariance between the market portfolio and security and beta for the security.

6. The rates of return on the security of Company X and market portfolio for 10 periods are given below:

Period	Return of Security X (%)	Return on Market Portfolio (%)
1	20	22
2	22	20
3	25	18
4	21	16
5	18	20
6	–5	8
7	17	–6
8	19	5
9	–7	6
10	20	11

(i) What is the beta of Security X?

(ii) What is the characteristic line for Security X?

7. XYZ Ltd. has substantial cash flow and until the surplus funds are utilised to meet the future capital expenditure, likely to happen after several months, are invested in a portfolio of short-term equity investments, details for which are given below:

Investment	No. of shares	Beta	Market price per share ₹	Expected dividend yield
I	60,000	1.16	4.29	19.50%
II	80,000	2.28	2.92	24.00%
III	1,00,000	0.90	2.17	17.50%
IV	1,25,000	1.50	3.14	26.00%

The current market return is 19% and the risk free rate is 11%.

Required to:

(i) Calculate the risk of XYZ's short-term investment portfolio relative to that of the market;

(ii) Whether XYZ should change the composition of its portfolio.

8. Mr. FedUp wants to invest an amount of ₹ 520 lakhs and had approached his Portfolio Manager. The Portfolio Manager had advised Mr. FedUp to invest in the following manner:

Security	Moderate	Better	Good	Very Good	Best
Amount (in ₹ Lakhs)	60	80	100	120	160
Beta	0.5	1.00	0.80	1.20	1.50

You are required to advise Mr. FedUp in regard to the following, using Capital Asset Pricing Methodology:

(i) Expected return on the portfolio, if the Government Securities are at 8% and the NIFTY is yielding 10%.

(ii) Advisability of replacing Security 'Better' with NIFTY.

9. Your client is holding the following securities:

Particulars of Securities	Cost ₹	Dividends ₹	Market Price ₹	BETA
Equity Shares:				
Co. X	8,000	800	8,200	0.8
Co. Y	10,000	800	10,500	0.7
Co. Z	16,000	800	22,000	0.5
PSU Bonds	34,000	3,400	32,300	0.2

Assuming a Risk-free rate of 15%, calculate:

– *Expected rate of return in each, using the Capital Asset Pricing Model (CAPM).*

– *Average return of the portfolio.*

10. Following are the details of a portfolio consisting of three shares:

Share	Portfolio weight	Beta	Expected return in %	Total variance
A	0.20	0.40	14	0.015
B	0.50	0.50	15	0.025
C	0.30	1.10	21	0.100

Standard Deviation of Market Portfolio Returns = 10%

You are given the following additional data:

Covariance (A, B) = 0.030

Covariance (A, C) = 0.020

Covariance (B, C) = 0.040

Calculate the following:

(i) The Portfolio Beta

(ii) Residual variance of each of the three shares

(iii) Portfolio variance using Sharpe Index Model

(iv) Portfolio variance (on the basis of modern portfolio theory given by Markowitz)

11. Mr. Tamarind intends to invest in equity shares of a company the value of which depends upon various parameters as mentioned below:

Factor	Beta	Expected value in %	Actual value in %
GNP	1.20	7.70	7.70
Inflation	1.75	5.50	7.00
Interest rate	1.30	7.75	9.00
Stock market index	1.70	10.00	12.00
Industrial production	1.00	7.00	7.50

If the risk free rate of interest be 9.25%, how much is the return of the share under Arbitrage Pricing Theory?

12. The following are the data on five mutual funds:

Fund	Return	Standard Deviation	Beta
A	15	7	1.25
B	18	10	0.75
C	14	5	1.40
D	12	6	0.98
E	16	9	1.50

You are required to compute Reward to Volatility Ratio and rank these portfolio using:

- Sharpe method and
- Treynor's method

assuming the risk free rate is 6%.

ANSWERS/ SOLUTIONS

Answers to Theoretical Questions

1. Please refer paragraph 10.3
2. Please refer paragraph 1.2
3. Please refer paragraph 7

Answers to the Practical Questions

1. Here, the probable returns have to be calculated using the formula

$$R = \frac{D}{P_0} + \frac{P_1 - P_0}{P_0}$$

Calculation of Probable Returns

Possible prices (P_1) ₹	P_1-P_0 ₹	[(P_1-P_0)/ P_0] x 100 Return (per cent)
115	-5	-4.17
120	0	0.00
125	5	4.17
130	10	8.33
135	15	12.50
140	20	16.67

Alternatively, it can be calculated as follows:

Calculation of Expected Returns

Possible return X_i	Probability $p(X_i)$	Product X_1-$p(X_i)$
-4.17	0.1	-0.417
0.00	0.1	0.000

4.17	0.2	0.834
8.33	0.3	2.499
12.50	0.2	2.500
16.67	0.1	1.667
		X = 7.083

Expected return X = 7.083 per

Alternatively, it can also be calculated as follows:

Expected Price = 115 x 0.1 + 120 x 0.1 + 125 x 0.2 + 130 x 0.3 + 135 x 0.2 + 140 x 0.1 = 128.50

Return = $\frac{128.50 - 120}{120} \times 100 = 7.0833\%$

Calculation of Standard Deviation of Returns

Probable return X_i	Probability $p(X_i)$	Deviation $(X_i - X)$	Deviation squared $(X_i - X)^2$	Product $(X_i - X)^2 p(X_i)$
-4.17	0.1	-11.253	126.63	12.66
0.00	0.1	-7.083	50.17	5.017
4.17	0.2	-2.913	8.49	1.698
8.33	0.3	1.247	1.56	0.467
12.50	0.2	5.417	29.34	5.869
16.67	0.1	9.587	91.91	9.191
				σ^2 = 34.902

Variance, σ^2 = 34.902 per cent

Standard deviation, $\sigma = \sqrt{34.902}$ = 5.908 per cent

2. We have $E_p = W_1E_1 + W_3E_3 + \ldots\ldots\ldots W_nE_n$

and for standard deviation $\sigma^2_p = \sum_{i=1}^{n}\sum_{j=1}^{n} w_i w_j \sigma_{ij}$

$$\sigma^2_p = \sum_{i=1}^{n} \sum_{j=1}^{n} w_i w_j \rho_{ij} \sigma_i \sigma_j$$

Two asset portfolio

$\sigma^2_p = w^2_1\sigma^2_1 + w^2_2\sigma^2_2 + 2\, w_1 w_2 \sigma_1 \sigma_2 \rho_{12}$

Substituting the respective values we get,

(i) All funds invested in B

$Ep = 12\%$

$\sigma_p = 10\%$

(ii) 50% of funds in each of B & D

$Ep = 0.50X12\%+0.50X20\%=16\%$

$\sigma^2_p = (0.50)^2(10\%)^2 + (0.50)^2(18\%)^2 +2(0.50)(0.50)(0.15)(10\%)(18\%)$

$\sigma^2_p = 25 + 81 + 13.5 = 119.50$

$\sigma_p = 10.93\%$

(iii) 75% in B and 25% in D

$Ep = 0.75\%X12\%+0.25\%X20=14\%$

$\sigma^2_p = (0.75)^2(10\%)^2 + (0.25)^2(18\%)^2 +2(0.75)(0.25)(0.15)(10\%)(18\%)$

$\sigma^2_p = 56.25 + 20.25 + 10.125 = 86.625$

$\sigma_p = 9.31\%$

(iv) All funds in D

$Ep = 20\%$

$\sigma_p = 18.0\%$

Portfolio	(i)	(ii)	(iii)	(iv)
Return	12	16	14	20
σ	10	10.93	9.31	18

In the terms of return, we see that portfolio (iv) is the best portfolio. In terms of risk we see that portfolio (iii) is the best portfolio.

3. **(i)** Expected return of the portfolio A and B

E (A) = (10 + 16) / 2 = 13%

E (B) = (12 + 18) / 2 = 15%

$$Rp = \sum_{i-l}^{N} X_i R_i = 0.4(13) + 0.6(15) = 14.2\%$$

(ii) Stock A:

Variance = 0.5 (10 – 13)² + 0.5 (16 – 13) ² = 9

Standard deviation = $\sqrt{9}$ = 3%

Stock B:

Variance = 0.5 (12 – 15) ² + 0.5 (18 – 15) ² = 9

Standard deviation = 3%

(iii) Covariance of stocks A and B

Cov_{AB} = 0.5 (10 – 13) (12 – 15) + 0.5 (16 – 13) (18 – 15) = 9

(iv) Correlation of coefficient

$$r_{AB} = \frac{Cov_{AB}}{\sigma_A \sigma_B} = \frac{9}{3 \times 3} = 1$$

(v) Portfolio Risk

$$\sigma_P = \sqrt{X^2{}_A \sigma^2{}_A + X^2{}_B \sigma^2{}_B + 2X_A X_B (\sigma_A \sigma_B \sigma_{AB})}$$

$$= \sqrt{(0.4)^2(3)^2 + (0.6)^2(3)^2 + 2(0.4)(0.6)(3)(3)(1)}$$

$$= \sqrt{1.44 + 3.24 + 4.32} = 3\%$$

4. **(i)** Security A has a return of 8% for a risk of 4, whereas B and F have a higher risk for the same return. Hence, among them A dominates.

For the same degree of risk 4, security D has only a return of 4%. Hence, D is also dominated by A.

Securities C and E remain in reckoning as they have a higher return though with higher degree of risk.

Hence, the ones to be selected are A, C & E.

(ii) The average values for A and C for a proportion of 3 : 1 will be :

Risk $= \frac{(3\times 4)+(1\times 12)}{4} = 6\%$

Return $= \frac{(3\times 8)+(1\times 12)}{4} = 9\%$

Therefore:	75% A	E
	25% C	–
Risk	6	5
Return	9%	9%

For the same 9% return the risk is lower in E. Hence, E will be preferable.

5. Security F

Prob(P)	R_f	PxR_f	Deviations of F ($R_f - ER_f$)	(Deviation)^2 of F	(Deviations)^2 P_X
0.3	30	9	13	169	50.7
0.4	20	8	3	9	3.6
0.3	0	0	-17	289	86.7
		ER_f=17			Var_f =141

STDEV $\sigma_f = \sqrt{141} = 11.87$

Market Portfolio, P

R_M %	P_M	Exp. Return $R_M \times P_M$	Dev. of P (R_M-ER_M)	(Dev. of P)^2	(DeV.)^2 P_M	(Deviation of F) x (Deviation of P)	Dev. of F x Dev. of P) x P
-10	0.3	-3	-24	576	172.8	-312	-93.6
20	0.4	8	6	36	14.4	18	7.2
30	0.3	9	16	256	76.8	-272	-81.6
		ER_M=14			Var_M=264		=Co Var P_M
					σ_M=16.25		=- 168

Beta= $\frac{\text{Co Var } P_M}{\sigma_M^2} = \frac{-168}{264} = -.636$

6. (i)

Period	R_X	R_M	$R_X - \bar{R}_X$	$R_M - \bar{R}_M$	$(R_X - \bar{R}_X)(R_M - \bar{R}_M)$	$(R_M - \bar{R}_M)^2$
1	20	22	5	10	50	100
2	22	20	7	8	56	64
3	25	18	10	6	60	36
4	21	16	6	4	24	16
5	18	20	3	8	24	64
6	-5	8	-20	-4	80	16
7	17	-6	2	-18	-36	324
8	19	5	4	-7	-28	49
9	-7	6	-22	-6	132	36
10	20	11	5	-1	-5	1
	150	120			357	706
	ΣR_X	ΣR_M			$\sum (R_X - \bar{R}_X)(R_M - \bar{R}_M)$	$\sum (R_M - \bar{R}_M)^2$

$\bar{R}_X = 15 \quad \bar{R}_M = 12$

$$\sigma^2_M = \frac{\sum\left(R_M - \bar{R}_M\right)^2}{n} = \frac{706}{10} = 70.60$$

$$Cov_{XM} = \frac{\sum\left(R_X - \bar{R}_X\right)\left(R_M - \bar{R}_M\right)}{n} = \frac{357}{10} = 35.70$$

$$Beta_x = \frac{Cov_{XM}}{\sigma^2_M} = \frac{35.70}{70.60} = 0.505$$

Alternative Solution

Period	X	Y	Y^2	XY
1	20	22	484	440
2	22	20	400	440
3	25	18	324	450
4	21	16	256	336
5	18	20	400	360

6	-5	8	64	-40
7	17	-6	36	-102
8	19	5	25	95
9	-7	6	36	-42
10	20	11	121	220
	150	120	2146	2157
	$\bar{X}$ = 15	$\bar{Y}$ = 12		

$$= \frac{\Sigma XY - n\bar{X}\bar{Y}}{\Sigma X^2 - n(\bar{X})^2}$$

$$= \frac{2157 - 10 \times 15 \times 12}{2146 - 10 \times 12 \times 12} = \frac{357}{706} = 0.506$$

(ii) $\bar{R}_X = 15$ $\bar{R}_M = 12$

$y = \alpha + \beta x$

$15 = \alpha + 0.505 \times 12$

Alpha (α) $= 15 - (0.505 \times 12) = 8.94\%$

Characteristic line for security X = $\alpha + \beta \times R_M$

Where, R_M = Expected return on Market Index

$\therefore$ Characteristic line for security X = 8.94 + 0.505 R_M

7. (i) Computation of Beta of Portfolio

Investment	*No. of shares*	*Market Price*	*Market Value*	*Dividend Yield*	*Dividend*	*Composition*	*β*	*Weighted β*
I.	60,000	4.29	2,57,400	19.50%	50,193	0.2339	1.16	0.27
II.	80,000	2.92	2,33,600	24.00%	56,064	0.2123	2.28	0.48
III.	1,00,000	2.17	2,17,000	17.50%	37,975	0.1972	0.90	0.18
IV.	1,25,000	3.14	3,92,500	26.00%	1,02,050	0.3566	1.50	0.53
			11,00,500		2,46,282	1.0000		1.46

Return of the Portfolio $\frac{2,46,282}{11,00,500} = 0.2238$

Beta of Port Folio 1.46

Market Risk implicit

$0.2238 = 0.11 + \beta \times (0.19 - 0.11)$

Or, $0.08\ \beta + 0.11 = 0.2238$

$$\beta = \frac{0.2238 - 0.11}{0.08} = 1.42$$

Market β implicit is 1.42 while the port folio β is 1.46. Thus the portfolio is marginally risky compared to the market.

(ii) The decision regarding change of composition may be taken by comparing the dividend yield (given) and the expected return as per CAPM as follows:

Expected return R_s as per CAPM is:

$R_s = I_{RF} + (R_M - I_{RF})\ \beta$

For investment I $R_s = I_{RF} + (R_M - I_{RF})\ \beta$

$= .11 + (.19 - .11)\ 1.16$

$= 20.28\%$

For investment II, $R_s = .11 + (.19 - .11)\ 2.28 = 29.24\%$

For investment III, $R_s = .11 + (.19 - .11)\ .90$

$= 18.20\%$

For investment IV, $R_s = .11 + (.19 - .11)\ 1.50$

$= 23\%$

Comparison of dividend yield with the expected return R_s shows that the dividend yields of investment I, II and III are less than the corresponding R_s,. So, these investments are over-priced and should be sold by the investor. However, in case of investment IV, the dividend yield is more than the corresponding R_s, so, XYZ Ltd. should increase its proportion.

8. **(i)** Computation of Expected Return from Portfolio

Security	Beta (β)	Expected Return (r) as per CAPM	Amount (₹ Lakhs)	Weights (w)	wr
Moderate	0.50	8%+0.50(10% - 8%) = 9%	60	0.115	1.035
Better	1.00	8%+1.00(10% - 8%) = 10%	80	0.154	1.540
Good	0.80	8%+0.80(10% - 8%) = 9.60%	100	0.192	1.843
Very Good	1.20	8%+1.20(10% - 8%)=10.40%	120	0.231	2.402

Best	1.50	8%+1.50(10% - 8%) = 11%	160	0.308	3.388
Total			520	1	10.208

Thus Expected Return from Portfolio 10.208% say 10.21%.

Alternatively, it can be computed as follows:

$$\text{Average } \beta = 0.50 \times \frac{60}{520} + 1.00 \times \frac{80}{520} + 0.80 \times \frac{100}{520} + 1.20 \times \frac{120}{520} + 1.50 \times \frac{160}{520} = 1.104$$

As per CAPM

= 0.08 + 1.104(0.10 – 0.08) = 0.10208 i.e. 10.208%

(ii) As computed above the expected return from Better is 10% same as from Nifty, hence there will be no difference even if the replacement of security is made. The main logic behind this neutrality is that the beta of security 'Better' is 1 which clearly indicates that this security shall yield same return as market return.

9. Calculation of expected return on market portfolio (R_m)

Investment	*Cost (₹)*	*Dividends (₹)*	*Capital Gains (₹)*
Shares X	8,000	800	200
Shares Y	10,000	800	500
Shares Z	16,000	800	6,000
PSU Bonds	34,000	3,400	–1,700
	68,000	5,800	5,000

$$R_m = \frac{5,800 + 5,000}{68,000} \times 100 = 15.88\%$$

Calculation of expected rate of return on individual security:

Security		
Shares X	15 + 0.8 (15.88 – 15.0)	= 15.70%
Shares Y	15 + 0.7 (15.88 – 15.0)	= 15.62%
Shares Z	15 + 0.5 (15.88 – 15.0)	= 15.44%
PSU Bonds	15 + 0.2 (15.88 – 15.0)	= 15.18%

Calculation of the Average Return of the Portfolio:

$$= \frac{15.70 + 15.62 + 15.44 + 15.18}{4} = 15.49\%.$$

10. **(i)** Portfolio Beta

0.20 x 0.40 + 0.50 x 0.50 + 0.30 x 1.10 = 0.66

(ii) Residual Variance

To determine Residual Variance first of all we shall compute the Systematic Risk as follows:

$\beta_A^2 \times \sigma_M^2 = (0.40)^2(0.01) = 0.0016$

$\beta_B^2 \times \sigma_M^2 = (0.50)^2(0.01) = 0.0025$

$\beta_C^2 \times \sigma_M^2 = (1.10)^2(0.01) = 0.0121$

Residual Variance

A	0.015 – 0.0016 = 0.0134
B	0.025 – 0.0025 = 0.0225
C	0.100 – 0.0121 = 0.0879

(iii) Portfolio variance using Sharpe Index Model

Systematic Variance of Portfolio = $(0.10)^2 \times (0.66)^2 = 0.004356$

Unsystematic Variance of Portfolio = $0.0134 \times (0.20)^2 + 0.0225 \times (0.50)^2 + 0.0879 \times (0.30)^2 = 0.014072$

Total Variance = 0.004356 + 0.014072 = 0.018428

(iii) Portfolio variance on the basis of Markowitz Theory

$= (w_A \times w_A \times \sigma_A^2) + (w_A \times w_B \times Cov_{AB}) + (w_A \times w_C \times Cov_{AC}) + (w_B \times w_A \times Cov_{AB}) + (w_B \times w_B \times \sigma_B^2) + (w_B \times w_C \times Cov_{BC}) + (w_C \times w_A \times Cov_{CA}) + (w_C \times w_B \times Cov_{CB}) + (w_C \times w_C \times \sigma_c^2)$

= (0.20 x 0.20 x 0.015) + (0.20 x 0.50 x 0.030) + (0.20 x 0.30 x 0.020) + (0.20 x 0.50 x 0.030) + (0.50 x 0.50 x 0.025) + (0.50 x 0.30 x 0.040) + (0.30 x 0.20 x 0.020) + (0.30 x 0.50 x 0.040) + (0.30 x 0.30 x 0.10)

= 0.0006 + 0.0030 + 0.0012 + 0.0030 + 0.00625 + 0.0060 + 0.0012 + 0.0060 + 0.0090

= 0.0363

11. **Return of the stock under APT**

Factor	*Actual value in %*	*Expected value in %*	*Difference*	*Beta*	*Diff. x Beta*
GNP	7.70	7.70	0.00	1.20	0.00

Inflation	7.00	5.50	1.50	1.75	2.63
Interest rate	9.00	7.75	1.25	1.30	1.63
Stock index	12.00	10.00	2.00	1.70	3.40
Ind. Production	7.50	7.00	0.50	1.00	0.50
					8.16
Risk free rate in %					9.25
Return under APT					17.41

12. Sharpe Ratio $S = (R_p - R_f)/\sigma_p$

Treynor Ratio $T = (R_p - R_f)/\beta_p$

Where,

R_p = Return on Fund

R_f = Risk-free rate

σ_p = Standard deviation of Fund

β_p = Beta of Fund

Reward to Variability (Sharpe Ratio)

Mutual Fund	R_p	R_f	$R_p - R_f$	σ_p	Reward to Variability	Ranking
A	15	6	9	7	1.285	2
B	18	6	12	10	1.20	3
C	14	6	8	5	1.60	1
D	12	6	6	6	1.00	5
E	16	6	10	9	1.11	4

Reward to Volatility (Treynor Ratio)

Mutual Fund	R_p	R_f	$R_p - R_f$	β_p	Reward to Volatility	Ranking
A	15	6	9	1.25	7.2	2
B	18	6	12	0.75	16	1
C	14	6	8	1.40	5.71	5
D	12	6	6	0.98	6.12	4
E	16	6	10	1.50	6.67	3

CHAPTER 6

SECURITIZATION

LEARNING OUTCOMES

After going through the chapter student shall be able to understand

- Introduction
- Concept and Definition
- Benefits of Securitization
- Participants in Securitization
- Mechanism of Securitization
- Problems in Securitization
- Securitization Instruments
- Pricing of Securitization Instruments
- Securitization in India

1. INTRODUCTION

Some companies or firms who are involved in sending the money or making credit sale must have a huge balance of receivables in their Balance Sheet. Though they have a huge receivable but still they may face liquidity crunch to run their business. One way may to adopt borrowing route, but this results in changing the debt equity ratio of the company which may not only be acceptable to some stakeholders but also put companies to financial risk which affects the future borrowings by the company. To overcome this problem the term 'securitization' was coined.

2. CONCEPT AND DEFINITION

The process of securitization typically involves the creation of pool of assets from the illiquid financial assets, such as receivables or loans which are marketable. In other words, it is the process of repackaging or rebundling of illiquid assets into marketable securities. These assets can be automobile loans, credit card receivables, residential mortgages or any other form of future receivables.

Features of Securitization

The securitization has the following features:

(i) Creation of Financial Instruments – The process of securities can be viewed as process of creation of additional financial product of securities in market backed by collaterals.

(ii) Bundling and Unbundling – When all the assets are combined in one pool it is bundling and when these are broken into instruments of fixed denomination it is unbundling.

(iii) Tool of Risk Management – In case of assets are securitized on non-recourse basis, then securitization process acts as risk management as the risk of default is shifted.

(iv) Structured Finance – In the process of securitization, financial instruments are tailor structured to meet the risk return trade of profile of investor, and hence, these securitized instruments are considered as best examples of structured finance.

(v) Tranching – Portfolio of different receivable or loan or asset are split into several parts based on risk and return they carry called 'Tranche'. Each Trench carries a different level of risk and return.

(vi) Homogeneity – Under each tranche the securities issued are of homogenous nature and even meant for small investors who can afford to invest in small amounts.

3. BENEFITS OF SECURITIZATION

The benefits of securitization can be viewed from the angle of various parties involved as follows:

3.1 From the angle of originator

Originator (entity which sells assets collectively to Special Purpose Vehicle) achieves the following benefits from securitization.

(i) Off – Balance Sheet Financing: When loan/receivables are securitized it releases a portion of capital tied up in these assets resulting in off Balance Sheet financing leading to improved liquidity position which helps in expanding the business of the company.

(ii) More specialization in main business: By transferring the assets the entity could concentrate more on core business as servicing of loan is transferred to SPV. Further, in case of non-recourse arrangement even the burden of default is shifted.

(iii) Helps to improve financial ratios: Especially in case of Financial Institutions and Banks, it helps to manage Capital –To-Weighted Asset Ratio effectively.

(iv) Reduced borrowing Cost: Since securitized papers are rated due to credit enhancement even they can also be issued at reduced rate as of debts and hence the originator earns a spread, resulting in reduced cost of borrowings.

3.2 From the angle of investor

Following benefits accrues to the investors of securitized securities.

1. Diversification of Risk: Purchase of securities backed by different types of assets provides the diversification of portfolio resulting in reduction of risk.

2. Regulatory requirement: Acquisition of asset backed belonging to a particular industry say micro industry helps banks to meet regulatory requirement of investment of fund in industry specific.

3. Protection against default: In case of recourse arrangement if there is any default by any third party then originator shall make good the least amount. Moreover, there can be insurance arrangement for compensation for any such default.

4. PARTICIPANTS IN SECURITIZATION

Broadly, the participants in the process of securitization can be divided into two categories; one is Primary Participant and the other is Secondary Participant.

4.1 Primary Participants

Primary Participants are main parties to this process. The primary participants in the process of securitization are as follows:

(a) Originator: It is the initiator of deal or can be termed as securitizer. It is an entity which sells the assets lying in its books and receives the funds generated through the sale of such assets. The originator transfers both legal as well as beneficial interest to the Special Purpose Vehicle (discussed later).

(b) Special Purpose Vehicle: Also, called SPV is created for the purpose of executing the deal. Since issuer originator transfers all rights in assets to SPV, it holds the legal title of these assets. It is created especially for the purpose of securitization only and normally could be in form of a company, a firm, a society or a trust.

The main objective of creating SPV is to remove the asset from the Balance Sheet of Originator. Since, SPV makes an upfront payment to the originator, it holds the key position in the overall process of securitization. Further, it also issues the securities (called Asset Based Securities or Mortgage Based Securities) to the investors.

(c) The Investors: Investors are the buyers of securitized papers which may be an individual, an institutional investor such as mutual funds, provident funds, insurance companies, mutual funds, Financial Institutions etc.

Since, they acquire a participating in the total pool of assets/receivable, they receive their money back in the form of interest and principal as per the terms agreed.

4.2 Secondary Participants

Besides the primary participants other parties involved into the securitization process are as follows:

(a) Obligors: Actually they are the main source of the whole securitization process. They are the parties who owe money to the firm and are assets in the Balance Sheet of Originator. The amount due from the obligor is transferred to SPV and hence they form the basis of securitization process and their credit standing is of paramount importance in the whole process.

(b) Rating Agency: Since the securitization is based on the pools of assets rather than the originators, the assets have to be assessed in terms of its credit quality and credit support available. Rating agency assesses the following:

- Strength of the Cash Flow.
- Mechanism to ensure timely payment of interest and principle repayment.
- Credit quality of securities.
- Liquidity support.
- Strength of legal framework.

Although rating agency is secondary to the process of securitization but it plays a vital role.

(c) Receiving and Paying agent (RPA): Also, called Servicer or Administrator, it collects the payment due from obligor(s) and passes it to SPV. It also follow up with defaulting borrower and if required initiate appropriate legal action against them. Generally, an originator or its affiliates acts as servicer.

(d) Agent or Trustee: Trustees are appointed to oversee that all parties to the deal perform in the true spirit of terms of agreement. Normally, it takes care of interest of investors who acquires the securities.

(e) Credit Enhancer: Since investors in securitized instruments are directly exposed to

performance of the underlying and sometime may have limited or no recourse to the originator, they seek additional comfort in the form of credit enhancement. In other words, they require credit rating of issued securities which also empowers marketability of the securities.

Originator itself or a third party say a bank may provide this additional context called Credit Enhancer. While originator provides his comfort in the form of over collateralization or cash collateral, the third party provides it in form of letter of credit or surety bonds.

(f) Structurer: It brings together the originator, investors, credit enhancers and other parties to the deal of securitization. Normally, these are investment bankers also called arranger of the deal. It ensures that deal meets all legal, regulatory, accounting and tax laws requirements.

5. MECHANISM OF SECURITIZATION

Let us discuss briefly the steps in securitization mechanism:

5.1 Creation of Pool of Assets

The process of securitization begins with creation of pool of assets by segregation of assets backed by similar type of mortgages in terms of interest rate, risk, maturity and concentration units.

5.2 Transfer to SPV

One assets have been pooled, they are transferred to Special Purpose Vehicle (SPV) especially created for this purpose.

5.3 Sale of Securitized Papers

SPV designs the instruments based on nature of interest, risk, tenure etc. based on pool of assets. These instruments can be Pass Through Security or Pay Through Certificates, (discussed later).

5.4 Administration of assets

The administration of assets in subcontracted back to originator which collects principal and interest from underlying assets and transfer it to SPV, which works as a conduct.

5.5 Recourse to Originator

Performance of securitized papers depends on the performance of underlying assets and unless specified in case of default they go back to originator from SPV.

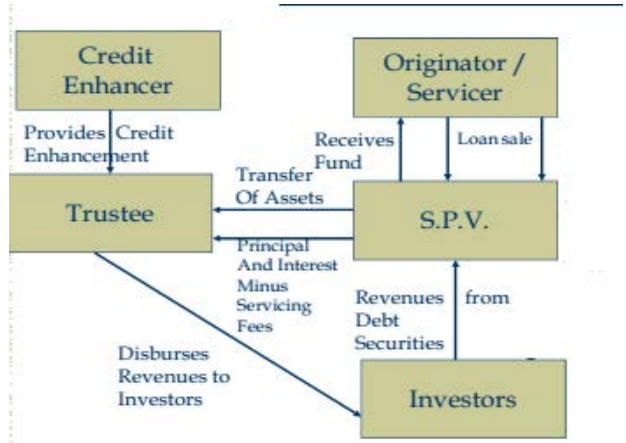
5.6 Repayment of funds

SPV will repay the funds in form of interest and principal that arises from the assets pooled.

5.7 Credit Rating to Instruments

Sometime before the sale of securitized instruments credit rating can be done to assess the risk of the issuer.

The mechanism of Securitization has been shown below in form of a diagram.



6. PROBLEMS IN SECURITIZATION

Following are main problems faced in growth of Securitization of instruments especially in Indian context:

6.1 Stamp Duty

Stamp Duty is one of the obstacle in India. Under Transfer of Property Act, 1882, a mortgage debt stamp duty which even goes upto 12% in some states of India and this impeded the growth of securitization in India. It should be noted that since pass through certificate does not evidence any debt only able to receivable, they are exempted from stamp duty.

Moreover, in India, recognizing the special nature of securitized instruments in some states has reduced the stamp duty on them.

6.2 Taxation

Taxation is another area of concern in India. In the absence of any specific provision relating to securitized instruments in Income Tax Act experts' opinion differ a lot. Some are of opinion that SPV as a trustee is liable to be taxed in a representative capacity then others are of view that instead of SPV, investors will be taxed on their share of income. Clarity is also required on the issues of capital gain implications on passing payments to the investors.

6.3 Accounting

Accounting and reporting of securitized assets in the books of originator is another area of concern. Although securitization is slated to be an off-balance sheet instrument but in true sense receivables are removed from originator's balance sheet. Problem arises especially when assets are transferred without recourse.

6.4 Lack of standardization

Every originator following his own format for documentation and administration having lack of standardization is another obstacle in the growth of securitization.

6.5 Inadequate Debt Market

Lack of existence of a well-developed debt market in India is another obstacle that hinders the growth of secondary market of securitized or asset backed securities.

6.6 Ineffective Foreclosure laws

For many years efforts are on for effective foreclosure but still foreclosure laws are not supportive to lending institutions and this makes securitized instruments especially mortgaged backed securities less attractive as lenders face difficulty in transfer of property in event of default by the borrower.

7. SECURITIZATION INSTRUMENTS

On the basis of different maturity characteristics, the securitized instruments can be divided into following three categories:

7.1 Pass Through Certificates (PTCs)

As the title suggests originator (seller of the assets) transfers the entire receipt of cash in the form of interest or principal repayment from the assets sold. Thus, these securities represent direct claim of the investors on all the assets that has been securitized through SPV.

Since all cash flows are transferred the investors carry proportional beneficial interest in the asset held in the trust by SPV.

It should be noted that since it is a direct route any prepayment of principal is also proportionately distributed among the securities holders. Further, due to these characteristics on completion of securitization by the final payment of assets, all the securities are terminated simultaneously.

Skewness of cash flows occurs in early stage if principals are repaid before the scheduled time.

7.2 Pay Through Security (PTS)

As mentioned earlier, since, in PTCs all cash flows are passed to the performance of the securitized assets. To overcome this limitation and limitation to single mature there is another structure i.e. PTS.

In contrast to PTC in PTS, SPV debt securities are backed by the assets and hence it can restructure different tranches from varying maturities of receivables.

In other words, this structure permits desynchronization of servicing of securities issued from cash flow generating from the asset. Further, this structure also permits the SPV to reinvest surplus funds for short term as per their requirement.

Since, in Pass Through, all cash flow immediately in PTS in case of early retirement of receivables plus cash can be used for short term yield. This structure also provides the freedom to issue several debt tranches with varying maturities.

7.3 Stripped Securities

Stripped Securities are created by dividing the cash flows associated with underlying securities into two or more new securities. Those two securities are as follows:

(i) Interest Only (IO) Securities

(ii) Principle Only (PO) Securities

As each investor receives a combination of principal and interest, it can be stripped into two portion of Interest and Principle.

Accordingly, the holder of IO securities receives only interest while PO security holder receives only principal. Being highly volatile in nature these securities are less preferred by investors.

In case yield to maturity in market rises, PO price tends to fall as borrower prefers to postpone the payment on cheaper loans. Whereas if interest rate in market falls, the borrower tends to repay the loans as they prefer to borrow fresh at lower rate of interest.

In contrast, value of IO's securities increases when interest rate goes up in the market as more interest is calculated on borrowings.

However, when interest rate due to prepayments of principals, IO's tends to fall.

Thus, from the above, it is clear that it is mainly perception of investors that determines the prices of IOs and Pos

8. PRICING OF THE SECURITIZED INSTRUMENTS

Pricing of securitized instruments in an important aspect of securitization. While pricing the instruments, it is important that it should be acceptable to both originators as well as to the investors. On the same basis pricing of securities can be divided into following two categories:

8.1 From Originator's Angle

From originator's point of view, the instruments can be priced at a rate at which originator has to incur an outflow and if that outflow can be amortized over a period of time by investing the amount raised through securitization.

8.2 From Investor's Angle

From an investor's angle security price can be determined by discounting best estimate of expected future cash flows using rate of yield to maturity of a security of comparable security with respect to credit quality and average life of the securities. This yield can also be estimated by referring the yield curve available for marketable securities, though some adjustments is needed on account of spread points, because of credit quality of the securitized instruments.

9. SECURITIZATION IN INDIA

It is the Citi Bank who pioneered the concept of securitization in India by bundling of auto loans into securitized instruments.

Thereafter many organizations securitized their receivables. Although started with securitization of auto loans it moved to other types of receivables such as sales tax deferrals, aircraft receivable etc.

In order to encourage securitization, the Government has come out with Securitization and Reconstruction of Financial Assets and Enforcement of Security Interest (SARFAESI) Act, 2002, to tackle menace of Non Performing Assets (NPAs) without approaching the Court.

With growing sophistication of financial products in Indian Capital Market, securitization has occupied an important place.

As mentioned above, though, initially started with auto loan receivables, it has become an important source of funding for micro finance companies and NBFCs and even now a days commercial mortgage backed securities are also emerging.

The important highlight of the scenario of securitization in Indian Market is that it is dominated by a few players e.g. ICICI Bank, HDFC Bank, NHB etc.

As per a report of CRISIL, securitization transactions in India scored to the highest level of approximately ₹ 70000 crores, in Financial Year 2016. (Business Line, 15th June, 2016)

In order to further enhance the investor base in securitized debts, SEBI has allowed FPIs to invest in securitized debt of unlisted companies upto a certain limit.

TEST YOUR KNOWLEDGE

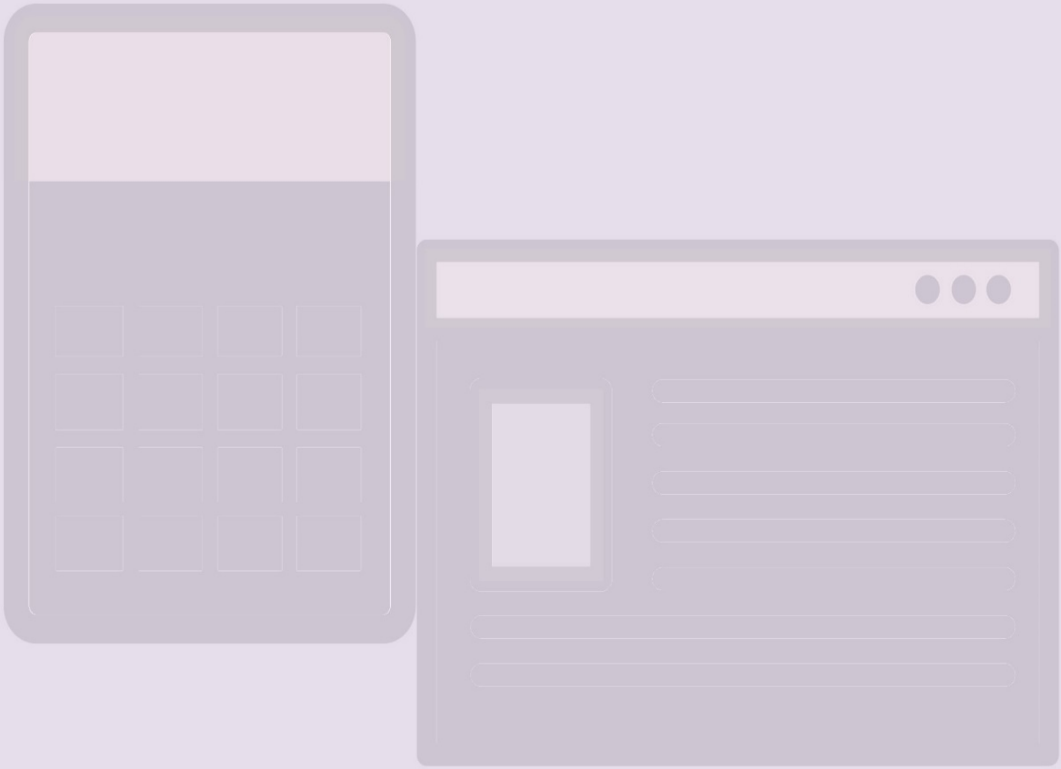
Theoretical Questions

1. Differentiate between PTS and PTC.
2. What are the main problems faced in securitisation especially in Indian context?

ANSWERS/ SOLUTIONS

Answers to Theoretical Questions

1. Please refer paragraph 7
2. Please refer paragraph 6



CHAPTER 7

MUTUAL FUNDS

LEARNING OUTCOMES

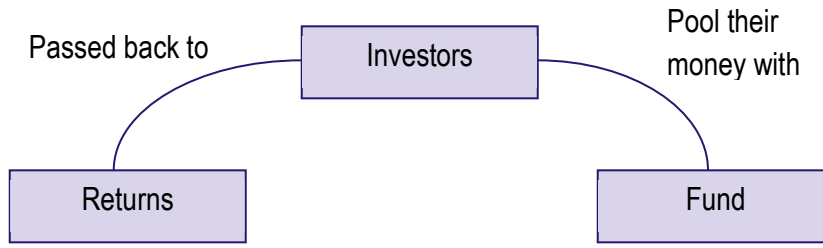
After going through the chapter student shall be able to understand:

- Basics of Mutual Funds
- Evolution of Mutual Funds
- Classification of Mutual Funds
- Types of Schemes
- Advantages of Mutual Fund
- Drawbacks of Mutual Fund
- Terms associated with Mutual Funds

1. INTRODUCTION

Mutual Fund is a trust that pools together the resources of investors to make a foray into investments in the capital market thereby making the investor to be a part owner of the assets of the mutual fund. The fund is managed by a

professional money manager who invests the money collected from different investors in various stocks, bonds or other securities according to specific investment objectives as established by the fund. If the value of the mutual fund investments goes up, the return on them increases and vice versa. The net income earned on the funds, along with capital appreciation of the investment, is shared amongst the unit holders in proportion to the units owned by them. Mutual Fund is therefore an indirect vehicle for the investor investing in capital markets. In return for administering the fund and managing its investment portfolio, the fund manager charges fees based on the value of the fund's assets.



How does a mutual fund work?

1.1 Mutual Benefits

Investing in mutual funds is an expert's job in the present market scenario. A systematic investment in this instrument is bound to give rich dividends in the long-term. That is why over 2 crore investors have faith in mutual funds.

1.2 What is a Mutual Fund

A mutual fund is a trust that pools the savings of a number of investors who share a common financial goal. A mutual fund is the most suitable investment for the cautious investor as it offers an opportunity to invest in a diversified professionally managed basket of securities at a relatively low cost. So, we can say that Mutual Funds are trusts which pool resources from large number of investors through issue of units for investments in capital market instruments such as shares, debentures and bonds and money-market instruments such as commercial papers, certificate of deposits and treasury bonds.

1.3 Who can invest in Mutual Funds

Anybody with an investible surplus of as little as a few thousand rupees can invest in mutual funds by buying units of a particular mutual fund scheme that has a defined investment objective and strategy.

1.4 How Mutual Funds work for you

The money collected from the investors is invested by a fund manager in different types of securities. These could range from shares and debentures to money market instruments depending upon the scheme's stated objectives.

The income earned through these investments and capital appreciation realized by the scheme is shared by its unit holders in proportion to the units owned by them. (please refer the diagram above)

1.5 Should we invest in Stocks or Mutual Funds?

As soon as, you have set your goals and decided to invest in equity the question arises should you invest in stocks or mutual funds? Well, you need to decide what kind of an investor you are.

First, consider if you have the kind of disposable income to invest in 15-20 stocks. That is how many stocks you will have to invest in if you want to create a well-diversified portfolio. Remember the

familiar adage: Do not put all your eggs in one basket? If ₹ 5,000 were all you have to spare, it would be impractical to invest it across many stocks.

Many beginners tend to focus on stocks that have a market price of less than ₹ 100 or ₹ 50; that should never be a criterion for choosing a stock. Also, brokerage could eat into your returns if you purchase small quantities of a stock.

On the other hand, you would be able to gain access to a wide basket of stocks for ₹ 5,000 if you buy into a fund. Investing in funds would also be an easy way to build your equity portfolio over time.

Let's say you can afford to put away only ₹ 1,000 a month in the market. You can simply invest in a fund every month through a systematic investment plan (SIP) as a matter of financial discipline. You can save yourself the trouble of scouting for a stock every month.

That brings us to the next point. Do you have the time to pick stocks? You need to invest a considerable amount of time reading newspapers, magazines, annual reports, quarterly updates, industry reports and talking to people who are familiar with industry practices. Else, you certainly won't catch a trend or pick a stock ahead of the market. How many great investors have you heard of who have not made investing their full-time job?

Plus, you may have the time, but not the inclination. You have to be an active investor, which means continuously monitor the stocks you pick and make changes – buy more, cut exposures – depending upon the turn of events. These actions have costs as well. As you churn your portfolio, you bear expenses such as capital gains tax. Funds do not pay capital gains tax when they sell a stock.

All this assumes you know what you are doing and have the skill to pick the right stocks. You are likely to be better at investing in an industry you understand. Only, too bad if that industry appears to be out of favour in the market.

If you love the thrill of the ups and downs in the stock market; if you find yourself turning to business channels and business newspapers hoping that you can pick the next Infosys; if you have an instinct for spotting stocks and, importantly, the discipline to act on it; if you have the emotional maturity to cut your losses when you are ahead, then you can trust yourself to invest in stocks.

Otherwise, hand over your money to the professional. Mutual funds could be the best avenue for the risk-averse Investors.

2. EVOLUTION OF THE INDIAN MUTUAL FUND INDUSTRY

The mutual fund industry in India started in 1963 with the formation of Unit Trust of India, at the initiative of the Government of India and Reserve Bank of India. The history of mutual funds in India can be broadly divided into four distinct phases.

First Phase – 1964-87

Unit Trust of India (UTI) was established in 1963 by an Act of Parliament. It was set up by the

Reserve Bank of India and functioned under the regulatory and administrative control of the Reserve Bank of India. In 1978, UTI was de-linked from the RBI and the Industrial Development Bank of India (IDBI) took over the regulatory and administrative control in place of RBI. The first scheme launched by UTI was Unit Scheme 1964. At the end of 1988, UTI had ₹ 6,700 crores of assets under management.

Second Phase – 1987-1993 (Entry of Public Sector Funds)

1987 marked the entry of non- UTI, public sector mutual funds set up by public sector banks, Life Insurance Corporation of India (LIC) and General Insurance Corporation of India (GIC). SBI Mutual Fund was the first non- UTI Mutual Fund established in June 1987 followed by Canbank Mutual Fund (Dec 87), Punjab National Bank Mutual Fund (Aug 89), Indian Bank Mutual Fund (Nov 89), Bank of India (Jun 90), Bank of Baroda Mutual Fund (Oct 92). LIC established its mutual fund in June 1989 while GIC had set up its mutual fund in December 1990. At the end of 1993, the mutual fund industry had assets under management of ₹ 47,004 crores.

Third Phase – 1993-2003 (Entry of Private Sector Funds)

With the entry of private sector funds in 1993, a new era started in the Indian mutual fund industry, giving the Indian investors a wider choice of fund families. Also, 1993 was the year in which the first Mutual Fund Regulations came into being, under which all mutual funds except UTI were to be registered and governed. The erstwhile Kothari Pioneer (now merged with Franklin Templeton) was the first private sector mutual fund registered in July 1993. The 1993 SEBI (Mutual Fund) Regulations were substituted by a more comprehensive and revised Mutual Fund Regulations in 1996. The industry now functions under the SEBI (Mutual Fund) Regulations 1996. The number of mutual fund houses went on increasing, with many foreign mutual funds setting up funds in India. The industry has also witnessed several mergers and acquisitions. As at the end of January 2003, there were 33 mutual funds with total assets of ₹1,21,805 crores. The Unit Trust of India with ₹ 44,541 crores of assets under management was way ahead of other mutual funds.

Fourth Phase – since February 2003

In February 2003, following the repeal of the Unit Trust of India Act 1963, UTI was bifurcated into two separate entities. One is the Specified Undertaking of the Unit Trust of India with assets under management of ₹ 29,835 crores as at the end of January 2003, representing broadly, the assets of US 64 scheme, assured return and certain other schemes. The Specified Undertaking of Unit Trust of India, functioning under an administrator and under the rules framed by Government of India does not come under the purview of the Mutual Fund Regulations. The second is the UTI Mutual Fund, sponsored by SBI, PNB, BOB and LIC. It is registered with SEBI and functions under the Mutual Fund Regulations. With the bifurcation of the erstwhile UTI which had in March 2000 more than ₹ 76,000 crores of assets under management and with the setting up of a UTI Mutual Fund, conforming to the SEBI Mutual Fund Regulations, and with recent mergers taking place among different private sector funds, the mutual fund industry has entered its current phase of consolidation and growth.

Moreover, in its effort to increase investor awareness, the industry and the Securities and Exchange Board of India (SEBI) have launched several initiatives. These include literature and campaigns to propagate financial education to various investor segments (including potential investors), such as school and college students, homemakers, executives, etc.

3. CLASSIFICATION OF MUTUAL FUNDS

There are three different types of classification of mutual funds - (1) Functional (2) Portfolio and (3) Ownership. Each classification is mutually exclusive.

3.1 Functional Classification

Funds are divided into:

(1) Open ended funds

(2) Close ended funds and

In an open ended scheme, the investor can make entry and exit at any time. Also, the capital of the fund is unlimited and the redemption period is indefinite. On the contrary, in a close ended scheme, the investor can buy into the scheme during Initial Public offering or from the stock market after the units have been listed. The scheme has a limited life at the end of which the corpus is liquidated. The investor can make his exit from the scheme by selling in the stock market, or at the expiry of the scheme or during repurchase period at his option. Interval schemes are a cross between an open ended and a close ended structure. These schemes are open for both purchase and redemption during pre-specified intervals (viz. monthly, quarterly, annually etc.) at prevailing NAV based prices. Interval funds are very similar to close-ended funds, but differ on the following points:

- They are not required to be listed on the stock exchanges, as they have an in-built redemption window.
- They can make fresh issue of units during the specified interval period, at the prevailing NAV based prices.
- Maturity period is not defined.

3.2 Portfolio Classification

Funds are classified into Equity Funds, Debt Funds and Special Funds.

Equity funds invest primarily in stocks. A share of stock represents a unit of ownership in a company. If a company is successful, shareholders can profit in two ways:

- the stock may increase in value, or
- the company can pass its profits to shareholders in the form of dividends.

If a company fails, a shareholder can lose the entire value of his or her shares; however, a shareholder is not liable for the debts of the company.

3.2.1 Equity Funds

Equity Funds are of the following types viz.

(a) **Growth Funds:** They seek to provide long term capital appreciation to the investor and are best to long term investors.

(b) **Aggressive Funds:** They look for super normal returns for which investment is made in start-ups, IPOs and speculative shares. They are best to investors willing to take risks.

(c) **Income Funds:** They seek to maximize present income of investors by investing in safe stocks paying high cash dividends and in high yield money market instruments. They are best to investors seeking current income.

(d) **Balanced Funds:** They are a mix of growth and income funds. They buy shares for growth and bonds for income and best for investors seeking to strike golden mean.

3.2.2 Debt Funds

Debt Funds are of two types viz.

(a) **Bond Funds:** They invest in fixed income securities e.g. government bonds, corporate debentures, convertible debentures, money market. Investors seeking tax free income go in for government bonds while those looking for safe, steady income buy government bonds or high grade corporate bonds. Although there have been past exceptions, bond funds tend to be less volatile than stock funds and often produce regular income. For these reasons, investors often use bond funds to diversify, provide a stream of income, or invest for intermediate-term goals. Like stock funds, bond funds have risks and can make or lose money.

(b) **Gilt Funds:** They are mainly invested in Government securities.

3.2.3 Special Funds

Special Funds are of four types viz.

(a) **Index Funds:** Every stock market has a stock index which measures the upward and downward sentiment of the stock market. Index Funds are low cost funds and influence the stock market. The investor will receive whatever the market delivers.

(b) **International Funds:** A mutual fund located in India to raise money in India for investing globally.

(c) **Offshore Funds:** A mutual fund located in India to raise money globally for investing in India.

(d) **Sector Funds:** They invest their entire fund in a particular industry e.g. utility fund for utility industry like power, gas, public works.

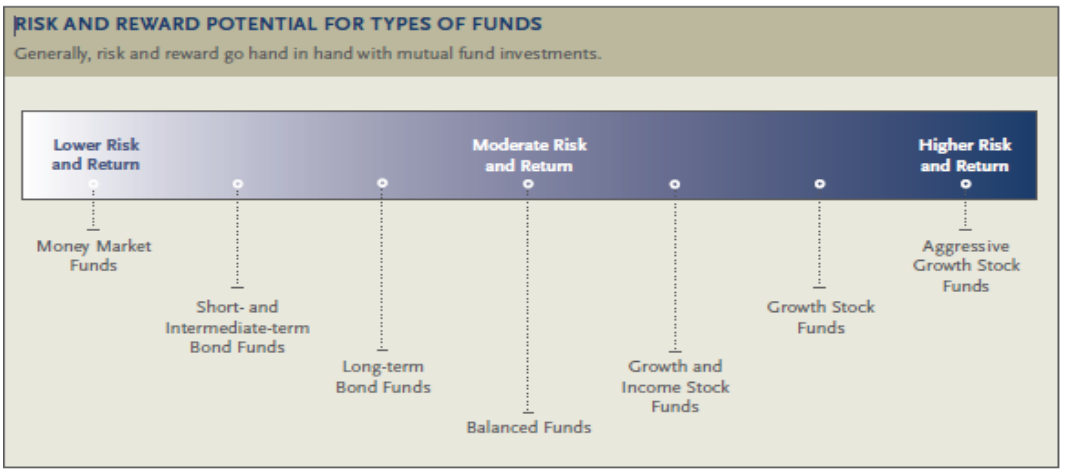
(e) **Money Market Funds:** These are predominantly debt-oriented schemes, whose main objective is preservation of capital, easy liquidity and moderate income. To achieve this objective, liquid funds invest predominantly in safer short-term instruments like Commercial Papers, Certificate of Deposits, Treasury Bills, G-Secs etc.

These schemes are used mainly by institutions and individuals to park their surplus funds for short periods of time. These funds are more or less insulated from changes in the interest rate in the economy and capture the current yields prevailing in the market.

(f) **Fund of Funds:** Fund of Funds (FoF) as the name suggests are schemes which invest in other mutual fund schemes. The concept is popular in markets where there are number of mutual fund offerings and choosing a suitable scheme according to one's objective is tough. Just as a mutual fund scheme invests in a portfolio of securities such as equity, debt etc, the underlying investments for a FoF is the units of other mutual fund schemes, either from the same fund family or from other fund houses.

(g) **Capital Protection Oriented Fund:** The term 'capital protection oriented scheme' means a mutual fund scheme which is designated as such and which endeavours to protect the capital invested therein through suitable orientation of its portfolio structure. The orientation towards protection of capital originates from the portfolio structure of the scheme and not from any bank guarantee, insurance cover etc. SEBI stipulations require these types of schemes to be close-ended in nature, listed on the stock exchange and the intended portfolio structure would have to be mandatory rated by a credit rating agency. A typical portfolio structure could be to set aside major portion of the assets for capital safety and could be invested in highly rated debt instruments. The remaining portion would be invested in equity or equity related instruments to provide capital appreciation. Capital Protection Oriented schemes are a recent entrant in the Indian capital markets and should not be confused with 'capital guaranteed' schemes.

(h) **Gold Funds:** The objective of these funds is to track the performance of Gold. The units represent the value of gold or gold related instruments held in the scheme. Gold Funds which are generally in the form of an Exchange Traded Fund (ETF) are listed on the stock exchange and offers investors an opportunity to participate in the bullion market without having to take physical delivery of gold.



3.3 Ownership Classification

Funds are classified into Public Sector Mutual Funds, Private Sector Mutual Funds and Foreign Mutual Funds. Public Sector Mutual Funds are sponsored by a company of the public sector. Private Sector Mutual Fund is sponsored by a company of the private sector. Foreign Mutual Funds are sponsored by companies for raising funds in India, operate from India and invest in India.

3.4 Direct Plans in Mutual Funds

Asset management companies (AMC) have been permitted to make direct investments in mutual fund schemes even before 2011. But, there were no separate plans for these investments. These investments were made in distributor plan itself and were tracked with single NAV - one of the distributor plans. Therefore, an investor was forced to buy mutual funds based on the NAV of the distributor plans. However, things changed with introduction of direct plans by SEBI on January 1, 2013.

Mutual fund direct plans are those plan where Asset Management Companies or mutual fund Houses do not charge distributor expenses, trail fees and transaction charges. NAV of the direct plan are generally higher in comparison to a regular plan. Studies have shown that the 'Direct Plans' have performed better than the 'Regular Plans' for almost all the mutual fund schemes.

4. TYPES OF SCHEMES

4.1 Balanced Funds

Balanced funds make strategic allocation to both debt as well as equities. It mainly works on the premise that while the debt portfolio of the scheme provides stability, the equity one provides growth. It can be an ideal option for those who do not like total exposure to equity, but only substantial exposure. Such funds provide moderate returns to the investors as the investors are neither taking too high risk nor too low a risk.

4.2 Equity Diversified Funds

A Diversified funds is a fund that contains a wide array of stocks. The fund manager of a diversified fund ensures a high level of diversification in its holdings, thereby reducing the amount of risk in the fund.

a. Flexicap/ Multicap Fund: These are by definition, diversified funds. The only difference is that unlike a normal diversified fund, the offer document of a multi-cap/flexi-cap fund generally spells out the limits for minimum and maximum exposure to each of the market caps.

b. Contra fund: A contra fund invests in those out-of-favour companies that have unrecognised value. It is ideally suited for investors who want to invest in a fund that has the potential to perform in all types of market environments as it blends together both growth and value opportunities. Investors who invest in contra funds have an aggressive risk appetite.

c. Index fund: An index fund seeks to track the performance of a benchmark market index like the BSE Sensex or S&P CNX Nifty. Simply put, the fund maintains the portfolio of all the securities in the same proportion as stated in the benchmark index and earns the same return as earned by the market.

d. Dividend Yield fund: A dividend yield fund invests in shares of companies having high dividend yields. Dividend yield is defined as dividend per share dividend by the share's market price. Most of these funds invest in stocks of companies having a dividend yield higher than the dividend yield of a particular index, i.e., Sensex or Nifty. The prices of dividend yielding stocks are generally less volatile than growth stocks. Besides, they also offer the potential to appreciate.

Among diversified equity funds, dividend yield funds are considered to be a medium-risk proposition. However, it is important to note that dividend yield funds have not always proved resilient in short-term corrective phases. Dividend yield schemes are of two types:

- Dividend Payout Option: Dividends are paid out to the unit holders under this option. However, the NAV of the units falls to the extent of the dividend paid out and applicable statutory levies.
- Dividend Re-investment Option: The dividend that accrues on units under option is re-invested back into the scheme at ex-dividend NAV. Hence investors receive additional units on their investments in lieu of dividends.

4.3 Equity Linked Tax Savings Scheme

ELSS is one of the options for investors to save taxes under Section 80 C of the Income Tax Act. They also offer the perfect way to participate in the growth of the capital market, having a lock-in-period of three years. Besides, ELSS has the potential to give better returns than any traditional tax savings instrument.

Moreover, by investing in an ELSS through a Systematic Investment Plan (SIP), one can not only avoid the problem of investing a lump sum towards the end of the year but also take advantage of "averaging".

4.4 Sector Funds

These funds are highly focused on a particular industry. The basic objective is to enable investors to take advantage of industry cycles. Since sector funds ride on market cycles, they have the potential to offer good returns if the timing is perfect. However, they are bereft of downside risk protection as available in diversified funds.

Sector funds should constitute only a limited portion of one's portfolio, as they are much riskier than a diversified fund. Besides, only those who have an existing portfolio should consider investing in these funds.

For example, Real Estate Mutual Funds invest in real estate properties and earn income in the form of rentals, capital appreciation from developed properties. Also some part of the fund corpus is

invested in equity shares or debentures of companies engaged in real estate assets or developing real estate development projects. REMFs are required to be close-ended in nature and listed on a stock exchange.

4.5 Thematic Funds

A Thematic fund focuses on trends that are likely to result in the 'out-performance' by certain sectors or companies. The theme could vary from multi-sector, international exposure, commodity exposure etc. Unlike a sector fund, theme funds have a broader outlook.

However, the downside is that the market may take a longer time to recognize views of the fund house with regards to a particular theme, which forms the basis of launching a fund.

4.6 Arbitrage Funds

Typically, these funds promise safety of deposits, but better returns, tax benefits and greater liquidity. Pru-ICICI is the latest to join the list with its equities and derivatives funds.

The open ended equity scheme aims to generate low volatility returns by inverting in a mix of cash equities, equity derivatives and debt markets. The fund seeks to provide better returns than typical debt instruments and lower volatility in comparison to equity.

This fund is aimed at an investor who seeks the return of small savings instruments, safety of bank deposits, tax benefits of RBI relief bonds and liquidity of a mutual fund.

Arbitrage fund finally seeks to capitalize on the price differentials between the spot and the futures market.

The other schemes in the arbitrage universe are Benchmark Derivative, JM Equity and Derivatives, Prudential ICICI Balanced, UTI Spread and Prudential ICICI Equity and Derivatives.

4.7 Hedge Fund

A hedge fund (there are no hedge funds in India) is a lightly regulated investment fund that escapes most regulations by being a sort of a private investment vehicle being offered to selected clients.

The big difference between a hedge fund and a mutual fund is that the former does not reveal anything about its operations publicly and charges a performance fee. Typically, if it outperforms a benchmark, it take a cut off the profits. Of course, this is a one way street, any losses are borne by the investors themselves. Hedge funds are aggressively managed portfolio of investments which use advanced investment strategies such as leveraged, long, short and derivative positions in both domestic and international markets with the goal of generating high returns (either in an absolute sense or over a specified market benchmark). It is important to note that hedging is actually the practice of attempting to reduce risk, but the goal of most hedge funds is to maximize return on investment.

4.8 Cash Fund

Cash Fund is an open ended liquid scheme that aims to generate returns with lower volatility and higher liquidity through a portfolio of debt and money market instrument.

The fund will have retail institutional and super institutional plans. Each plan will offer growth and dividend options. The minimum initial investment for the institutional plan is ₹ 1 crore and the super institutional is ₹ 25 crore. For the retail plan, the minimum initial investment is ₹ 5,000/-. The fund has no entry or exit loads. Investors can invest even through the Systematic Investment Planning (SIP) route with a minimum amount of ₹ 500 per instalment with the total of all instalments not being less than ₹ 5,000/-.

4.9 Exchange Traded Funds

An Exchange Traded Fund (ETF) is a hybrid product that combines the features of an index fund. These funds are listed on the stock exchanges and their prices are linked to the underlying index. The authorized participants act as market makers for ETFs.

ETFs can be bought and sold like any other stock on an exchange. In other words, ETFs can be bought or sold any time during the market hours at prices that are expected to be closer to the NAV at the end of the day. Therefore, one can invest at real time prices as against the end of the day prices as is the case with open-ended schemes.

There is no paper work involved for investing in an ETF. These can be bought like any other stock by just placing an order with a broker. ETFs may be attractive as investments because of their low costs, tax efficiency, and stock-like features. An ETF combines the valuation feature of a mutual fund or unit investment trust, which can be bought or sold at the end of each trading day for its net asset value, with the tradability feature of a closed-end fund, which trades throughout the trading day at prices that may be more or less than its net asset value. Following types of ETF products are available in the market:

- Index ETFs - Most ETFs are index funds that hold securities and attempt to replicate the performance of a stock market index.
- Commodity ETFs - Commodity ETFs invest in commodities, such as precious metals and futures.
- Bond ETFs - Exchange-traded funds that invest in bonds are known as bond ETFs. They thrive during economic recessions because investors pull their money out of the stock market and into bonds (for example, government treasury bonds or those issues by companies regarded as financially stable). Because of this cause and effect relationship, the performance of bond ETFs may be indicative of broader economic conditions.
- Currency ETFs - The funds are total return products where the investor gets access to the FX spot change, local institutional interest rates and a collateral yield.

4.10 Fixed Maturity Plans

Fixed Maturity Plans (FMPs) are closely ended mutual funds in which an investor can invest during a New Fund Offer (NFO). FMPs usually invest in Certificates of Deposits (CDs), Commercial Papers (CPs), Money Market Instruments and Non-Convertible Debentures over fixed investment period. Sometimes, they also invest in Bank Fixed Deposits.

In New Fund Offers, during the course of which FMPs are issued, are later traded on the stock exchange where they are listed. But, the trading in FMPs is very less. So, basically FMPs are not liquid instruments.

The main advantage of Fixed Maturity Plans is that they are free from any interest rate risk because FMPs invest in debt instruments that have the same maturity as that of the fund. However, they carry credit risk, as there is a possibility of default by the debt issuing company. So, if the credit rating of an instrument is downgraded, the returns of FMP can come down.

Presently, most of the FMPs are launched with tenure of three years to take the benefit of indexation. But, because of the longer maturity period they find it difficult to provide good returns in the form of interest to the investors in highest rated instruments. They, therefore assign some portions of the invested funds in AA and below rated debt instruments to earn higher interest. The reason is that lower rated instruments carry higher coupon rates than higher rated instruments.

5. ADVANTAGES OF MUTUAL FUND

(a) **Professional Management:** The funds are managed by skilled and professionally experienced managers with a back up of a Research team.

(b) **Diversification:** Mutual Funds offer diversification in portfolio which reduces the risk.

(c) **Convenient Administration:** There are no administrative risks of share transfer, as many of the Mutual Funds offer services in a demat form which save investor's time and delay.

(d) **Higher Returns:** Over a medium to long-term investment, investors always get higher returns in Mutual Funds as compared to other avenues of investment. This is already seen from excellent returns, Mutual Funds have provided in the last few years. However, investors are cautioned that such high returns riding on the IT boom should not be taken as regular returns and therefore one should look at the average returns provided by the Mutual Funds particularly in the equity schemes during the last couple of years.

(e) **Low Cost of Management:** No Mutual Fund can increase the cost beyond prescribed limits of 2.5% maximum and any extra cost of management is to be borne by the AMC.

(f) **Liquidity:** In all the open ended funds, liquidity is provided by direct sales / repurchase by the Mutual Fund and in case of close ended funds, the liquidity is provided by listing the units on the Stock Exchange.

(g) **Transparency:** The SEBI Regulations now compel all the Mutual Funds to disclose their portfolios on a half-yearly basis. However, many Mutual Funds disclose this on a quarterly or monthly basis to their investors. The NAVs are calculated on a daily basis in case of open ended funds and are now published through AMFI in the newspapers.

(h) **Other Benefits:** Mutual Funds provide regular withdrawal and systematic investment plans according to the need of the investors. The investors can also switch from one scheme to another without any load.

(i) **Highly Regulated:** Mutual Funds all over the world are highly regulated and in India all Mutual Funds are registered with SEBI and are strictly regulated as per the Mutual Fund Regulations which provide excellent investor protection.

(j) **Economies of scale:** The way mutual funds are structured gives it a natural advantage. The "pooled" money from a number of investors ensures that mutual funds enjoy economies of scale; it is cheaper compared to investing directly in the capital markets which involves higher charges. This also allows retail investors access to high entry level markets like real estate, and also there is a greater control over costs.

(k) **Flexibility:** There are a lot of features in a regular mutual fund scheme, which imparts flexibility to the scheme. An investor can opt for Systematic Investment Plan (SIP), Systematic Withdrawal Plan etc. to plan his cash flow requirements as per his convenience. The wide range of schemes being launched in India by different mutual funds also provides an added flexibility to the investor to plan his portfolio accordingly.

6. DRAWBACKS OF MUTUAL FUND

(a) **No guarantee of Return** – There are three issues involved:

(i) All Mutual Funds cannot be winners. There may be some who may underperform the benchmark index i.e. it may not even perform well as a novice who invests in the stocks constituting the index.

(ii) A mutual fund may perform better than the stock market but this does not necessarily lead to a gain for the investor. The market may have risen and the mutual fund scheme increased in value but the investor would have got the same increase had he invested in risk free investments than in mutual fund.

(iii) Investors may forgive if the return is not adequate. But they will not do so if the principal is eroded. Mutual Fund investment may depreciate in value.

(b) **Diversification** – A mutual fund helps to create a diversified portfolio. Though diversification minimizes risk, it does not ensure maximizing returns. The returns that mutual funds offer are less than what an investor can achieve. For example, if a single security held by a mutual fund doubles in value, the mutual fund itself would not double in value because that security is only one small part of the fund's holdings. By holding a large number of different investments, mutual funds tend to do neither exceptionally well nor exceptionally poor.

(c) **Selection of Proper Fund** – It may be easier to select the right share rather than the right fund. For stocks, one can base his selection on the parameters of economic, industry and company analysis. In case of mutual funds, past performance is the only criteria to fall back upon. But past cannot predict the future.

(d) **Cost Factor** – Mutual Funds carry a price tag. Fund Managers are the highest paid executives. While investing, one has to pay for entry load and when leaving he has to pay for exit load. Such costs reduce the return from mutual fund. The fees paid to the Asset Management Company is in no way related to performance.

(e) **Unethical Practices** – Mutual Funds may not play a fair game. Each scheme may sell some of the holdings to its sister concerns for substantive notional gains and posting NAVs in a formalized manner.

(f) **Taxes –** When making decisions about your money, fund managers do not consider your personal tax situations. For example when a fund manager sells a security, a capital gain tax is triggered, which affects how profitable the individual is from sale. It might have been more profitable for the individual to defer the capital gain liability.

(g) **Transfer Difficulties –** Complications arise with mutual funds when a managed portfolio is switched to a different financial firm. Sometimes the mutual fund positions have to be closed out before a transfer can happen. This can be a major problem for investors. Liquidating a mutual fund portfolio may increase risk, increase fees and commissions, and create capital gains taxes.

7. TERMS ASSOCIATED WITH MUTUAL FUNDS

7.1 Net Asset Value (NAV)

It is the amount which a unit holder would receive if the mutual fund were wound up. An investor in mutual fund is a part owner of all its assets and liabilities. Returns to the investor are determined by the interplay of two elements, Net Asset Value and Costs of Mutual Fund.Net Asset Value is the mutual fund's calling card. It is the basis for assessing the return that an investor has earned. There are three aspects which need to be highlighted:

(i) It is the net value of all assets less liabilities. NAV represents the market value of total assets of the Fund less total liabilities attributable to those assets.

(ii) NAV changes daily. The value of assets and liabilities changes daily. NAV today will not be NAV tomorrow or day later.

(iii) NAV is computed on per unit basis i.e. dividing the Net Asset Value by number of Outstanding Units.

How Net Asset Value is calculated?

It is value of net assets of the funds. The investor's subscription is treated as the unit capital in the

balance sheet of the fund and the investments on their behalf are treated as assets. The fund's net assets are defined as the assets less liabilities.

$$NAV = \frac{\text{Net asset of the scheme}}{\text{Number of units outstanding}}$$

Where net assets of the scheme is defined as below -

Net Assets of the Scheme = Market value of investments + Receivables + Other accrued income + other assets - Accrued Expenses - Other Payables - Other Liabilities

7.2 Entry and Exit Load in Mutual Funds

Some Asset Management Companies (AMCs) have sales charges, or loads, on their funds (entry load and/or exit load) to compensate for distribution costs. Funds that can be purchased without a sales charge are called no-load funds.

Entry load is charged at the time an investor purchases the units of a scheme. The entry load percentage is added to the prevailing NAV at the time of allotment of units.

Exit load is charged at the time of redeeming (or transferring an investment between schemes). The exit load percentage is deducted from the NAV at the time of redemption (or transfer between schemes). This amount goes to the Asset Management Company and not into the pool of funds of the scheme. In simple terms, therefore, Entry and Exit Load in Mutual Fund are the charges one pays while buying and selling the fund respectively.

Example

Mr. X earns 10% on his investments in equity shares. He is considering a recently floated scheme of a Mutual Fund where the initial expenses are 6% and annual recurring expenses are expected to be 2%. How much the Mutual Fund scheme should earn to provide a return of 10% to Mr. X?

Answer

$$r_2 = \frac{1}{1 - \text{initial exp}} \times r_1 + \text{recurring exp.}$$

The rate of return the mutual fund should earn;= $\frac{1}{1-0.06} \times 0.1 + 0.02 = 0.1264$ or 12.64%

7.3 Trail Commission

It is the amount that a mutual fund investor pays to his advisor each year. The purpose of charging this commission from the investor is to provide incentive to the advisor to review their customer's holdings and to give advice from time to time.

Distributors usually charge a trail commission of 0.3-0.75% on the value of the investment for each year that the investor's money remains invested with the fund company.

This is calculated on a daily basis as a percentage of the assets under management of the distributor and is paid monthly. This is separate from any upfront commission that is usually paid by the fund company to the distributor out of its own pocket.

7.4 Expense Ratio

It is the percentage of the assets that were spent to run a mutual fund. It includes things like management and advisory fees, travel costs and consultancy fees. The expense ratio does not include brokerage costs for trading the portfolio. It is also referred to as the Management Expense Ratio (MER).

Paying close attention to the expense ratio is necessary. The reason is it can sometimes be as high as 2-3% which can seriously undermine the performance of a mutual fund.

7.5 Side Pocketing

In simple words, a Side Pocketing in Mutual Funds leads to separation of risky assets from other investments and cash holdings. The purpose is to make sure that money invested in a mutual fund, which is linked to stressed assets, gets locked, until the fund recovers the money from the company or could avoid distress selling of illiquid securities.

The modus operandi is simple. Whenever, the rating of a mutual fund decreases, the fund shifts the illiquid assets into a side pocket so that current shareholders can be benefitted from the liquid assets. Consequently, the Net Asset Value (NAV) of the fund will then reflect the actual value of the liquid assets.

Side Pocketing is beneficial for those investors who wish to hold on to the units of the main funds for long term. Therefore, the process of Side Pocketing ensures that liquidity is not the problem even in the circumstances of frequent allotments and redemptions.

Side Pocketing is quite common internationally. However, Side Pocketing has also been resorted to bereft the investors of genuine returns.

In India recent fiasco in the Infrastructure Leasing and Financial Services (IL&FS) has led to many discussions on the concept of side pocketing as IL&FS and its subsidiaries have failed to fulfill its repayments obligations due to severe liquidity crisis.

The Mutual Funds have given negative returns because they have completely written off their exposure to IL&FS instruments.

7.6 Tracking Error

Tracking error can be defined as the divergence or deviation of a fund's return from the benchmarks return it is following.

The passive fund managers closely follow or track the benchmark index. Although they design their investment strategy on the same index but often it may not exactly replicate the index return. In such situation, there is possibility of deviation between the returns.

The tracking error can be calculated on the basis of corresponding benchmark return vis a vis quarterly or monthly average NAVs.

Higher the tracking error higher is the risk profile of the fund. Whether the funds outperform or underperform their benchmark indices; it clearly indicates that of fund managers are not following the benchmark indices properly. In addition to the same other reason for tracking error are as follows:

- Transaction cost
- Fees charged by AMCs
- Fund expenses
- Cash holdings
- Sampling biasness

Thus from above it can be said that to replicate the return to any benchmark index the tracking error should be near to zero.

The Tracking Error is calculated as follows:

$$TE = \sqrt{\frac{\sum(d-\bar{d})}{n-1}}$$

d = Differential return

$\bar{d}$ = Average differential return

n = No. of observation

TEST YOUR KNOWLEDGE

Theoretical Questions

1. Explain how to establish a Mutual Fund.
2. What are the advantages of investing in Mutual Funds?

Practical Questions

1. Mr. A can earn a return of 16 per cent by investing in equity shares on his own. Now he is considering a recently announced equity based mutual fund scheme in which initial expenses are 5.5 per cent and annual recurring expenses are 1.5 per cent. How much should the mutual fund earn to provide Mr. A return of 16 per cent?
2. A mutual fund that had a net asset value of ₹16 at the beginning of a month, made income and capital gain distribution of ₹0.04 and ₹0.03 respectively per unit during the month, and

then ended the month with a net asset value of ₹16.08. Calculate monthly and annual rate of return.

3. Cinderella Mutual Fund has the following assets in Scheme Rudolf at the close of business on 31st March,2014.

Company	No. of Shares	Market Price Per Share
Nairobi Ltd.	25000	₹ 20
Dakar Ltd.	35000	₹ 300
Senegal Ltd.	29000	₹ 380
Cairo Ltd.	40000	₹ 500

The total number of units of Scheme Rudol fare 10 lacs. The Scheme Rudolf has accrued expenses of ₹ 2,50,000 and other liabilities of ₹ 2,00,000. Calculate the NAV per unit of the Scheme Rudolf.

4. A Mutual Fund Co. has the following assets under it on the close of business as on:

Company	No. of Shares	1st February 2012 Market price per share ₹	2nd February 2012 Market price per share ₹
L Ltd	20,000	20.00	20.50
M Ltd	30,000	312.40	360.00
N Ltd	20,000	361.20	383.10
P Ltd	60,000	505.10	503.90

Total No. of Units 6,00,000

(i) Calculate Net Assets Value (NAV) of the Fund.

(ii) Following information is given:

Assuming one Mr. A, submits a cheque of ₹ 30,00,000 to the Mutual Fund and the Fund manager of this company purchases 8,000 shares of M Ltd; and the balance amount is held in Bank. In such a case, what would be the position of the Fund?

(iii) Find new NAV of the Fund as on 2nd February 2012.

Answers to Theoretical Questions

1. Establishment of a Mutual Fund: A mutual fund is required to be registered with the Securities and Exchange Board of India (SEBI) before it can collect funds from the public. All mutual funds are governed by the same set of regulations and are subject to monitoring and inspections by the SEBI. The Mutual Fund has to be established through the medium of a

sponsor. A sponsor means any body corporate who, acting alone or in combination with another body corporate, establishes a mutual fund after completing the formalities prescribed in the SEBI's Mutual Fund Regulations.

The role of sponsor is akin to that of a promoter of a company, who provides the initial capital and appoints the trustees. The sponsor should be a body corporate in the business of financial services for a period not less than 5 years, be financially sound and be a fit party to act as sponsor in the eyes of SEBI.

The Mutual Fund has to be established as either a trustee company or a Trust, under the Indian Trust Act and the instrument of trust shall be in the form of a deed. The deed shall be executed by the sponsor in favour of the trustees named in the instrument of trust. The trust deed shall be duly registered under the provisions of the Indian Registration Act, 1908. The trust deed shall contain clauses specified in the Third Schedule of the Regulations.

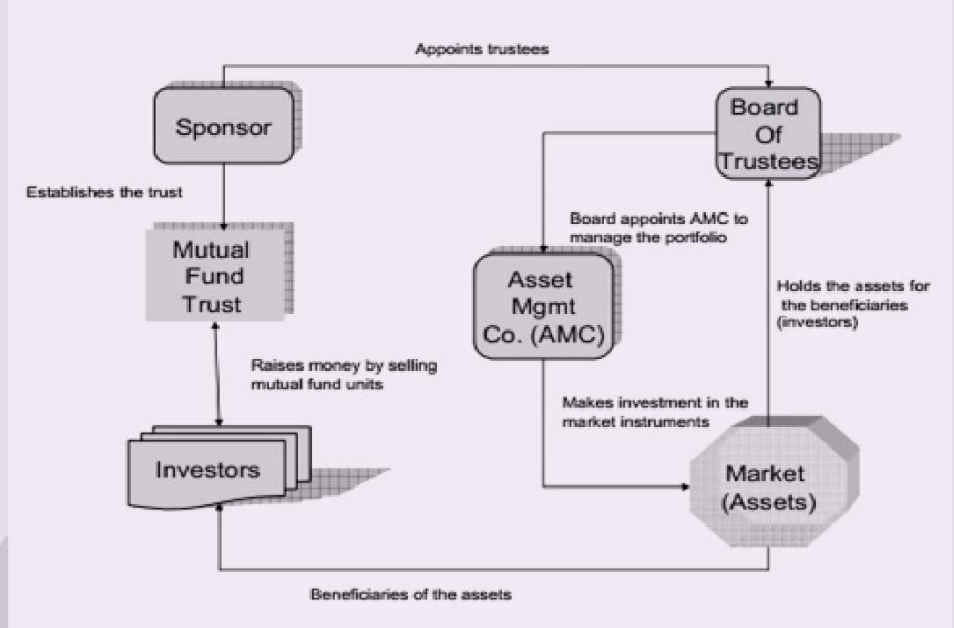
An Asset Management Company, who holds an approval from SEBI, is to be appointed to manage the affairs of the Mutual Fund and it should operate the schemes of such fund. The Asset Management Company is set up as a limited liability company, with a minimum net worth of ₹ 10 crores.

The sponsor should contribute at least 40% to the networth of the Asset Management Company. The Trustee should hold the property of the Mutual Fund in trust for the benefit of the unit holders.

SEBI regulations require that at least two-thirds of the directors of the Trustee Company or board of trustees must be independent, that is, they should not be associated with the sponsors. Also, 50 per cent of the directors of AMC must be independent. The appointment of the AMC can be terminated by majority of the trustees or by 75% of the unit holders of the concerned scheme.

The AMC may charge the mutual fund with Investment Management and Advisory fees subject to prescribed ceiling. Additionally, the AMC may get the expenses on operation of the mutual fund reimbursed from the concerned scheme.

The Mutual fund also appoints a custodian, holding valid certificate of registration issued by SEBI, to have custody of securities held by the mutual fund under different schemes. In case of dematerialized securities, this is done by Depository Participant. The custodian must be independent of the sponsor and the AMC.



2. Please refer paragraph 5

Answers to the Practical Questions

1. Personal earnings of Mr. A = R_1 = 16%

Mutual Fund earnings = R_2

$$R_2 = \frac{1}{1 - \text{Initial expenses}(\%)} R_1 + \text{Recurring expenses}(\%)$$

$$= \frac{1}{1-0.055} \times 16\% + 1.5\%$$

= 18.43%

Mutual Fund earnings = 18.43%

2. Calculation of monthly return on the mutual funds:

$$r = \frac{(NAV_t - NAV_{t-1}) + I_t + G_t}{NAV_{t-1}}$$

$$\text{Or, } r = \frac{(₹16.08 - ₹16.00) + (₹0.04 + ₹0.03)}{16}$$

$$= \frac{0.08 + 0.07}{16} = 0.009375 \quad \text{or, } r = 0.9375\% \text{ or } 11.25\% \text{ p.a.}$$

3.

Shares	No. of shares	Price	Amount (₹)
Nairobi Ltd.	25,000	20.00	5,00,000
Dakar Ltd.	35,000	300.00	1,05,00,000
Senegal Ltd.	29,000	380.00	1,10,20,000
Cairo Ltd.	40,000	500.00	2,00,00,000
			4,20,20,000
Less: Accrued Expenses			2,50,000
Other Liabilities			2,00,000
Total Value			4,15,70,000
No. of Units			10,00,000
NAV per Unit (4,15,70,000/10,00,000)			41.57

4. (i) NAV of the Fund

$$= \frac{₹\ 4,00,000 + ₹\ 93,72,000 + ₹\ 72,24,000 + ₹\ 3,03,06,000}{6,00,000}$$

$$= \frac{₹\ 4,73,02,000}{6,00,000} = ₹\ 78.8366 \text{ rounded to } ₹\ 78.84$$

(ii) The revised position of fund shall be as follows:

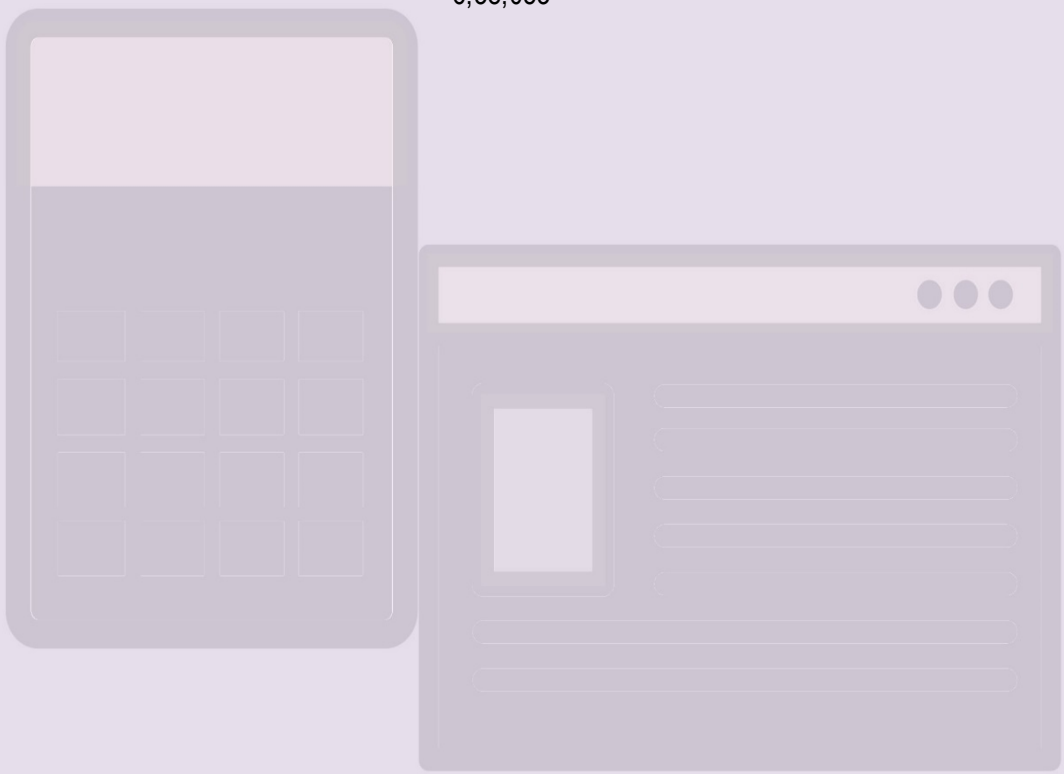
Shares	No. of shares	Price	Amount (₹)
L Ltd.	20,000	20.00	4,00,000
M Ltd.	38,000	312.40	1,18,71,200
N Ltd.	20,000	361.20	72,24,000
P Ltd.	60,000	505.10	3,03,06,000
Cash			5,00,800
			5,03,02,000

$$\text{No. of units of fund} = 6,00,000 + \frac{30,00,000}{78.8366} = 6,38,053$$

(iii) On 2nd February 2012, the NAV of fund will be as follows:

Shares	No. of shares	Price	Amount (₹)
L Ltd.	20,000	20.50	4,10,000
M Ltd.	38,000	360.00	1,36,80,000
N Ltd.	20,000	383.10	76,62,000
P Ltd.	60,000	503.90	3,02,34,000
Cash			5,00,800
			5,24,86,800

NAV as on 2nd February 2012 = $\frac{₹\ 5,24,86,800}{6,38,053}$ = ₹ 82.26 per unit



CHAPTER 8

DERIVATIVES ANALYSIS AND VALUATION

LEARNING OUTCOMES

After going through the chapter student shall be able to understand

- Forward/ Future Contract
- Options
- Swaps
- Commodity Derivatives

1. INTRODUCTION

Derivative is a product whose value is to be derived from the value of one or more basic variables called bases (underlying assets, index or reference rate). The underlying assets can be Equity, Forex, and Commodity.

The underlying has a marketable value which is subject to market risks. The importance of underlying in derivative instruments is as follows:

- All derivative instruments are dependent on an underlying to have value.
- The change in value in a forward contract is broadly equal to the change in value in the underlying.
- In the absence of a valuable underlying asset the derivative instrument will have no value.
- On maturity, the position of profit/loss is determined by the price of underlying instruments. If the price of the underlying is higher than the contract price the buyer makes a profit. If the price is lower, the buyer suffers a loss.

Main users of Derivatives are as follows:

	Users	Purpose
(a)	Corporation	To hedge currency risk and inventory risk
(b)	Individual Investors	For speculation, hedging and yield enhancement.
(c)	Institutional Investor	For hedging asset allocation, yield enhancement and to avail arbitrage opportunities.
(d)	Dealers	For hedging position taking, exploiting inefficiencies and earning dealer spreads.

The basic differences between Cash and the Derivative market are enumerated below:-

(a) In cash market tangible assets are traded whereas in derivative market contracts based on tangible or intangibles assets like index or rates are traded.

(b) In cash market, we can purchase even one share whereas in Futures and Options minimum lots are fixed.

(c) Cash market is more risky than Futures and Options segment because in "Futures and Options" risk is limited upto 20%.

(d) Cash assets may be meant for consumption or investment. Derivative contracts are for hedging, arbitrage or speculation.

(e) The value of derivative contract is always based on and linked to the underlying security. However, this linkage may not be on point-to-point basis.

(f) In the cash market, a customer must open securities trading account with a securities depository whereas to trade futures a customer must open a future trading account with a derivative broker.

(g) Buying securities in cash market involves putting up all the money upfront whereas buying futures simply involves putting up the margin money.

(h) With the purchase of shares of the company in cash market, the holder becomes part owner of the company. While in future it does not happen.

The most important derivatives are forward, futures and options. Here we will discuss derivatives as financial derivatives and embedded derivatives.

2. FORWARD CONTRACT

Consider a Punjab farmer who grows wheat and has to sell it at a profit. The simplest and the traditional way for him is to harvest the crop in March or April and sell in the spot market then. However, in this way the farmer is exposing himself to risk of a downward movement in the price of wheat which may occur by the time the crop is ready for sale.

In order to avoid this risk, one way could be that the farmer may sell his crop at an agreed-upon rate now with a promise to deliver the asset, i.e., crop at a pre-determined date in future. This will at least ensure to the farmer the input cost and a reasonable profit.

Thus, the farmer would sell wheat forward to secure himself against a possible loss in future. It is true that by this way he is also foreclosing upon him the possibility of a bumper profit in the event of wheat prices going up steeply. But then, more important is that the farmer has played safe and insured himself against any eventuality of closing down his source of livelihood altogether. The transaction which the farmer has entered into is called a **forward transaction** and the contract which covers such a transaction is called a **forward contract.**

A forward contract is an agreement between a buyer and a seller obligating the seller to deliver a specified asset of specified quality and quantity to the buyer on a specified date at a specified place and the buyer, in turn, is obligated to pay to the seller a pre-negotiated price in exchange of the delivery.

This means that in a forward contract, the contracting parties negotiate on, not only the price at which the commodity is to be delivered on a future date but also on what quality and quantity to be delivered and at what place. No part of the contract is standardised and the two parties sit across and work out each and every detail of the contract before signing it.

For example, in case a gold bullion forward contract is being negotiated between two parties, they would negotiate each of the following features of the contract:

- the weight of the gold bullion to be delivered,
- the fineness of the metal to be delivered,
- the place at which the delivery is to be made,
- the period after which the delivery is to be made, and
- the price which the buyer would pay.

Suppose a buyer L and a seller S agrees to do a trade in 100 tolas of gold on 31 Dec 2013 at ₹ 30,000/tola. Here, ₹ 30,000/tola is the 'forward price of 31 Dec 2013 Gold'. The buyer L is said to be long and the seller S is said to be short. Once the contract has been entered into, L is obligated to pay S ₹ 30 lakhs on 31 Dec 2013, and take delivery of 100 tolas of gold. Similarly, S is obligated to be ready to accept ₹ 30 lakhs on 31 Dec 2013, and give 100 tolas of gold in exchange.

3. FUTURE CONTRACT

A futures contract is an agreement between two parties that commits one party to buy an underlying financial instrument (bond, stock or currency) or commodity (gold, soybean or natural gas) and one party to sell a financial instrument or commodity at a specific price at a future date. The agreement is completed at a specified expiration date by physical delivery or cash settlement

or offset prior to the expiration date. In order to initiate a trade in futures contracts, the buyer and seller must put up "good faith money" in a margin account. Regulators, commodity exchanges and brokers doing business on commodity exchanges determine margin levels.

Suppose A buyer "B" and a Seller "S" enter into a 5,000 kgs corn futures contract at ₹ 5 per kg. Assuming that on the second day of trading the settlement price (settlement price is generally the representative price at which the contracts trade during the closing minutes of the trading period and this price is designated by a stock exchange as the settlement price). In case the price movement during the day is such that the price during the closing minutes is not the representative price, the stock exchange may select a price which it feels is close to being a representative price, e.g., average of the high and low prices which have occurred during a trading day) of March corn is ₹ 5.20 per kg. This price movement has led to a loss of ₹ 1,000 to S while B has gained the corresponding amount.

Thus, the initial margin account of S gets reduced by ₹ 1,000 and that of B is increased by the same amount. While the margin accounts, also called the equity of the buyer and the seller, get adjusted at the end of the day in keeping with the price movement, the futures contract gets replaced with a new one at a price which has been used to make adjustments to the buyer and seller's equity accounts. In this case, the settle price is ₹ 5.20, which is the new price at which next day's trading would start for this particular futures contract. Thus, each future contract is rolled over to the next day at a new price. This is called marking-to-market.

Difference between forward and future contract is as follows:

S.No.	Features	Forward	Futures
1.	Trading	Forward contracts are traded on personal basis or on telephone or otherwise.	Futures Contracts are traded in a competitive arena.
2.	Size of Contract	Forward contracts are individually tailored and have no standardized size	Futures contracts are standardized in terms of quantity or amount as the case may be
3.	Organized exchanges	Forward contracts are traded in an over the counter market.	Futures contracts are traded on organized exchanges with a designated physical location.
4.	Settlement	Forward contracts settlement takes place on the date agreed upon between the parties.	Futures contracts settlements are made daily via. Exchange's clearing house.
5.	Delivery date	Forward contracts may be delivered on the dates agreed upon and in terms of actual	Futures contracts delivery dates are fixed on cyclical basis and hardly takes place. However, it

		delivery.	does not mean that there is no actual delivery.
6.	Transaction costs	Cost of forward contracts is based on bid – ask spread.	Futures contracts entail brokerage fees for buy and sell order.
7.	Marking to market	Forward contracts are not subject to marking to market	Futures contracts are subject to marking to market in which the loss or profit is debited or credited in the margin account on daily basis due to change in price.
8.	Margins	Margins are not required in forward contract.	In futures contracts every participants is subject to maintain margin as decided by the exchange authorities
9.	Credit risk	In forward contract, credit risk is born by each party and, therefore, every party has to bother for the creditworthiness.	In futures contracts the transaction is a two way transaction, hence the parties need not to bother for the risk.

4. PRICING/ VALUATION OF FORWARD/ FUTURE CONTRACTS

The difference between the prevailing spot price of an asset and the futures price is known as the basis, i.e.,

Basis = Spot price – Futures price

In a normal market, the spot price is less than the futures price (which includes the full cost-of-carry) and accordingly the basis would be negative. Such a market, in which the basis is decided solely by the cost-of-carry is known as a contango market.

Basis can become positive, i.e., the spot price can exceed the futures price only if there are factors other than the cost of carry to influence the futures price. In case this happens, then basis becomes positive and the market under such circumstances is termed as a backwardation market or inverted market.

Basis will approach zero towards the expiry of the contract, i.e., the spot and futures prices converge as the date of expiry of the contract approaches. The process of the basis approaching zero is called convergence.

The relationship between futures prices and cash prices is determined by the cost-of-carry. However, there might be factors other than cost-of-carry, especially in stock futures in which there may be various other returns like dividends, in addition to carrying costs, which may influence this relationship.

The cost-of-carry model in for futures/ forward, is as under:-

Future price = Spot price + Carrying cost – Returns (dividends, etc).

Let us take an example to understand this relationship.

Example

The price of ACC stock on 31 December 2010 was ₹ 220 and the futures price on the same stock on the same date, i.e., 31 December 2010 for March 2011 was ₹ 230. Other features of the contract and related information are as follows:

Time to expiration	- 3 months (0.25 year)
Borrowing rate	- 15% p.a.
Annual Dividend on the stock	- 25% payable before 31.03. 2011
Face Value of the Stock	- ₹ 10

Based on the above information, the futures price for ACC stock on 31 December 2010 should be:

= 220 + (220 x 0.15 x 0.25) – (0.25 x 10) = 225.75

Thus, as per the 'cost of carry' criteria, the futures price is ₹ 225.75, which is less than the actual price of ₹ 230 on 31 March 2011. This would give rise to arbitrage opportunities and consequently the two prices will tend to converge.

How Will the Arbitrager Act?

He will buy the ACC stock at ₹ 220 by borrowing the amount @ 15 % for a period of 3 months and at the same time sell the March 2011 futures on ACC stock. By 31st March 2011, he will receive the dividend of ₹ 2.50 per share. On the expiry date of 31st March, he will deliver the ACC stock against the March futures contract sales.

The arbitrager's inflows/outflows are as follows:

Sale proceeds of March 2011 futures		₹ 230.00
Dividend		₹ 2.50
	Total (A)	₹ 232.50
Pays back the Bank		₹ 220.00
Cost of borrowing		₹ 8.25
Total (B)		₹ 228.25
Balance (A) – (B)		₹ 4.25

Thus, the arbitrager earns ₹ 4.25 per share without involving any risk.

In financial forward contracts, the cost of carry is primarily the interest cost.

Let us take a very simple example of a fixed deposit in the bank. ₹ 100 deposited in the bank at a rate of interest of 10% would be come ₹ 110 after one year. Based on annual compounding, the amount will become ₹ 121 after two years. Thus, we can say that the forward price of the fixed deposit of ₹ 100 is ₹ 110 after one year and ₹ 121 after two years.

As against the usual annual, semi-annual and quarterly compounding, which the reader is normally used to, continuous compounding are used in derivative securities. In terms of the annual compounding, the forward price can be computed through the following formula:

$A=P\ (1+r/100)^t$

Where, A is the terminal value of an amount P invested at a rate of interest of r % p.a. for t years.

However, in case there are multiple compounding in a year, say n times per annum, then the above formula will read as follows:

$A = P\ (1+r/n)^{nt}$

And in case the compounding becomes continuous, i.e., more than daily compounding, the above formula can be simplified mathematically and rewritten as follows:

$A = Pe^{r\ n}$

Where 'e', called epsilon, is a mathematical constant and has a value of 2.72. This function is available in all mathematical calculators and is easy to handle.

The above formula gives the future value of an amount invested in a particular security now. In this formula, we have assumed no interim income flow like dividends etc

Example

Consider a 3 month maturity forward contract on a non-dividend paying stock. The stock is available for ₹ 200. With compounded continuously risk-free rate of interest (CCRRI) of 10 % per annum, the price of the forward contract would be:

$A = 200 \times e^{(0.25)(0.10)} = ₹\ 205.06$

In case there is cash income accruing to the security like dividends, the above formula will read as follows:

$A = (P-I)e^{nr}$

Where I is the present value of the income flow during the tenure of the contract.

Example

Consider a 4 month forward contract on 500 shares with each share priced at ₹ 75. Dividend @ ₹ 2.50 per share is expected to accrue to the shares in a period of 3 months. The CCRRI is 10% p.a. The value of the forward contract is as follows:

Dividend proceeds = $500 \times 2.50 = 1250$

= $1250e^{-(3/12)(0.10)} = 1219.13$

Value of forward contract = $(500 \times 75 - 1219.13)\, e^{(4/12)(0.10)}$

= $36280.87 \times e^{0.033}$

= ₹ 37498.11

However, in case the income accretion to the securities is in the form of percentage yield, y, as in the case of stock indices arising on account of dividend accruals to individual stocks constituting the index, the above formula will read as follows:

$A = Pe^{n(r-y)}$

Correlation between Forward and Futures Prices

For contracts of the same maturity, the forward and futures contracts tend to have the same value subject to the interest rates remaining fixed. In case the interest rates are fluid, the value of a futures contract would differ from that of a forward contract because the cash flows generated from marking to the market in the case of the former would be available for reinvestment at variable rates on a day-to-day basis. However, market imperfections like transaction costs, taxes and asset indivisibilities bring futures prices close enough to the forward prices to safely assume the two prices to be practically the same.

5. TYPES OF FUTURES CONTRACTS

5.1 Single Stock Futures

A single stock futures contract is an agreement to buy or sell shares or stock such as Microsoft, Intel, ITC, or Tata Steel at a point in the future. The buyer has an obligation to purchase shares or stock and the seller has an obligation to sell shares or stock at a specific price at a specific date in the future. Thus a stock futures contract is a standardized contract to buy or sell a specific stock at a future date at an agreed price. Single-stock futures contracts are completed via offset or the delivery of actual shares at expiration. Margin on a single-stock futures contract is expected normally to be 20% of notional value.

Each Stock Future contract is standardized and includes basic specifications.

The terms of the contract call for delivery of the stock by the seller at some time specified in the future. However, most contracts are not held to expiration. The contracts are standardized, making them highly liquid. To get out of an open long (buying) position, the investor simply takes an

offsetting short position (sells). Conversely, if an investor has sold (short) a contract and wishes to close it out, he or she buys (goes long) the offsetting contract.

5.2 Index Futures

A contract for stock index futures is based on the level of a particular stock index such as the S&P 500 or the Dow Jones Industrial Average or NIFTY or BSE sensex. The agreement calls for the contract to be bought or sold at a designated time in the future. Just as hedgers and speculators buy and sell futures contracts based on future prices of individual stocks they may—for mostly the same reasons—buy and sell such contracts based on the level of a number of stock indexes.

Stock index futures may be used to either speculate on the equity market's general performance or to hedge a stock portfolio against a decline in value. Unlike commodity futures or individual stocks, stock index futures are not based on tangible goods, thus all settlements are in cash. Because settlements are in cash, investors usually have to meet liquidity or income requirements to show that they have money to cover their potential losses.

Stock index futures are traded in terms of number of contracts. Each contract is to buy or sell a fixed value of the index. The value of the index is defined as the value of the index multiplied by the specified monetary amount. In Nifty 50 futures contract traded at the National Stock Exchange, the contract specification states:

1 Contract = 50 units of Nifty 50 * Value of Nifty 50

If we assume that Nifty 50 is quoting at 8000 , the value of one contract will be equal to ₹ 4,00,000 (50*8000). The contract size of 50 units of Nifty 50 in this case is fixed by National Stock Exchange where the contract is traded.

Example

Consider the following:

Current value of index	-	1400
Dividend yield	-	6%
CCRRI	-	10%

To find the value of a 3 month forward contract.

$A = Pe^{n(r-y)}$

$= 1400 \times e^{(3/12)(0.10 - .06)} =$ ₹ 1,414

5.2.1 Trading Mechanism in Stock Futures

While trading in futures contracts (both stock as well as futures) both buyers and sellers of the contract have to deposit an initial margin with their brokers based on the value of contact entered. The rules for calculation of margins to be deposited with the brokers are framed by the stock exchanges.

Another major feature regarding the margin requirements for stock as well index futures is that the margin requirement is continuous. Every business day, the broker will calculate the margin requirement for each position. The investor will be required to post additional margin funds if the account does not meet the minimum margin requirement.

The investor can square off his position in the futures contract before expiry or wait till expiry date when the contracts will automatically stand as squared off at the closing price on the expiry date. In Indian stock market the expiry date is the last Thursday of the relevant month to which the future contract belongs.

Example–Margin Requirements

In a stock future contract on ITC stock at ₹ 120, both the buyer and seller have a margin requirement of 20% or ₹ 24. If ITC stock goes up to ₹ 122, the account of the long contract is credited with ₹ 200 (₹ 122-₹ 120 = ₹ 2 X 100 = ₹ 200) and the account of the seller (seller) is debited by the same ₹ 200. This indicates that investors in futures must be very vigilant - they must keep close track of market movements.

5.2.2 Purpose of Trading in Futures

Trading in futures is for two purposes namely:

(a) Speculation and

(b) Hedging

(a) Speculation – For simplicity we will assume that one contract= 100 units and the margin requirement is 20% of the value of contract entered. Brokerage and transaction costs are not taken into account.

Example- Going Long on a Single Stock Futures Contract

Suppose an investor is bullish on McDonald's (MCD) and goes long on one September stock future contract on MCD at ₹ 80. At some point in the near future, MCD is trading at ₹ 96. At that point, the investor sells the contract at ₹ 96 to offset the open long position and makes a ₹ 1600 gross profit on the position.

This example seems simple, but let's examine the trades closely. The investor's initial margin requirement was only ₹ 1600 (₹ 80 x 100 = ₹ 8,000 x 20% = ₹ 1600). This investor had a 100% return on the margin deposit. This dramatically illustrates the leverage power of trading futures. Of course, had the market moved in the opposite direction, the investor easily could have experienced losses in excess of the margin deposit.

The pay off table for the above transaction can be depicted as follows:-

Particulars	Details	Inflow/(outflow){In ₹}
Initial Payoff - Margin (Refundable at maturity)	₹ 8000 x 20%= ₹ 1600	(₹ 1600)

Pay off upon squaring off the contract	Profit (₹ 96 - ₹ 80)x100 = ₹ 1600 Initial Margin = ₹ 1600	₹ 3200
Net Payoff		₹ 1600

Example- Going Short on a Single Stock Futures Contract

An investor is bearish in Kochi Refinery (KR) stock for the near future and goes short an August stock future contract on KR at ₹ 160. KR stock performs as the investor had guessed and drops to ₹ 140 in July. The investor offsets the short position by buying an August stock future at ₹ 140. This represents a gross profit of ₹ 20 per share, or a total of ₹ 2,000.

Again, let's examine the return the investor had on the initial deposit. The initial margin requirement was ₹ 3,200 (₹ 160 x 100 = ₹ 16,000 x 20% = ₹ 3,200) and the gross profit was ₹ 2,000. The return on the investor's deposit was more than 60% - a terrific return on a short-term investment.

Particulars	Details	Inflow/(outflow){In ₹}
Initial Payoff - Margin (Refundable at maturity)	₹ 160x100x20%= ₹ 3200	(₹ 3200)
Pay off upon squaring off the contract	Profit (₹ 160 - ₹ 140) x 100 = ₹ 2000 Initial Margin= ₹ 3200	₹ 5200
Net Payoff		₹ 2000

Example- Going Long on an Index Futures Contract

Suppose an investor has a bullish outlook for Indian market for the month of October 2014. He will go for a long position one October 2014 Nifty Index Future Contract. Assuming that he enters into long positions when Nifty is trading at 8000 and one month later he squares off his position when the value of Nifty rises to 8500 his payoff will be as under. (Assuming that one contract= 50 units of Nifty and margin requirement is 20% of the value of the contract)

Particulars	Details	Inflow/(outflow){In ₹}
Initial Payoff - Margin (Refundable at maturity)	(8000x 50x20%)=₹ 80,000	(₹ 80,000)
Pay off upon squaring off the contract	Profit (8500- 8000)x50= ₹ 25,000 Initial Margin= ₹ 80,000	₹ 1,05,000
Net Payoff		₹ 25,000

Example- Going Short on an Index Futures Contract

Suppose an investor has a bearish outlook for Indian banking sector for the month of October 2014. He will go for a short position for one October 2014 Bank Nifty Future Contract. Assuming

that he enters into short positions when Bank Nifty is trading at 25000 and one month later he squares off his position when the value of Bank Nifty declines to 24000 his payoff will be as under. (Assuming that one contract=10 units of Bank Nifty and margin requirement is 20% of the value of the contract)

Particulars	Details	Inflow/(outflow){In ₹}
Initial Payoff – Margin (Refundable at maturity)	(25000x 10x20%)=₹ 50,000	(₹ 50,000)
Pay off upon squaring off the contract	Profit(25000-24000)x10= ₹ 10,000 Initial Margin= ₹ 50,000	₹ 60,000
Net Payoff		₹ 10,000

(b) Hedging – Hedging is the practice of taking a position in one market to offset and balance against the risk adopted by assuming a position in a contrary or opposing market or investment. In simple language, hedging is used to reduce any substantial losses/gains suffered by an individual or an organization. To hedge, the investor takes a stock future position exactly opposite to the stock position. That way, any losses on the stock position will be offset by gains on the future position.

Example- Using single stock future as a Hedge

Consider an investor who has bought 100 shares of Tata Steel (TS) at ₹ 300. In July, the stock is trading at ₹ 350. The investor is happy with the unrealized gain of ₹ 50 per share but is concerned that in a stock as volatile as TS, the gain could be wiped out in one bad day. The investor wishes to keep the stock at least until September, however, because of an upcoming dividend payment.

To hedge, the investor sells a ₹ 350 September stock future contract - whether the stock rises or declines, the investor has locked in the ₹ 50-per-share gain.In September on maturity date of the futures contract (last Thursday of September) , the investor sells the stock at the market price and buys back the future contract.

The pay-off at various price levels of Tata Steel is as under:-

Particulars	September Closing price of Tata Steel= ₹ 300	September Closing price of Tata Steel= ₹ 350	September Closing price of Tata Steel= ₹ 400
Initial Payoff	₹ 300x100 = ₹ 30000	₹ 300x100 = ₹ 30000	₹ 300x100 = ₹ 30000
Cost of scrip in cash market	₹ 350X100X20% = ₹7000	₹ 350X100X20% = ₹7000	₹ 350X100X20% = ₹7000
Margin Payment on futures contract	₹ 37000	₹ 37000	₹ 37000

Total Initial Payoff (outflow)			
Pay-off at maturity (September end) Total Pay-off at maturity (Inflow)	Sale proceeds of TS in cash market= ₹300x 100 = ₹ 30000 Margin refund on futures contract = ₹ 7000 Gain on futures contract(inflow) = (₹ 350-₹ 300)x100 = - ₹ 5000) ₹ 42000	Sale proceeds of TS in cash market= ₹350x 100 = ₹ 35000 Margin refund on futures contract = ₹ 7000 No profit /loss on futures contract = (₹ 350-₹ 350)x100 = ₹ 0 ₹ 42000	Sale proceeds of TS in cash market= ₹400x 100 = ₹ 40000 Margin refund on futures contract = ₹ 7000 Loss on futures contract(outflow) = (₹ 350-₹ 400)x100 = -₹ 5000 ₹ 42000
Net Payoff	₹ 5000	₹ 5000	₹ 5000

Hence it can be observed in the above table that in any case the investor has locked in a profit of ₹ 5000 via hedging.

In a similar manner as illustrated above index futures can also be used as a hedge . The difference would be that instead of single stock futures the investor would enter into a position into a Index Futures Contract according to the risk potential of the investor.

5.2.3 Marking to Market

It implies the process of recording the investments in traded securities (shares, debt-instruments, etc.) at a value, which reflects the market value of securities on the reporting date. In the context of derivatives trading, the futures contracts are marked to market on periodic (or daily) basis. Marking to market essentially means that at the end of a trading session, all outstanding contracts are repriced at the settlement price of that session. Unlike the forward contracts, the future contracts are repriced every day. Any loss or profit resulting from repricing would be debited or credited to the margin account of the broker. It, therefore, provides an opportunity to calculate the extent of liability on the basis of repricing. Thus, the futures contracts provide better risk management measure as compared to forward contracts.

Suppose on 1st day we take a long position, say at a price of ₹ 100 to be matured on 7th day. Now on 2nd day if the price goes up to ₹ 105, the contract will be repriced at ₹ 105 at the end of the trading session and profit of ₹ 5 will be credited to the account of the buyer. This profit of ₹ 5 may be drawn and thus cash flow also increases. This marking to market will result in three things – one, you will get a cash profit of ₹ 5; second, the existing contract at a price of ₹ 100 would stand cancelled; and third you will receive a new futures contract at ₹ 105. In essence, the marking to

market feature implies that the value of the futures contract is set to zero at the end of each trading day.

5.2.4 Advantages of Futures Trading Vs. Stock Trading

Stock index futures is most popular financial derivatives over stock futures due to following reasons:

1. It adds flexibility to one's investment portfolio. Institutional investors and other large equity holders prefer the most this instrument in terms of portfolio hedging purpose. The stock systems do not provide this flexibility and hedging.
2. It creates the possibility of speculative gains using leverage. Because a relatively small amount of margin money controls a large amount of capital represented in a stock index contract, a small change in the index level might produce a profitable return on one's investment if one is right about the direction of the market. Speculative gains in stock futures are limited but liabilities are greater.
3. Stock index futures are the most cost efficient hedging device whereas hedging through individual stock futures is costlier.
4. Stock index futures cannot be easily manipulated whereas individual stock price can be exploited more easily.
5. Since, stock index futures consists of many securities, so being an average stock, is much less volatile than individual stock price. Further, it implies much lower capital adequacy and margin requirements in comparison of individual stock futures. Risk diversification is possible under stock index future than in stock futures.
6. One can sell contracts as readily as one buys them and the amount of margin required is the same.
7. In case of individual stocks the outstanding positions are settled normally against physical delivery of shares. In case of stock index futures they are settled in cash all over the world on the premise that index value is safely accepted as the settlement price.
8. It is also seen that regulatory complexity is much less in the case of stock index futures in comparison to stock futures.
9. It provides hedging or insurance protection for a stock portfolio in a falling market.

5.2.5 Uses/Advantages of Stock Index Futures

Investors can use stock index futures to perform myriad tasks. Some common uses are:

(1) Investors commonly use stock index futures to change the weightings or risk exposures of their investment portfolios. A good example of this is investors who hold equities from two or more countries. Suppose these investors have portfolios invested in 60 percent U.S. equities and 40 percent Japanese equities and want to increase their systematic risk to the

U.S. market and reduce these risks to the Japanese market. They can do this by buying U.S. stock index futures contracts in the indexes underlying their holdings and selling Japanese contracts (in the Nikkei Index).

(2) Stock index futures also allow investors to separate market timing from market selection decisions. For instance, investors may want to take advantage of perceived immediate increases in an equity market but are not certain which securities to buy; they can do this by purchasing stock index futures. If the futures contracts are bought and the present value of the money used to buy them is invested in risk-free securities, investors will have a risk exposure equal to that of the market. Similarly, investors can adjust their portfolio holdings at a more leisurely pace. For example, assume the investors see that they have several undesirable stocks but do not know what holdings to buy to replace them. They can sell the unwanted stocks and, at the same time, buy stock index futures to keep their exposure to the market. They can later sell the futures contracts when they have decided which specific stocks they want to purchase.

(3) Investors can also make money from stock index futures through index arbitrage, also referred to as program trading. Basically, arbitrage is the purchase of a security or commodity in one market and the simultaneous sale of an equal product in another market to profit from pricing differences. Investors taking part in stock index arbitrage seek to gain profits whenever a futures contract is trading out of line with the fair price of the securities underlying it. Thus, if a stock index futures contract is trading above its fair value, investors could buy a basket of about 100 stocks composing the index in the correct proportion—such as a mutual fund comprised of stocks represented in the index—and then sell the expensively priced futures contract. Once the contract expires, the equities could then be sold and a net profit would result. While the investors can keep their arbitrage position until the futures contract expires, they are not required to. If the futures contract seems to be returning to fair market value before the expiration date, it may be prudent for the investors to sell early.

(4) Investors often use stock index futures to hedge the value of their portfolios. Provide hedging or insurance protection for a stock portfolio in a falling market. To implement a hedge, the instruments in the cash and futures markets should have similar price movements. Also, the amount of money invested in the cash and futures markets should be the same. To illustrate, while investors owning well-diversified investment portfolios are generally shielded from unsystematic risk (risk specific to particular firms), they are fully exposed to systematic risk (risk relating to overall market fluctuations). A cost-effective way for investors to reduce the exposure to systematic risk is to hedge with stock index futures, similar to the way that people hedge commodity holdings using commodity futures. Investors often use short hedges when they are in a long position in a stock portfolio and believe that there will be a temporary downturn in the overall stock market. Hedging transfers the price risk of owning the stock from a person unwilling to accept systematic risks to someone willing to take the risk.

To carry out a short hedge, the hedger sells a futures contract; thus, the short hedge is also called a "sell-hedge."

Example

Consider investors who own portfolios of securities valued at $.1.2 million with a dividend of 1 percent. The investors have been very successful with their stock picks. Therefore, while their portfolios' returns move up and down with the market, they consistently outperform the market by 6 percent. Thus, the portfolio would have a beta of 1.00 and an alpha of 6 percent. Say that the investors believe that the market is going to have a 15 percent decline, which would be offset by the 1 percent received from dividends. The net broad market return would be -14 percent but, since they consistently outperform the market by 6 percent, their estimated return would be -8 percent. In this instance, the investors would like to cut their beta in half without necessarily cutting their alpha in half. They can achieve this by selling stock index futures. In this scenario, the S&P 500 index is at 240. The contract multiplier is $500, and therefore each contract represents a value of $120,000. Since the investors want to simulate the sale of half of their $1.2 million portfolios, they must sell five contracts (5 × $120,000 = $600,000). Thus, their portfolios would be affected by only half of the market fluctuation. While the investors could protect their portfolios equally well by selling half of their shares of stock and buying them again at short time later, using a short hedge on stock index futures is much cheaper than paying the capital gains tax plus the broker commissions associated with buying and selling huge blocks of stock.

At the extreme, stock index futures can theoretically eliminate the effects of the broad market on a portfolio. Perfect hedges are very unusual because of the existence of basis risk. The basis is the difference between the existing price in the futures market and the cash price of the underlying securities. Basis risk occurs when changes in the economy and the financial situation have different impacts on the cash and futures markets.

(5) Stock index futures add flexibility to his or her portfolio as a hedging and trading instrument.

(6) Create the possibility of speculative gains using leverage. Because a relatively small amount of margin money controls a large amount of capital represented in a stock index contract, a small change in the index level might produce a profitable return on one's investment if he or she is right about the market's direction.

(7) Maintain one's stock portfolio during stock market corrections. One may not need "insurance" for all the time, but there are certain times when one would like less exposure to stocks. Yet, one doesn't want to sell off part of a stock portfolio that has taken him or her a long time to put together and looks like a sound, long-term investment program.

(8) One of the major advantages of futures markets, in general, is that one can sell contracts as readily as he or she can buy them and the amount of margin required is the same. Mutual funds do not specialize in bear market approaches by short selling stocks but, and also it is not possible for individuals to short sell stocks in a falling market to make money.

(9) Transfer risk quickly and efficiently. Whether one is speculating, looking for insurance protection (hedging), or temporarily substituting futures for a later cash transaction, most stock index futures trades can be accomplished quickly and efficiently. Many mutual funds require investors to wait until the end of the day to see at what price they were able to purchase or sell shares. With today's volatility, once-a-day pricing may not give one the maneuverability to take positions at exactly the time he or she wants. Stock index futures give individual the opportunity to get into or out of a position whenever he or she wants.

6. OPTIONS

An Option may be understood as a privilege, sold by one party to another, that gives the buyer the right, but not the obligation, to buy (call) or sell (put) any underlying say stock, foreign exchange, commodity, index, interest rate etc. at an agreed-upon price within a certain period or on a specific date regardless of changes in underlying's market price during that period.

The various kinds of stock options include put and call options, which may be purchased in anticipation of changes in stock prices, as a means of speculation or hedging. A put gives its holder an option to sell, or put, shares to another party at a fixed price even if the market price declines. A call gives the holder an option to buy, or call for, shares at a fixed price even if the market price rises.

6.1 Stock Options

Stock options involve no commitments on the part of the buyers of the option contracts individual to purchase or sell the stock and the option is usually exercised only if the price of the stock has risen (in case of call option) or fallen (in case of put option) above the price specified at the time the option was given. One important difference between stocks and options is that stocks give you a small piece of ownership in the company, while options are just contracts that give you the right to buy or sell the stock at a specific price by a specific date. Investing in options provide limited risk, high potential reward and smaller amount of capital required to control the same number of shares which can be done via investing through cash market.

6.2 Stock Index Option

It is a call or put option on a financial index. Investors trading index options are essentially betting on the overall movement of the stock market as represented by a basket of stocks.

Index options can be used by the portfolio managers to limit their downside risk. Suppose the value of the index is S. Consider a manager in charge of a well diversified portfolio which has a β of 1.0 so that its value mirrors the value of the index. If for each 100S rupees in the portfolio, the manager buys one put option contract with exercise price X, the value of the portfolio is protected against the possibility of the index falling below X. For instance, suppose that the manager's portfolio is worth ₹ 10,00,000 and the value of the index is 10000. The portfolio is worth 100 times the index. The manager can obtain insurance against the value of the portfolio dropping below ₹

900,000 in the next two months by buying 1 put option contracts with a strike price of ₹ 9000. To illustrate how this would work, consider the situation where the index drops to 8500. The portfolio will be worth ₹ 850000 (100 x 8500). However, the payoff from the options will be 1 x (₹ 9000 – ₹ 8500) x 100 = ₹ 50000, bringing the total value of the portfolio up to the insured value of ₹ 9,00,000.

6.3 Parties to the Options

There are always two types of entities for an option transaction buyer and a seller (also known as writer of the option) . So, for every call or put option purchased, there is always someone else selling/buying it. When individuals sell options, they effectively create a security that didn't exist before. This is known as writing an option and explains one of the main sources of options, since neither the associated company nor the options exchange issues options. When you write a call, you may be obligated to sell shares at the strike price any time before the expiration date. When you write a put, you may be obligated to buy shares at the strike price any time before expiration. The price of an option is called its premium. The buyer of an option cannot lose more than the initial premium paid for the contract, no matter what happens to the underlying security. So, the risk to the buyer is never more than the amount paid for the option. The profit potential, on the other hand, is theoretically unlimited

6.4 Premium for Options

In return for the premium received from the buyer, the seller of an option assumes the risk of having to deliver (if a call option) or taking delivery (if a put option) of the shares of the stock. Unless that option is covered by another option or a position in the underlying stock (opposite to the position taken via selling the option contracts), the seller's loss can be unlimited, meaning the seller can lose much more than the original premium received.

6.5 Types of Options

You should be aware that there are two basic styles of options: American and European. An American, or American-style, option can be exercised at any time between the date of purchase and the expiration date. Most exchange-traded options are American style and all stock options are American style. A European, or European-style, option can only be exercised on the expiration date. In Indian Market options are European style options.

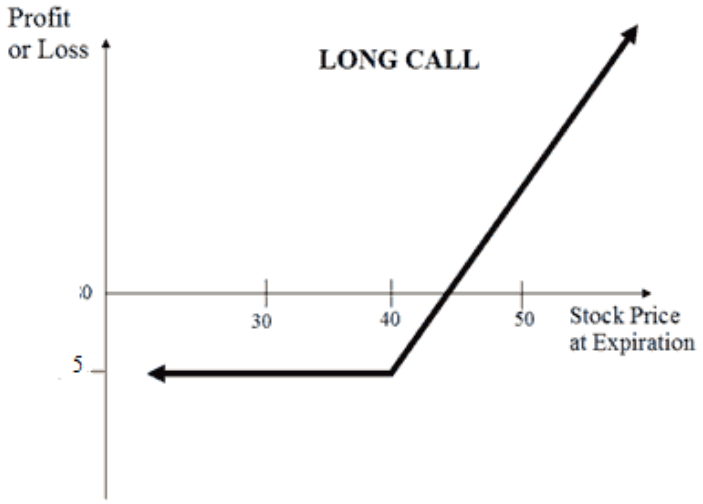
6.6 Pay-off scenarios

The possible pay-off under various scenarios are as follows:

6.6.1 Pay-off for a Call Buyer

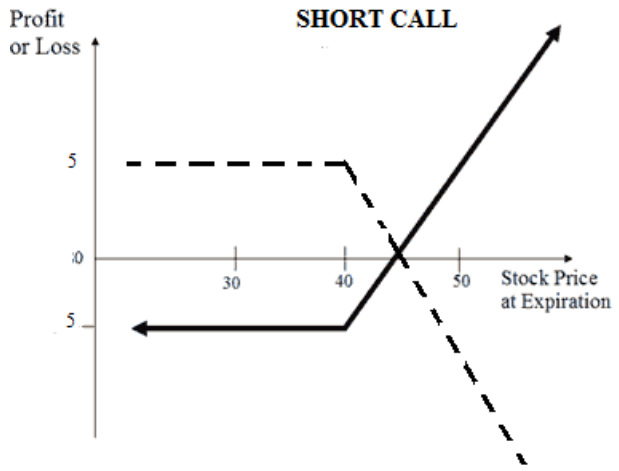
Also, called Long Call. For example, Mr. X buys a call option at strike price of Rs. 40 in exchange of a premium of Rs. 5. In case if actual price of the stock at the time of exercise is less than Rs. 40, Mr. X would not exercise his option his loss would be Rs. 5. Mr. X would exercise his option at

any price above Rs. 40. In such situation his loss would start reducing and at the price of Rs. 45 there will be Break Even at the price of Rs. 45.



6.6.2 Pay-off for a Call Seller

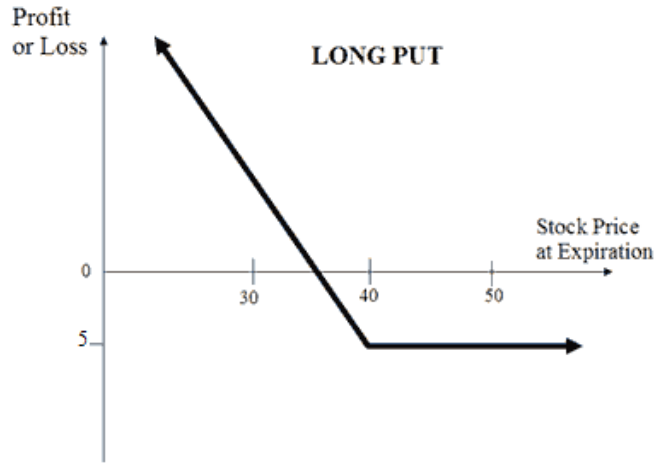
Also, called Short Call. The pay-off profile of Call Seller shall be the mirror image of the Long Call as shown below in dotted line.



6.6.3 Pay-off for a Put Buyer

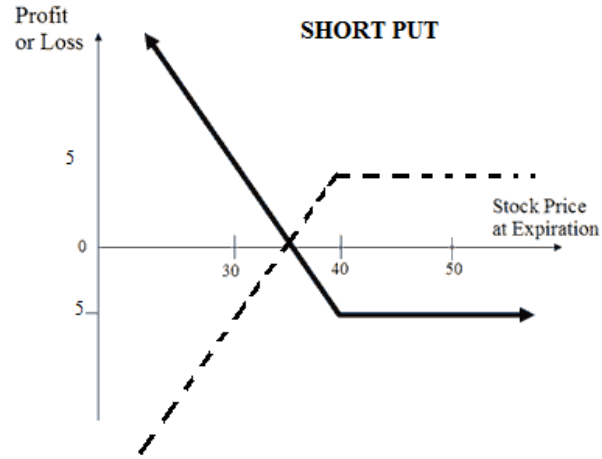
Also, called Long Put. For example, Mr. X buys a put option at strike price of Rs. 40 in exchange of a premium of Rs. 5. In case if actual price of the stock at the time of exercise is less than Rs. 40, Mr. X would exercise his option his gain would be (Spot Price – Exercise Price – Premium). Mr. X

would exercise his option at any price below Rs. 40. The break- even Break Even price will be Rs. 35 and Mr. X would not exercise his option for any price above Rs. 40.



6.6.4 Pay-off for a Put Seller

Also, called Short Put. For example, The pay-off profile of Put Seller shall be the mirror image of the Long Put as shown below in dotted line.



6.7 Comparison with Single Stock Futures

Investing in stock futures differs from investing in equity options contracts in several ways:

- *Nature:* In options, the buyer of the options has the right but not the obligation to purchase or sell the stock. However while going in for a long futures position , the investor is obligated to square off his position at or before the expiry date of the futures contract.

- *Movement of the Market*: Options traders use a mathematical factor, the delta that measures the relationship between the options premium and the price of the underlying stock. At times, an options contract's value may fluctuate independently of the stock price. By contrast, the future contract will much more closely follow the movement of the underlying stock.
- *The Price of Investing*: When an options investor takes a long position, he or she pays a premium for the contract. The premium is often called a sunk cost. At expiration, unless the options contract is in the money, the contract is worthless and the investor has lost the entire premium. Stock future contracts require an initial margin deposit and a specific maintenance level of cash for mark to market margin

7. OPTION VALUATION TECHNIQUES

We have already been introduced to characteristics of both European and American Options. Assuming a European Call Option on a non dividend paying stock it is easy to see that its value at expiration date shall either be zero or the difference between the market price and the exercise price, whichever is higher. It may be noted that the value of an Option cannot be negative. An investor is required to pay a premium for acquiring such an Option. In case this premium is less than the value of the Option, the investor shall make profits, however, in case the premium paid is more than the value, the investor shall end up losing money. Note that, while measuring these gains or losses, Time Value of Money and Transaction Costs have been ignored. The opposite picture emerges for the Writer.

The Value of an Option with one period to expire: Simply speaking, the theoretical value of an Option should be the difference between the current stock price and the exercise price. In case the stock price is less than the exercise price the theoretical value shall be zero. However, as long as there is time to expiration it is possible for a zero theoretical value Option to have some actual positive Market value. This is because there may be a possibility of the stock price rising at which point of time the Option may be exercised advantageously.

7.1 Binomial Model

The binomial model breaks down the time to expiration into potentially a very large number of time intervals, or steps. This requires the use of probability and future discrete projections through which a tree of stock prices is initially produced working forward from the present to expiration.

To facilitate understanding we shall restrict ourselves to a European Option having a one year time branching process where at the end of the year there are only two possible values for the common stock. One is higher and the other lower than the current value. Assume that the probability of the two values to materialize is known. In such a situation, a hedged position can be established by buying the stock and by writing Options. This shall help offset price movements. At each step, it is assumed that the stock price will either move up or down. The pricing of the Options should be such that the return equals the risk-free rate.

The above mentioned is an example of Binomial Distribution. When the number of high and low value projections for the concerned stock are numerous, the tree shall represent all possible paths that the stock price could take during the life of the option.

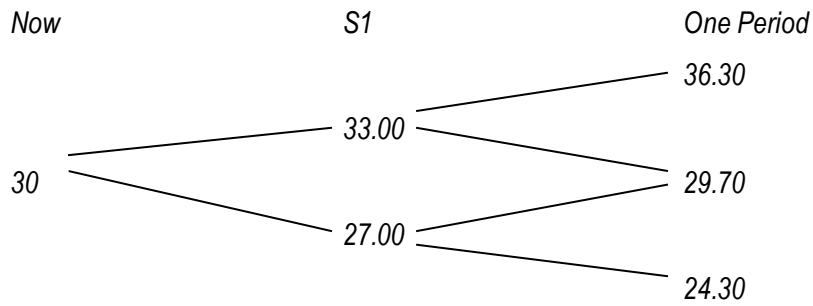
At the end of the tree - i.e. at expiration of the option - all the terminal option prices for each of the final possible stock prices are known as they simply equal their intrinsic values.

The big advantage the binomial model has over the Black-Scholes model is that it can be used to accurately price American options. This is because with the binomial model it's possible to check at every point in an option's life (i.e. at every step of the binomial tree) for the possibility of early exercise (e.g. where, due to e.g. a dividend, or a put being deeply in the money the option price at that point is less than its intrinsic value).

Where an early exercise point is found it is assumed that the option holder would elect to exercise, and the option price can be adjusted to equal the intrinsic value at that point. This then flows into the calculations higher up the tree and so on.

Illustration 1

Following is a two-period tree for a share of stock in CAB Ltd.:



Using the binomial model, calculate the current fair value of a regular call option on CAB Stock with the following characteristics: X = ₹ 28, Risk Free Rate = 5 percent. You should also indicate the composition of the implied riskless hedge portfolio at the valuation date.

Solution

u = 33.00/30.00 = 36.30/33.00 = 1.10 d = 27.00/30.00 = 24.30/27.00 = 0.90

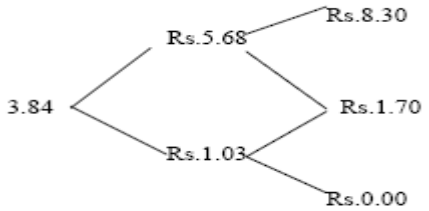
$r = (1 + .05)^{1/2} = 1.0247$

$$p = \frac{r - d}{u - d} = \frac{1.0247 - 0.90}{1.10 - 0.90} = 0.1247/0.20 = 0.6235$$

C_{uu} = Max [0, 36.30 – 28] = 8.30

C_{ud} = Max [0, 29.70 – 28] = 1.70

C_{dd} = Max [0, 24.30 – 28] = 0



$$C_U = \frac{(0.6235)(8.30)+(0.3765)(1.70)}{1.025} = \frac{5.175+.064}{1.025} = 5.815/1.025 = ₹\ 5.675$$

$$C_d = \frac{(0.6235)(1.70)+(0.3765)(0.00)}{1.025} = \frac{1.05995}{1.025} = ₹\ 1.0340$$

$$C_o = \frac{(0.6235)(5.675)+(0.3765)(1.0340)}{1.025} = \frac{3.538+3895}{1.025} = ₹\ 3.83$$

h = (33.00 – 27.00)/(1.03 – 5.68) = 6.00/4.65 = 1.29

7.2 Risk Neutral Method

The "risk-neutral" technique can also be used to value derivative securities. It was developed by John Cox and Stephen Ross in 1976. The basic argument in the risk neutral approach is that since the valuation of options is based on arbitrage and is therefore independent of risk preferences; one should be able to value options assuming any set of risk preferences and get the same answer as by using Binomial Model. This model is a simple model.

Example

Suppose the price of the share of Company X is ₹ 50. In one year it is expected either to go up to ₹ 60 or go down to ₹ 40. The risk free rate of interest is 5%.

Let p be the probability that the price will increase then (1-p) will be probability of price decrease. The value of the stock today must be equal to the present value of the expected price after one year discounted at risk-free rate as follows:

$$50 = \frac{60p+40(1-p)}{1.05}$$

On solving we shall get the value of p= 0.65. With this value we can find out the present value of the expected payout as follows:

$$\frac{10(0.65)+0(1-0.65)}{1.05} = 6.19$$

It may however be noted that the discounting can also be made on daily basis as shown in following illustration.

Illustration 2

The current market price of an equity share of Penchant Ltd is ₹ 420. Within a period of 3 months, the maximum and minimum price of it is expected to be ₹ 500 and ₹ 400 respectively. If the risk free rate of interest be 8% p.a., what should be the value of a 3 months Call option under the "Risk Neutral" method at the strike rate of ₹ 450 ? Given $e^{0.02}$ = 1.0202

Solution

Let the probability of attaining the maximum price be p

(500 - 420) x p+(400 - 420) x (1-p) = 420 x ($e^{0.02}$-1)

or, 80p - 20(1 - p) = 420 x 0.0202

or, 80p – 20 + 20p = 8.48

or, 100p = 28.48

p= 0.2848

The value of Call Option in ₹ = $\frac{0.2848x(500-450)}{1.0202} = \frac{0.2848x50}{1.0202}$ =13.96

7.3 Black-Scholes Model

The Black-Scholes model is used to calculate a theoretical price of an Option. The Black-Scholes price is nothing more than the amount an option writer would require as compensation for writing a call and completely hedging the risk of buying stock. The important point is that the hedger's view about future stock prices is irrelevant. Thus, while any two investors may strongly disagree on the rate of return they expect on a stock they will, given agreement to the assumptions of volatility and the risk-free rate, always agree on the fair value of the option on that underlying asset. This key concept underlying the valuation of all derivatives -- that fact that the price of an option is independent of the risk preferences of investors -- is called risk-neutral valuation. It means that all derivatives can be valued by assuming that the return from their underlying assets is the risk-free rate.

The model is based on a normal distribution of underlying asset returns.

The following assumptions accompany the model:

1. European Options are considered,
2. No transaction costs,
3. Short term interest rates are known and are constant,
4. Stocks do not pay dividend,
5. Stock price movement is similar to a random walk,
6. Stock returns are normally distributed over a period of time, and

7. The variance of the return is constant over the life of an Option.

The original formula for calculating the theoretical option price (OP) is as follows:

$$OP = SN(d_1) - Xe^{-rt}N(d_2)$$

Where:

$$d_1 = \frac{\ln\left(\frac{S}{X}\right) + \left(r + \frac{v^2}{2}\right)t}{v\sqrt{t}}$$

$$d_2 = d_1 - v\sqrt{t}$$

The variables are:

S = *current stock price*

X = *strike price of the option*

t = time remaining until expiration, expressed as a percent of a year

r = current continuously compounded risk-free interest rate

v = annual volatility of stock price (the standard deviation of the short-term returns over one year).

ln = natural logarithm

N(x) = standard normal cumulative distribution function

e = the exponential function

Understanding the formula

$N(d_1)$ represents the hedge ratio of shares of stock to Options necessary to maintain a fully hedged position.

Consider the Option holder as an investor who has borrowed an equivalent amount of the exercise price at interest rate r. $Xe^{-rt}N(d_2)$ represents this borrowing which is equivalent to the present value of the exercise price times an adjustment factor of $N(d_2)$

The main advantage of the Black-Scholes model is speed -- it lets you calculate a very large number of option prices in a very short time.

The Black-Scholes model has one major limitation that it cannot be used to accurately price options with an American-style exercise as it only calculates the option price at one point of time -- at expiration. It does not consider the steps along the way where there could be the possibility of early exercise of an American option.

Illustration 3

(i) The shares of TIC Ltd. are currently priced at ₹ 415 and call option exercisable in three months' time has an exercise rate of ₹ 400. Risk free interest rate is 5% p.a. and standard deviation (volatility) of share price is 22%. Based on the assumption that TIC Ltd. is not going to declare any dividend over the next three months, is the option worth buying for ₹ 25?

(ii) Calculate value of aforesaid call option based on Block Scholes valuation model if the current price is considered as ₹ 380.

(iii) What would be the worth of put option if current price is considered ₹ 380.

(iv) If TIC Ltd. share price at present is taken as ₹ 408 and a dividend of ₹ 10 is expected to be paid in the two months time, then, calculate value of the call option.

Solution

(i) Given: TIC Ltd. Current Price = ₹ 415

Exercise rate = 400

Risk free interest rate is = 5% p.a.

SD (Volatility) = 22%

Based on the above bit is calculated value of an option based on Block Scholes Model:

$$d_1 = \frac{\ln\left(\frac{415}{400}\right) + \left[.05 + \frac{1}{2}(.22)^2\right].25}{.22\sqrt{.25}} = \frac{.03681 + .01855}{.11} = .5032727$$

$$d_2 = \frac{\ln\left(\frac{415}{400}\right) + \left[.05 - \frac{1}{2}(.22)^2\right].25}{.22\sqrt{.25}} = \frac{.03681 + .00645}{.11} = .3932727$$

$N(d_1) = N(.50327) = 1 - .3072 = .6928$

$N(d_2) = N(.39327) = 1 - .3471 = .6529$

$$\text{Value of Option} = 415(.6928) - \frac{400}{e^{(.05)(.25)}}(.6529)$$

$$= 287.512 - \frac{400}{1.012578}(.6529) = 287.512 - 257.916 = ₹\ 29.60$$

NB : N(0.39327) can also be find as under :

Step 1: From table of area under normal curve find the area of variable 0.39 i.e. 0.6517.

Step 2: From table of area under normal curve find the area of variable 0.40.

Step 3: Find out the difference between above two variables and areas under normal curve.

Step 4 : Using interpolation method find out the value of 0.00327. Which is as follows:

$$\frac{0.0037}{0.01} \times 0.00327 = 0.0012$$

Step 5: Add this value, computed above to the N(0.39). Thus N (0.39327) = 0.6517 + 0.0012 = 0.6529

Since market price of ₹ 25 is less than ₹ 27.60 (Block Scholes Valuation model) indicate that option is underpriced, hence worth buying.

(ii) If the current price is taken as ₹ 380 the computations are as follows:

$$d_1 = \frac{\ln\left(\frac{380}{400}\right) + \left[.05 + \frac{1}{2}(.22)^2\right].25}{.22\sqrt{.25}} = \frac{-0.05129 + .01855}{.11} = -0.297636$$

$$d_2 = \frac{\ln\left(\frac{380}{400}\right) + \left[.05 - \frac{1}{2}(.22)^2\right].25}{.22\sqrt{.25}} = \frac{-0.05129 + .00645}{.11} = -0.407636$$

$$V_o = V_s\, N(d_1) - \frac{E}{e^{rt}} N(d_2)$$

$N(d_1) = N(-0.297636) = .3830$

$N(d_2) = N(-0.407636) = .3418$

$$380\,(.3830) - \frac{400}{e^{(.05)(.25)}} \times (.3418)$$

$$145.54 - \frac{400}{1.012578}\,(.3418) = 145.54 - 135.02 = ₹\ 10.52$$

(iii) Value of call option = ₹ 10.52

Current Market Value = ₹ 415

Present Value of Exercise Price = $\frac{400}{1.0125} = 395.06$

$V_p = -V_s + V_s + PV\,(E)$

$V_p = -380 + 10.52 + 395.06 = 25.58 =$ ₹ 25.58 Ans

(iv) Since dividend is expected to be paid in two months time we have to adjust the share price and then use Block Scholes model to value the option:

Present Value of Dividend (using continuous discounting) = Dividend $\times e^{-rt}$

$= ₹ 10 \times e^{-.05 \times .1666}$

$= ₹ 10 \times e^{-.008333}$

= ₹ 9.917 (Please refer Exponential Table)

Adjusted price of shares is ₹ 408 – 9.917 = ₹ 398.083

This can be used in Block Scholes model

$$d_1 = \frac{\ln\left(\frac{398.083}{400}\right) + \left[.05 + \frac{1}{2}(.22)^2\right].25}{.22\sqrt{.25}} = \frac{-.00480 + .01855}{.11} = .125$$

$$d_2 = \frac{\ln\left(\frac{398.083}{400}\right) + \left[.05 - \frac{1}{2}(.22)^2\right].25}{.22\sqrt{.25}} = \frac{-.00480 + .00645}{11} = .015$$

$N(d_1) = N(.125) = .5498$

$N(d_2) = N(.015) = .5060$

$$\text{Value of Option} = 398.0\ 83\ (.5498) - \frac{400}{e^{(.05)(.25)}}(.5060)$$

$$218.866 - \frac{400}{e^{.0125}}(.5060)$$

$$218.866 - \frac{400}{1.012578}(.5060) = 218.866 – 199.8858 = ₹ 18.98$$

7.4 Greeks

The Greeks are a collection of statistical values (expressed as percentages) that give the investor a better overall view of how a stock has been performing. These statistical values can be helpful in deciding what options strategies are best to use. The investor should remember that statistics show trends based on past performance. It is not guaranteed that the future performance of the stock will behave according to the historical numbers. These trends can change drastically based on new stock performance.

Before we discuss these statistical measures let us discuss the factors that affects the value of option as these statistical measures are related to changes in the in these factors.

7.4.1 Factors Affecting Value of an Option

There are a number of different mathematical formulae, or models, that are designed to compute the fair value of an option. You simply input all the variables (stock price, time, interest rates,

dividends and future volatility), and you get an answer that tells you what an option should be worth. Here are the general effects the variables have on an option's price:

(a) ***Price Movement of the Underlying:*** The value of calls and puts are affected by changes in the underlying stock price in a relatively straightforward manner. When the stock price goes up, calls should gain in value and puts should decrease. Put options should increase in value and calls should drop as the stock price falls.

(b) ***Time till expiry:*** The option's future expiry, at which time it may become worthless, is an important and key factor of every option strategy. Ultimately, time can determine whether your option trading decisions are profitable. To make money in options over the long term, you need to understand the impact of time on stock and option positions.

With stocks, time is a trader's ally as the stocks of quality companies tend to rise over long periods of time. But time is the enemy of the options buyer. If days pass without any significant change in the stock price, there is a decline in the value of the option. Also, the value of an option declines more rapidly as the option approaches the expiration day. That is good news for the option seller, who tries to benefit from time decay, especially during that final month when it occurs most rapidly.

(c) ***Volatility in Stock Prices:*** Volatility can be understood via a measure measure called statistical (sometimes called historical) volatility, or SV for short. SV is a statistical measure of the past price movements of the stock; it tells you how volatile the stock has actually been over a given period of time.

But to give you an accurate fair value for an option, option pricing models require you to put in what the future volatility of the stock will be during the life of the option. Naturally, option traders don't know what that will be, so they have to try to guess. To do this, they work the options pricing model "backwards" (to put it in simple terms). After all, you already know the price at which the option is trading; you can also find the other variables (stock price, interest rates, dividends, and the time left in the option) with just a bit of research. So the only missing number is future volatility, which you can calculate from the equation.

(d) ***Interest Rate***- Another feature which affects the value of an Option is the time value of money. The greater the interest rates, the present value of the future exercise price are less.

Now let us discuss these measures.

7.4.2 Delta

A by-product of the Black-Scholes model is the calculation of the delta. It is the degree to which an option price will move given a small change in the underlying stock price. For example, an option with a delta of 0.5 will move half a rupee for every full rupee movement in the underlying stock.

A deeply out-of-the-money call will have a delta very close to zero; a deeply in-the-money call will have a delta very close to 1.

The formula for a delta of a European call on a non-dividend paying stock is:

Delta = N (d_1) (see Black-Scholes formula above for d1)

Call deltas are positive; put deltas are negative, reflecting the fact that the put option price and the underlying stock price are inversely related. The put delta equals the call delta - 1.

The delta is often called the hedge ratio: If you have a portfolio short 'n' options (e.g. you have written n calls) then n multiplied by the delta gives you the number of shares (i.e. units of the underlying) you would need to create a riskless position - i.e. a portfolio which would be worth the same whether the stock price rose by a very small amount or fell by a very small amount. In such a "delta neutral" portfolio any gain in the value of the shares held due to a rise in the share price would be exactly offset by a loss on the value of the calls written, and vice versa.

Note that as the delta changes with the stock price and time to expiration the number of shares would need to be continually adjusted to maintain the hedge. How quickly the delta changes with the stock price are given by gamma.

In addition to delta there are some other "Greeks" which some find useful when constructing option strategies.

7.4.3 Gamma

It measures how fast the delta changes for small changes in the underlying stock price. i.e. the delta of the delta. If you are hedging a portfolio using the delta-hedge technique described under "Delta", then you will want to keep gamma as small as possible, the smaller it is the less often you will have to adjust the hedge to maintain a delta neutral position. If gamma is too large, a small change in stock price could wreck your hedge. Adjusting gamma, however, can be tricky and is generally done using options .

7.4.4 Theta

The change in option price given a one day decrease in time to expiration. Basically it is a measure of time decay. Unless you and your portfolio are travelling at close to the speed of light the passage of time is constant and inexorable. Thus, hedging a portfolio against time decay, the effects of which are completely predictable, would be pointless.

7.4.5 Rho

The change in option price given a one percentage point change in the risk-free interest rate. It is sensitivity of option value to change in interest rate. Rho indicates the absolute change in option value for a one percent change in the interest rate. For example, a Rho of .060 indicates the option's theoretical value will increase by .060 if the interest rate is decreased by 1.0.

7.4.6 Vega

Sensitivity of option value to change in volatility. Vega indicates an absolute change in option value for a one percent change in volatility. For example, a Vega of .090 indicates an absolute

change in the option's theoretical value will increase by .090 if the volatility percentage is increased by 1.0 or decreased by .090 if the volatility percentage is decreased by 1.0. Results may not be exact due to rounding. It can also be stated as the change in option price given a one percentage point change in volatility. Like delta and gamma, Vega is also used for hedging.

8. COMMODITY DERIVATIVES

Trading in commodity derivatives first started to protect farmers from the risk of the value of their crop going below the cost price of their produce. Derivative contracts were offered on various agricultural products like cotton, rice, coffee, wheat, pepper etc.

The first organized exchange, the Chicago Board of Trade (CBOT) -- with standardized contracts on various commodities -- was established in 1848. In 1874, the Chicago Produce Exchange - which is now known as Chicago Mercantile Exchange (CME) was formed.

CBOT and CME are two of the largest commodity derivatives exchanges in the world.

8.1 Necessary Conditions to Introduce Commodity Derivatives

The commodity characteristic approach defines feasible commodities for derivatives trading based on an extensive list of required commodity attributes. It focuses on the technical aspects of the underlying commodity. The following attributes are considered crucial for qualifying for the derivatives trade: 1) a commodity should be durable and it should be possible to store it; 2) units must be homogeneous; 3) the commodity must be subject to frequent price fluctuations with wide amplitude; supply and demand must be large; 4) supply must flow naturally to market and there must be breakdowns in an existing pattern of forward contracting.

The first attribute, durability and storability, has received considerable attention in commodity finance, since one of the economic functions often attributed to commodity derivatives markets is the temporal allocation of stocks. The commodity derivatives market is an integral part of this storage scenario because it provides a hedge against price risk for the carrier of stocks.

Since commodity derivatives contracts are standardized contracts, this approach requires the underlying product to be homogeneous, the second attribute, so that the underlying commodity as defined in the commodity derivatives contract corresponds with the commodity traded in the cash market. This allows for actual delivery in the commodity derivatives market.

The third attribute, a fluctuating price, is of great importance, since firms will feel little incentive to insure themselves against price risk if price changes are small. A broad cash market is important because a large supply of the commodity will make it difficult to establish dominance in the market place and a broad cash market will tend to provide for a continuous and orderly meeting of supply and demand forces.

The last crucial attribute, breakdowns in an existing pattern of forward trading, indicates that cash market risk will have to be present for a commodity derivatives market to come into existence.

Should all parties decide to eliminate each and every price fluctuation by using cash forward contracts for example, a commodity derivatives market would be of little interest.

A commodity derivative must reflect the commercial movement of a commodity both loosely and broadly enough, so that price distortions will not be a result of specifications in the contract. To warrant hedging, the contract must be as close a substitute for the cash commodity as possible. Hedging effectiveness is an important determinant in explaining the success of commodity derivatives and as a result considerable attention has been paid to the hedging effectiveness of commodity derivatives.

The total set of customer needs concerning commodity derivatives is differentiated into instrumental needs and convenience needs (see Figure 1). Customers will choose that "service-product" (futures, options, cash forwards, etc.) which best satisfy their needs, both instrumental and convenience, at an acceptable price.

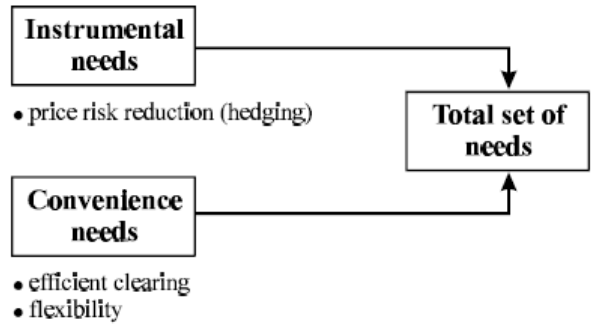


FIGURE 1

Instrumental needs are the hedgers' needs for price risk reduction. Hedgers wish to reduce, or, if possible, eliminate portfolio risks at low cost. The instrumental needs are related to the core service of the commodity derivatives market, which consists of reducing price variability to the customer. Not only do hedgers wish to reduce price risk, they also desire flexibility in doing business, easy access to the market, and an efficient clearing system. These needs are called convenience needs. They deal with the customer's need to be able to use the core service provided by the exchange with relative ease. The extent to which the commodity derivatives exchange is able to satisfy convenience needs determines the process quality. The service offering is not restricted to the core service, but has to be complemented by so-called peripheral services

8.2 Investing in Commodity Derivatives

Commodity derivatives, which were traditionally developed for risk management purposes, are now growing in popularity as an investment tool. Most of the trading in the commodity derivatives market is being done by people who have no need for the commodity itself.

They just speculate on the direction of the price of these commodities, hoping to make money if the price moves in their favour.

The commodity derivatives market is a direct way to invest in commodities rather than investing in the companies that trade in those commodities.

For example, an investor can invest directly in a steel derivative rather than investing in the shares of Tata Steel. It is easier to forecast the price of commodities based on their demand and supply forecasts as compared to forecasting the price of the shares of a company which depend on many other factors than just the demand and supply of the products they manufacture and sell or trade in.

Also, derivatives are much cheaper to trade in as only a small sum of money is required to buy a derivative contract.

Let us assume that an investor buys a tonne of soybean for ₹ 8,700 in anticipation that the prices will rise to ₹ 9,000 by June 30, 2013. He will be able to make a profit of ₹ 300 on his investment, which is 3.4%. Compare this to the scenario if the investor had decided to buy soybean futures instead.

Before we look into how investment in a derivative contract works, we must familiarise ourselves with the buyer and the seller of a derivative contract. A buyer of a derivative contract is a person who pays an initial margin to buy the right to buy or sell a commodity at a certain price and a certain date in the future.

On the other hand, the seller accepts the margin and agrees to fulfill the agreed terms of the contract by buying or selling the commodity at the agreed price on the maturity date of the contract.

Now let us say the investor buys soybean futures contract to buy one tonne of soybean for ₹ 8,700 (exercise price) on November 30, 2013. The contract is available by paying an initial margin of 10%, i.e. ₹ 870. Note that the investor needs to invest only ₹ 870 here.

On November 30, 2013, the price of soybean in the market is, say, ₹ 9,000 (known as Spot Price -- Spot Price is the current market price of the commodity at any point in time).

The investor can take the delivery of one tonne of soybean at ₹ 8,700 and immediately sell it in the market for ₹ 9,000, making a profit of ₹ 300. So the return on the investment of ₹ 870 is 34.5%. On the contrary, if the price of soybean drops to ₹ 8,400 the investor will end up making a loss of 34.5%.

If the investor wants, instead of taking the delivery of the commodity upon maturity of the contract, an option to settle the contract in cash also exists. Cash settlement comprises exchange of the difference in the spot price of the commodity and the exercise price as per the futures contract.

At present, the option of cash settlement lies only with the seller of the contract. If the seller decides to make or take delivery upon maturity, the buyer of the contract has to fulfill his obligation by either taking or making delivery of the commodity, depending on the specifications of the contract.

In the above example, if the seller decides to go for cash settlement, the contract can be settled by the seller by paying ₹ 300 to the buyer, which is the difference in the spot price of the commodity and the exercise price. Once again, the return on the investment of ₹ 870 is 34.5%.

The above example shows that with very little investment, the commodity futures market offers scope to make big bucks. However, trading in derivatives is highly risky because just as there are high returns to be earned if prices move in favour of the investors, an unfavourable move results in huge losses.

The most critical function in a commodity derivatives exchange is the settlement and clearing of trades. Commodity derivatives can involve the exchange of funds and goods. The exchanges have a separate body to handle all the settlements, known as the clearing house.

For example, the holder of a futures contract to buy soybean might choose to take delivery of soya bean rather than closing his position before maturity. The function of the clearing house or clearing organisation, in such a case, is to take care of possible problems of default by the other party involved by standardising and simplifying transaction processing between participants and the organisation.

Certain special characteristics/benefits of Commodity derivatives trading are:

- To complement investment in companies that use commodities;
- To invest in a country's consumption and production;
- No dividends, only returns from price increases.

In spite of the surge in the turnover of the commodity exchanges in recent years, a lot of work in terms of policy liberalisation, setting up the right legal system, creating the necessary infrastructure, large-scale training programs, etc. still needs to be done in order to catch up with the developed commodity derivative markets.

8.3 Commodity Market

Commodity markets in a crude early form are believed to have originated in Sumer where small baked clay tokens in the shape of sheep or goats were used in trade. Sealed in clay vessels with a certain number of such tokens, with that number written on the outside, they represented a promise to deliver that number.

In modern times, commodity markets represent markets where raw or primary products are exchanged. These raw commodities are traded on regulated, commodity exchanges in which they are bought and sold in standardized contracts.

Some of the advantages of commodity markets are:

- Most money managers prefer derivatives to tangible commodities;
- Less hassle (delivery, etc);
- Allows indirect investment in real assets that could provide an additional hedge against inflation risk.

8.4 Commodity Futures

Almost all the commodities were allowed to be traded in the futures market from April 2003. To make trading in commodity futures more transparent and successful, multi-commodity exchanges at national level were also conceived and these next generation exchanges were allowed to start futures trading in commodities on-line.

The process of trading commodities is also known as futures trading. Unlike other kinds of investments, such as stocks and bonds, when you trade futures, you do not actually buy anything or own anything. You are speculating on the future direction of the price in the commodity you are trading. This is like a bet on future price direction. The terms "buy" and "sell" merely indicate the direction you expect future prices will take.

If, for instance, you were speculating in corn, you would buy a futures contract if you thought the price would be going up in the future. You would sell a futures contract if you thought the price would go down. For every trade, there is always a buyer and a seller. Neither person has to own any corn to participate. He must only deposit sufficient capital with a brokerage firm to insure that he will be able to pay the losses if his trades lose money.

On one side of a transaction may be a producer like a farmer. He has a field full of corn growing on his farm. It won't be ready for harvest for another three months. If he is worried about the price going down during that time, he can sell futures contracts equivalent to the size of his crop and deliver his corn to fulfill his obligation under the contract. Regardless of how the price of corn changes in the three months until his crop will be ready for delivery, he is guaranteed to be paid the current price.

On the other side of the transaction might be a producer such as a cereal manufacturer who needs to buy lots of corn. The manufacturer, such as Kellogg, may be concerned that in the next three months the price of corn will go up, and it will have to pay more than the current price. To protect against this, Kellogg can buy futures contracts at the current price. In three months Kellogg can fulfill its obligation under the contracts by taking delivery of the corn. This guarantees that regardless of how the price moves in the next three months, Kellogg will pay no more than the current price for its commodity.

In addition to agricultural commodities, there are futures for financial instruments and intangibles such as currencies, bonds and stock market indexes. Each futures market has producers and consumers who need to hedge their risk from future price changes. The speculators, who do not actually deal in the physical commodities, are there to provide liquidity. This maintains an orderly market where price changes from one trade to the next are small.

Rather than taking delivery or making delivery, the speculator merely offsets his position at some time before the date set for future delivery. If price has moved in the right direction, he will profit. If not, he will lose.

Advantages of Commodity Futures

Some of the advantages of commodity futures are:

- Easiest and cheapest way to invest in commodities
- 3 Major Categories like Agricultural products (soft commodities) –fibers, grains, food, livestock; Energy – crude oil, heating oil, natural gas; and Metals – copper, aluminum, gold, silver, platinum

8.5 Commodity Swaps

Producers need to manage their exposure to fluctuations in the prices for their commodities. They are primarily concerned with fixing prices on contracts to sell their produce. A gold producer wants to hedge his losses attributable to a fall in the price of gold for his current gold inventory. A cattle farmer wants to hedge his exposure to changes in the price of his livestock.

End-users need to hedge the prices at which they can purchase these commodities. A university might want to lock in the price at which it purchases electricity to supply its air conditioning units for the upcoming summer months. An airline wants to lock in the price of the jet fuel it needs to purchase in order to satisfy the peak in seasonal demand for travel.

Speculators are funds or individual investors who can either buy or sell commodities by participating in the global commodities market. While many may argue that their involvement is fundamentally destabilizing, it is the liquidity they provide in normal markets that facilitates the business of the producer and of the end-user.

Why would speculators look at the commodities markets? Traditionally, they may have wanted a hedge against inflation. If the general price level is going up, it is probably attributable to increases in input prices. Or, speculators may see tremendous opportunity in commodity markets. Some analysts argue that commodity markets are more technically-driven or more likely to show a persistent trend.

8.5.1 Types of Commodity Swaps

There are two types of commodity swaps: fixed-floating or commodity-for-interest.

(a) Fixed-Floating Swaps: They are just like the fixed-floating swaps in the interest rate swap market with the exception that both indices are commodity based indices.

General market indices in the international commodities market with which many people would be familiar include the S&P Goldman Sachs Commodities Index (S&PGSCI) and the Commodities Research Board Index (CRB). These two indices place different weights on the various commodities so they will be used according to the swap agent's requirements.

(b) Commodity-for-Interest Swaps: They are similar to the equity swap in which a total return on the commodity in question is exchanged for some money market rate (plus or minus a spread).

8.5.2 Valuing Commodity Swaps

In pricing commodity swaps, we can think of the swap as a strip of forwards, each priced at inception with zero market value (in a present value sense). Thinking of a swap as a strip of at-the-money forwards is also a useful intuitive way of interpreting interest rate swaps or equity swaps.

Commodity swaps are characterized by some peculiarities. These include the following factors for which we must account:

(i) The cost of hedging;

(ii) The institutional structure of the particular commodity market in question;

(iii) The liquidity of the underlying commodity market;

(iv) Seasonality and its effects on the underlying commodity market;

(v) The variability of the futures bid/offer spread;

(vi) Brokerage fees; and

(vii) Credit risk, capital costs and administrative costs.

Some of these factors must be extended to the pricing and hedging of interest rate swaps, currency swaps and equity swaps as well. The idiosyncratic nature of the commodity markets refers more to the often limited number of participants in these markets (naturally begging questions of liquidity and market information), the unique factors driving these markets, the inter-relations with cognate markets and the individual participants in these markets.

8.6 Hedging with Commodity Derivatives

Many times when using commodity derivatives to hedge an exposure to a financial price, there is not one exact contract that can be used to hedge the exposure. If you are trying to hedge the value of a particular type of a refined chemical derived from crude oil, you may not find a listed contract for that individual product. You will find an over-the-counter price if you are lucky.

They look at the correlation (or the degree to which prices in the individual chemical trade with respect to some other more liquid object, such as crude oil) for clues as to how to price the OTC product that they offer you. They make assumptions about the stability of the correlation and its volatility and they use that to "shade" the price that they show you.

Correlation is an un-hedgable risk for the OTC market maker, though. There is very little that he can do if the correlation breaks down.

For example, if all of a sudden the price for your individual chemical starts dropping faster than the correlation of the chemical's price with crude oil suggests it should, the OTC dealer has to start dumping more crude oil in order to compensate.

It is a very risky business. The OTC market maker's best hope is to see enough "two-way" business involving end-users and producers so that his exposure is "naturally" hedged by people seeking to benefit from price movement in either direction.

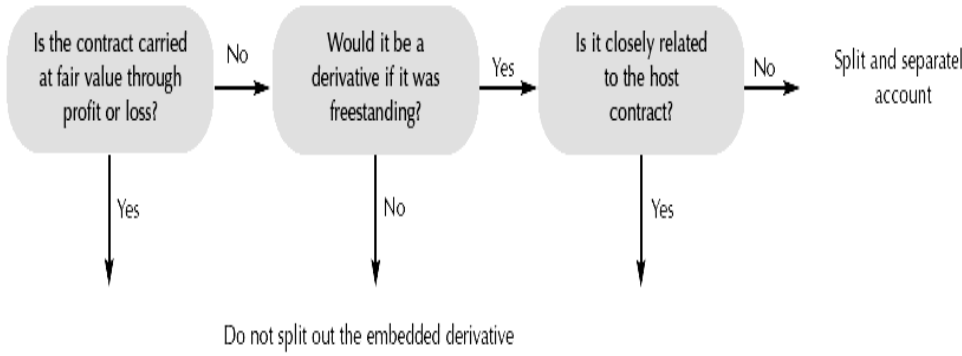
Commodity swaps and commodity derivatives are a useful and important tool employed by most leading energy, chemical and agricultural corporations in today's world.

Note: Please note other forms of Swaps such as Currency Swap and Interest Rate Swap have been discussed in the respective chapters.

9. EMBEDDED DERIVATIVES

An embedded derivative is a derivative instrument that is embedded in another contract - the host contract. The host contract might be a debt or equity instrument, a lease, an insurance contract or a sale or purchase contract. Derivatives require to be marked-to-market through the income statement, other than qualifying hedging instruments. This requirement on embedded derivatives are designed to ensure that mark-to-market through the income statement cannot be avoided by including - embedding - a derivative in another contract or financial instrument that is not marked-to market through the income statement.

A coal purchase contract may include a clause that links the price of the coal to a pricing formula based on the prevailing electricity price or a related index at the date of delivery. The coal purchase contract, which qualifies for the executory contract exemption, is described as the host contract, and the pricing formula is the embedded derivative. The pricing formula is an embedded derivative because it changes the price risk from the coal price to the electricity price.



An embedded derivative that modifies an instrument's inherent risk (such as a fixed to floating interest rate swap) would be considered closely related. Conversely, an embedded derivative that changes the nature of the risks of a contract is not closely related.

Most equity- or commodity-linked features embedded in a debt instrument will not be closely related. This includes puts that force the issuer to reacquire an instrument based on changes in commodity price or index, equity or commodity indexed interest or principal payments and equity conversion features. Puts or calls on equity instruments at specified prices (that is, not market on

date of exercise) are seldom closely related, neither are calls, puts or prepayment penalties on debt instruments. Credit derivatives embedded in a host debt instrument are seldom closely related to it.

The economic characteristics and risks of an embedded derivative are closely related to the economic characteristics and risks of the host contract when the host contract is a debt instrument and the embedded derivative is an interest rate floor or a cap out of the money when the instrument is issued. An entity would not account for the embedded derivative separately from the host contract. The same principle applies to caps and floors in a sale or purchase contract.

Closely related- Examples of embedded derivatives that need not be separated

A derivative embedded in a host lease contract is closely related to the host contract if the embedded derivative comprises contingent rentals based on related sales;

An inflation index term in a debt instrument as long as it is not leveraged and relates to the inflation index in the economic environment in which the instrument is denominated or issued;

Not closely related- Examples of embedded derivatives that must be separated

Equity conversion feature embedded in a debt instrument e.g. investment in convertible bonds;

Option to extend the term of a debt instrument unless there is a concurrent adjustment of the interest rate to reflect market prices;

Equity-indexed interest embedded in a debt instrument

Fair Valuing Embedded Derivatives: Embedded derivatives that are separated from the host contract are accounted for at fair value with changes in fair value taken through the income statement. Published price quotations in an active market are normally the best evidence of fair value.

Valuation techniques are used to determine the fair value of the derivative if there is no active market that matches the exact terms of the embedded derivative.

In the case of option derivatives (e.g. puts & calls), the embedded derivatives should be separated from the host contract and valued based on the stated terms of the option. It is assumed that an option derivative will not normally have a fair value of zero initial recognition. In the case of non-option derivatives, the embedded derivatives should be separated from the host contract based on its stated and implied terms and is assumed to have a fair value of zero at initial recognition.

TEST YOUR KNOWLEDGE

Theoretical Questions

1. What are the reasons for stock index futures becoming more popular financial derivatives over stock futures segment in India?
2. Write short note on Marking to market.
3. State any four assumptions of Black Scholes Model.
4. Write short note on Embedded derivatives.
5. Define the term Greeks with respect to options.

Practical Questions

1. Calculate the price of 3 months PQR futures, if PQR (FV ₹10) quotes ₹220 on NSE and the three months future price quotes at ₹230 and the one month borrowing rate is given as 15 percent and the expected annual dividend is 25 percent per annum payable before expiry. Also examine arbitrage opportunities.

2. Sensex futures are traded at a multiple of 50. Consider the following quotations of Sensex futures in the 10 trading days during February, 2009:

Day	High	Low	Closing
4-2-09	3306.4	3290.00	3296.50
5-2-09	3298.00	3262.50	3294.40
6-2-09	3256.20	3227.00	3230.40
7-2-09	3233.00	3201.50	3212.30
10-2-09	3281.50	3256.00	3267.50
11-2-09	3283.50	3260.00	3263.80
12-2-09	3315.00	3286.30	3292.00
14-2-09	3315.00	3257.10	3309.30
17-2-09	3278.00	3249.50	3257.80
18-2-09	3118.00	3091.40	3102.60

Abshishek bought one sensex futures contract on February, 04. The average daily absolute change in the value of contract is ₹ 10,000 and standard deviation of these changes is ₹ 2,000. The maintenance margin is 75% of initial margin.

You are required to determine the daily balances in the margin account and payment on margin calls, if any.

3. Sumana wanted to buy shares of EIL which has a range of ₹ 411 to ₹ 592 a month later. The present price per share is ₹ 421. Her broker informs her that the price of this share can sore up to ₹ 522 within a month or so, so that she should buy a one month CALL of EIL. In order to be prudent in buying the call, the share price should be more than or at least ₹ 522 the assurance of which could not be given by her broker.

Though she understands the uncertainty of the market, she wants to know the probability of attaining the share price ₹ 592 so that buying of a one month CALL of EIL at the execution price of ₹ 522 is justified. Advice her. Take the risk free interest to be 3.60% and $e^{0.036} = 1.037$.

4. Mr. X established the following spread on the Delta Corporation's stock :

(i) Purchased one 3-month call option with a premium of ₹ 30 and an exercise price of ₹ 550.

(ii) Purchased one 3-month put option with a premium of ₹ 5 and an exercise price of ₹ 450.

Delta Corporation's stock is currently selling at ₹ 500. Determine profit or loss, if the price of Delta Corporation's :

(i) remains at ₹500 after 3 months.

(ii) falls at ₹350 after 3 months.

(iii) rises to ₹600.

Assume the size option is 100 shares of Delta Corporation.

5. The equity share of VCC Ltd. is quoted at ₹ 210. A 3-month call option is available at a premium of ₹ 6 per share and a 3-month put option is available at a premium of ₹ 5 per share. Ascertain the net payoffs to the optionholder of a call option and a put option.

(i) the strike price in both cases in ₹ 220; and

(ii) the share price on the exercise day is ₹ 200,210,220,230,240.

Also indicate the price range at which the call and the put options may be gainfully exercised.

ANSWERS/ SOLUTIONS

Answers to Theoretical Questions

1. Please refer paragraph 4.2.4
2. Please refer paragraph 4.2.3
3. Please refer paragraph 6.3

4. Please refer paragraph 8

5. Please refer paragraph 6.4

Answers to the Practical Questions

1. Future's Price = Spot + cost of carry – Dividend

F = 220 + 220 × 0.15 × 0.25 – 0.25** × 10 = 225.75

** Entire 25% dividend is payable before expiry, which is ₹2.50.

Thus we see that futures price by calculation is ₹225.75 which is quoted at ₹230 in the exchange.

(i) Analysis:

Fair value of Futures less than Actual futures Price:

Futures Overvalued Hence it is advised to sell. Also do Arbitraging by buying stock in the cash market.

Step I

He will buy PQR Stock at ₹220 by borrowing at 15% for 3 months. Therefore, his outflows are:

Cost of Stock	220.00
Add: Interest @ 15 % for 3 months i.e. 0.25 years (220 × 0.15 × 0.25)	8.25
Total Outflows (A)	228.25

Step II

He will sell March 2000 futures at ₹230. Meanwhile he would receive dividend for his stock.

Hence his inflows are	230.00
Sale proceeds of March 2000 futures	2.50
Total inflows (B)	232.50

Inflow – Outflow = Profit earned by Arbitrageur

= 232.50 – 228.25 = 4.25

2. Initial Margin = $\mu + 3\sigma$

Where μ = Daily Absolute Change

σ = Standard Deviation

Accordingly

Initial Margin = ₹ 10,000 + ₹ 6,000 = ₹ 16,000

Maintenance margin = ₹ 16,000 x 0.75 = ₹ 12,000

Day	Changes in future Values (₹)	Margin A/c (₹)	Call Money (₹)
4/2/09	-	16000	-
5/2/09	50 x (3294.40 - 3296.50) = -105	15895	-
6/2/09	50 x (3230.40 - 3294.40)= -3200	12695	-
7/2/09	50 x (3212.30 - 3230.40)= -905	16000	4210
10/2/09	50x(3267.50 - 3212.30)= 2760	18760	-
11/2/09	50x(3263.80 - 3267.50)= -185	18575	-
12/2/09	50x(3292 - 3263.80) =1410	19985	-
14/2/09	50x(3309.30 - 3292)=865	20850	-
17/2/09	50x(3257.80 - 3309.30)=-2575	18275	-
18/2/09	50x(3102.60 - 3257.80)=-7760	16000	5485

3. $p = \frac{e^{rt} - d}{u - d}$

$e^{rt} = e^{0.036}$

d = 411/421 = 0.976

u = 592/421 = 1.406

$p = \frac{e^{0.036} - 0.976}{1.406 - 0.976} = \frac{1.037 - 0.976}{0.43} = \frac{0.061}{0.43} = 0.1418$

Thus probability of rise in price 0.1418

4. (i) Total premium paid on purchasing a call and put option

= (₹30 per share × 100) + (₹5 per share × 100).

= 3,000 + 500 = ₹3,500

In this case, X exercises neither the call option nor the put option as both will result in a loss for him.

Ending value = - ₹3,500 + zero gain = - ₹3,500

i.e Net loss = ₹3,500

(ii) Since the price of the stock is below the exercise price of the call, the call will not be exercised. Only put is valuable and is exercised.

Total premium paid = ₹3,500

Ending value = – ₹3,500 + ₹[(450 – 350) × 100] = – ₹3,500 + ₹10,000 = ₹6,500

∴ Net gain = ₹6,500

(iii) In this situation, the put is worthless, since the price of the stock exceeds the put's exercise price. Only call option is valuable and is exercised.

Total premium paid = ₹3,500

Ending value = -3,500 +[(600 – 550) × 100]

Net Gain = -3,500 + 5,000 = ₹1,500

5. Net payoff for the holder of the call option

					(₹)
Share price on exercise day	200	210	220	230	240
Option exercise	No	No	No	Yes	Yes
Outflow (Strike price)	Nil	Nil	Nil	220	220
Out flow (premium)	6	6	6	6	6
Total Outflow	6	6	6	226	226
Less inflow (Sales proceeds)	-	-	-	230	240
Net payoff	-6	-6	-6	4	14

Net payoff for the holder of the put option

					(₹)
Share price on exercise day	200	210	220	230	240
Option exercise	Yes	Yes	No	No	No
Inflow (strike price)	220	220	Nil	Nil	Nil
Less outflow (purchase price)	200	210	-	-	-
Less outflow (premium)	5	5	5	5	5
Net Payoff	15	5	-5	-5	-5

The call option can be exercised gainfully for any price above ₹226 (₹220 + ₹6) and put option for any price below ₹215 (₹220 - ₹5).

CHAPTER 9

FOREIGN EXCHANGE EXPOSURE AND RISK MANAGEMENT

LEARNING OUTCOMES

After going through the chapter student shall be able to understand

- Exchange rate determination
- Foreign currency market
- Management of transaction, translation and economic exposures
- Hedging currency risk
- Foreign exchange derivatives – Forward, futures, options and swaps

1. INTRODUCTION

Coupled with globalisation of business, the raising of capital from the international capital markets has assumed significant proportion during the recent years. The volume of finance raised from international capital market is steadily increasing over a period of years, across the national boundaries. Every day new institutions are emerging on the international financial scenario and introducing new derivative financial instruments (products) to cater to the requirements of multinational organisations and the foreign investors.

To accommodate the underlying demands of investors and capital raisers, financial institutions and instruments have also changed dramatically. Financial deregulation, first in the United States and then in Europe and Asia, has prompted increased integration of world financial markets. As a result of the rapidly changing scenario, the finance manager today has to be global in his approach.

In consonance with these remarkable changes, the Government of India has also opened Indian economy to foreign investments and has taken a number of bold and drastic measures to globalise the Indian economy. Various fiscal, trade and industrial policy decisions have been taken and new avenues provided to foreign investors like Foreign Institutional Investors (FII's) and NRI's etc., for investment especially in infrastructural sectors like power and telecommunication etc.

The basic principles of financial management i.e., efficient allocation of resources and raising of funds on most favourable terms and conditions etc. are the same, both for domestic and international enterprises. However the difference lies in the environment in which these multi-national organisations function. The environment relates to political risks, Government's tax and investment policies, foreign exchange risks and sources of finance etc. These are some of the crucial issues which need to be considered in the effective management of international financial transactions and investment decisions.

Under the changing circumstances as outlined above, a finance manager, naturally cannot just be a silent spectator and wait and watch the developments. He has to search for "best price" in a global market place (environment) through various tools and techniques. Sometimes he uses currency and other hedges to optimise the utilisation of financial resources at his command.

However, the problems to be faced by him in the perspective of financial management of the multinational organisations are slightly more complex than those of domestic organisations. While the concepts developed earlier in the previous chapters are also applicable here, the environment in which decisions are made in respect of international financial management is different and it forms the subject matter of this chapter for discussion. In this chapter we shall describe how a finance manager can protect his organisation from the vagaries of international financial transactions.

2. NOSTRO, VOSTRO AND LORO ACCOUNTS

In interbank transactions, foreign exchange is transferred from one account to another account and from one centre to another centre. Therefore, the banks maintain three types of current accounts in order to facilitate quick transfer of funds in different currencies. These accounts are Nostro, Vostro and Loro accounts meaning “our”, “your” and “their”. A bank’s foreign currency account maintained by the bank in a foreign country and in the home currency of that country is known as Nostro Account or “our account with you”. For example, An Indian bank’s Swiss franc account with a bank in Switzerland. Vostro account is the local currency account maintained by a foreign bank/branch. It is also called “your account with us”. For example, Indian rupee account maintained by a bank in Switzerland with a bank in India. The Loro account is an account wherein a bank remits funds in foreign currency to another bank for credit to an account of a third bank.

2.1 Exchange Position

It is referred to total of purchases or sale of commitment of a bank to purchase or sale foreign exchange whether actual delivery has taken place or not. In other words all transactions for which bank has agreed with counter party are entered into exchange position on the date of the contract.

2.2 Cash Position

it is outstanding balance (debit or credit) in bank's Nostro account. Since all foreign exchange dealings of bank are routed through Nostro account it is credited for all purchases and debited for sale by bank.

It should however be noted that all dealings whether delivery has taken place or not effects the Exchange Position but Cash Position is effected only when actual delivery has taken place.

Therefore, all transactions effecting Cash position will affect Exchange Position not vice versa.

Illustration 1

Suppose you are a dealer of ABC Bank and on 20.10.2014 you found that balance in your Nostro account with XYZ Bank in London is £65,000 and you had overbought £35,000. During the day following transaction have taken place:

	£
DD purchased	12,500
Purchased a Bill on London	40,000
Sold forward TT	30,000
Forward purchase contract cancelled	15,000
Remitted by TT	37,500
Draft on London cancelled	15,000

What steps would you take, if you are required to maintain a credit Balance of £7,500 in the Nostro A/c and keep as overbought position on £7,500?

Solution

Exchange Position:

Particulars	Purchase £	Sale £
Opening Balance Overbought	35,000	—
DD Purchased	12,500	—
Purchased a Bill on London	40,000	—
Sold forward TT	—	30,000
Forward purchase contract cancelled	—	15,000

TT Remittance		37,500
Draft on London cancelled	15,000	—
	1,02,500	82,500
Closing Balance Overbougt	—	20,000
	1,02,500	1,02,500

Cash Position (Nostro A/c)

	Credit £	Debit £
Opening balance credit	65,000	—
TT Remittance	—	37,500
	65,000	37,500
Closing balance (credit)	—	27,500
	65,000	65,000

To maintain Cash Balance in Nostro Account at £7,500 you have to sell £20,000 in Spot which will bring Overbought exchange position to Nil. Since bank require Overbought position of £7,500 it has to buy the same in forward market.

3. EXCHANGE RATE QUOTATION

3.1 American Term and European Term

Quotes in *American terms* are the rates quoted in amounts of U.S. dollar per unit of foreign currency. While rates quoted in amounts of foreign currency per U.S. dollar are known as quotes in *European terms*.

For example, U.S. dollar 0.2 per unit of Indian rupee is an American quote while INR 44.92 per unit of U.S. dollar is a European quote.

Most foreign currencies in the world are quoted in terms of the number of units of foreign currency needed to buy one U.S. dollar i.e. the European term.

3.2 Direct and Indirect Quote

As indicated earlier, a currency quotation is the price of a currency in terms of another currency. For example, $1 = ₹48.00, means that one dollar can be exchanged for ₹48.00. Alternatively; we may pay ₹48.00 to buy one dollar. A foreign exchange quotation can be either a direct quotation and or an indirect quotation, depending upon the home currency of the person concerned.

A direct quote is the home currency price of one unit foreign currency. Thus, in the aforesaid example, the quote $1 =₹48.00 is a direct-quote for an Indian.

An indirect quote is the foreign currency price of one unit of the home currency. The quote Re.1 =$0.0208 is an indirect quote for an Indian. ($1/₹ 48.00 =$0.0208 approximately)

Direct and indirect quotes are reciprocals of each other, which can be mathematically expressed as follows.

Direct quote = 1/indirect quote and vice versa

The following table is an extract from the Bloomberg website showing the Foreign Exchange Cross rates prevailing on 14/09/2012.

	USD	CNY	JPY	HKD	INR	KRW	SGD	EUR
USD		0.1583	0.0128	0.129	0.0184	0.0009	0.8197	1.3089
CNY	6.3162		0.0809	0.8147	0.1161	0.0057	5.177	8.2667
JPY	78.08	12.362		10.072	1.435	0.0701	64	102.17
HKD	7.7526	1.2274	0.0993		0.143	0.0069	6.3546	10.148
INR	54.405	8.613	0.6955	7.005		0.0488	44.505	71.067
KRW	1,114.65	176.5476	14.2965	143.9908	20.4965		914.8582	1,459.05
SGD	1.2202	0.1932	0.0156	0.1574	0.0224	0.0011		1.5961
EUR	0.7642	0.121	0.0098	0.0986	0.014	0.0007	0.6263	

Source :http://www.bloomberg.com/markets/currencies/cross-rates/

Students will notice that the rates given in the rows are direct quotes for each of the currencies listed in the first column and the rates given in the columns are the indirect quotes for the currencies listed in the first row. Students can also verify that in every case above

3.3 Bid, Offer and Spread

A foreign exchange quotes are two-way quotes, expressed as a 'bid' and an offer' (or ask) price. Bid is the price at which the dealer is willing to buy another currency. The offer is the rate at which he is willing to sell another currency. Thus a bid in one currency is simultaneously an offer in another currency. For example, a dealer may quote Indian rupees as ₹48.80 - 48.90 vis-a-vis dollar. That means that he is willing to buy dollars at ₹48.80/$ (sell rupees and buy dollars), while he will sell dollar at ₹ 48.90/$ (buy rupees and sell dollars). The difference between the bid and the offer is called the spread. The offer is always higher than the bid as inter-bank dealers make money by buying at the bid and selling at the offer.

$$\% \text{ Spread} = \frac{\text{Bid - Offer}}{\text{Bid}} \times 100$$

It must be clearly understood that while a dealer buys a currency, he at the same time is selling another currency. When a dealer wants to buy a currency, he/she will ask the other dealer a quote for say a million dollars. The second dealer does not know whether the first dealer is interested in buying or selling one million dollars. The second dealer would then give a two way quote (a

bid/offer quote). When the first dealer is happy with the 'ask' price given by the second dealer, he/she would convey "ONE MINE", which means "I am buying one million dollars from you". If the first dealer had actually wanted to sell one million dollars and had asked a quote, and he is happy with the 'bid' price given by the second dealer, he/she would convey "ONE YOURS", which means "I am selling one million dollars to you".

3.4 Cross Rates

It is the exchange rate which is expressed by a pair of currency in which none of the currencies is the official currency of the country in which it is quoted. For example, if the currency exchange rate between a Canadian dollar and a British pound is quoted in Indian newspapers, then this would be called a cross rate since none of the currencies of this pair is of Indian rupee.

Broadly, it can be stated that the exchange rates expressed by any currency pair that does not involve the U.S. dollar are called cross rates. This means that the exchange rate of the currency pair of Canadian dollar and British pound will be called a cross rate irrespective of the country in which it is being quoted as it does not have U.S. dollar as one of the currencies.

3.5 Pips

This is another technical term used in the market. PIP is the Price Interest Point. It is the smallest unit by which a currency quotation can change. E.g., USD/INR quoted to a customer is INR 61.75. The minimum value this rate can change is either INR 61.74 or INR 61.76. In other words, for USD/INR quote, the pip value is0.01. Pip in foreign currency quotation is similar to the tick size in share quotations. However, in Indian interbank market, USD-INR rate is quoted upto 4 decimal point. Hence minimum value change will be to the tune of 0.0001. Spot EUR/USD is quoted at a bid price of 1.0213 and an ask price of 1.0219. The difference is USD 0.0006 equal to 6 "pips".

3.6 Forward exchange rate quotation

Forward contract or outright forward contractor merely outright is an agreement between two counterparts to exchange currencies on a future date at a rate fixed in the contract. Ideally, the wayin which exchange rate for a forward date [forward exchange rate] is quoted should be the same as that for spot date e.g. if the spot rate is 61.53/54, then the [say six months] forward rate quoting should look like say 61.93/98. However, the market convention is different. Forward rate is not quoted as so and so exchange rate like this but always quoted with spot rate and the forward margin separately. In other words, forward quote is not a foreign exchange rate quotation but is quoted as a difference between spot & forward rates.

The reader or user has to calculate the forward applicable rate by loading the forward margin into the spot rate. Thus e.g. in the above case, the foreign exchange dealer will quote the six month forward rate as 40/44. He will even presume that the ongoing spot rate is known to the counterparty and may not even mention. Even if he were to mention, he will mention only 53/54, because the 'big figure' [in this case, "61"] is supposed to be known to the counterparty without ambiguity. Since the rate fluctuation is very high, the dealer has no time to quote rates in very

detailed English sentences and these conventions have come into practice! The numbers 40 & 44 are arrived at as the differential between 61.93 – 61.53 and 61.98 – 62.54 respectively. These numbers 40 & 44 are called forward margins representing the factor by which the forward rate is different from the spot rate i.e. the margin to be 'loaded' onto the spot rate. Though looks silly, it is worth reiterating that this margin is not the profit margin of the trader!

If the price on a future date is higher, then the currency is said to be at forward premium and then the number represents the forward premium for that forward period. If the price on a future date is lower, then the currency is said to be at forward discount and then the number represents the forward discount for that forward period. In the above example, US dollar is at a premium and the forward premium of USD for six months is 40/44 paise for buying and selling rate respectively in the interbank market. Generally, the margin is quoted in annualized percentage terms. E.g. in this case, extrapolating the premium of six months to twelve months, it can be said that US dollar is likely to have a premium of 80 paise per year [40 paise per six months X 2] which means on a base rate of 61.53, the annualized premium [=0.8*2*100/61.53] is 2.60% p.a. In market parlance, forward premium is quoted in percentage terms and this is the basis of calculation. Actually, the forward market in foreign exchange is an interest rate market and is not a foreign exchange market. Because it compares interest rate of one currency with that of another over a period of time. In fact some banks include FX forward traders under their interest rate segment rather than FX segment.

3.7 Forward point determination

The number of 'basis points' from the spot rate to arrive at the forward rate in the above discussions is also referred to as forward points. The points are added to the spot rate when the [foreign] currency is at a premium and deducted from the spot rate when the [foreign] currency is at a discount, to arrive at the forward rate. This is when the rates are quoted in direct method. In case of indirect rate quotations, the process will be exactly the opposite. The forward point may be positive or negative and marked accordingly or specifically mentioned so. The forward points represent the interest rate differential between the two currencies. E.g. if the spot exchange rate is GBP 1 = 1.6000 - 1.6010 USD and if the outright forward points are 5-8, then the outright forward exchange rate quote is GBP 1 = $ 1.6005 - 1.6018. The number of forward points between the spot and forward is influenced by the present and forward interest rates, the 'length' of the forward and other market factors. Forward point is not a rate but a difference in the rate! Between two currencies, the currency which carries lower interest rate is always at a premium versus the other currency. This is the same as stating that if a currency has a relatively higher 'yield', then it will cost less in the forward market and a currency having lower yield will cost more in the forward market. If there is an aberration to this, arbitration opportunity arises, which itself will push the prices to equilibrium. If the forward points are mentioned simply as 5/8, then a doubt arises as to whether it is at premium, and hence has to be added or at discount and hence to be deducted. The spot market always has the lowest bid- ask spread and the spread will steadily widen as the duration lengthens.

This is because the uncertainty and the liquidity concerns increase as we go forward in time. If we add 5/8 to the left and right side, the spread will widen and hence fits into the argument.

Hence a quote such as 5/8 or 43/45 with increasing numbers from left to right means the foreign currency is at premium. This looks like a workaround to calculate but the reader can visualize the logic.

Forward points are equivalent to pips in the spot market which we discussed earlier. They are quoted to an accuracy of 1/100thof one point. E.g. if EUR/USD rates for spot and forward are 1.1323 & 1.1328, then the forward point is 5 because one pip or point is worth 0.0001 in EUR/USD.

3.8 Broken period forward rate

Interbank exchange rates are wholesale rates which are applicable to transaction among banks and in the interbank market. They are for large standard amounts with standardized due dates i.e. end of January, end of February and so on. However, in customer transactions, the amounts are not only smaller & for odd amounts, but the due date could be also a non standardized one. There could be an export bill for euro 12,345.67 getting realized on 10thJanuary or 23rdFebruary and so on. Thus the forward rate that is available in the interbank market [in the form of forward points for February, for March and so on] cannot be applied as such for customer transactions. The broken period concept becomes relevant in such situations.

On 1stJanuary, if the spot rate for US Dollar is 62 and if the forward margin for two months is 10 paise [premium], then the forward rate can be calculated as ₹ 62.10 per USD and any customer transaction exchange rate can be calculated using this as the base rate. Thus if the bank wishes to keep a margin of say 3 paise, it will quote a rate of ₹ 62.13 for an importer and quote a rate of ₹ 62.07 for an exporter for an end February realizing bill. However, this logic is valid only for a bill to be realized [for an exporter] or a bill to be paid [for an importer] on 28thFebruary because the underlying forward rate was for two months on 1stJanuary i.e. the date of 28thFebruary. However, in customer transactions, the event [of converting FC into INR or vice versa] does not always happen on the exact standard dates. Thus if the bill is getting paid or is to be retired on 23rdFebruary, then the forward points are to be calculated for such odd number of days starting from 1stJanuary. It will be presumed [though there is no logical answer, in practice, it turns out to be adequately accurate], that the forward points 'grow' uniformly throughout and arithmetical proportionate for the applicable date is arrived at. E.g. in the above instance, on 1stJanuary, the premium for a customer transaction expected to happen on 23rdFebruary is calculated as =10*53/59 = 8.98 paise [53 & 59 are broken & full periods] and hence the exchange rate will be 62.0898. As market convention, this will be rounded off to 62.09. The merchant forward rate for a customer transaction expected to happen on 23rdFebruary will be this margin loaded onto spot rate. Thus if the margin is 3 paise, the rate for an exporter will be 62.06 & for an importer, the rate will be 62.12. This logic will be applied even while calculating exchange rate for a third currency though the calculation will be a bit lengthier.

3.9 Merchant Rates

It is always interesting to know who 'fixes' the exchange rates as quoted to customers and to realize that nobody fixes but the market decides the exchange rate based on demand and supply and other relevant factors. RBI often clarifies that it does not fix the exchange rates, though in the same breath, RBI also clarifies that it monitors the 'volatility' of Indian rupee exchange rate. In other words, RBI does not control the exchange rates but it controls the volatile movement of INR exchange rate by intervention i.e. by deliberately altering the demand and supply of the foreign currency say USD. It does it by either buying USD from the interbank market or pumping in USD into the market. This wholesale interbank market rate is the basis for banks' exchange rates quoted to customers.

In foreign exchange market, banks consider customers as 'merchants' for historical reasons. It may look ridiculous to call an NRI who has remitted dollars to India as a merchant but exchange rates applied to all types of customers including that for converting inward remittance in USD to INR are called merchant rates as against the rates quoted to each other by banks in the interbank market, which are called interbank rates. Why this term is important here is because there are guidelines issued by FEDAI [Foreign Exchange Dealers Association of India] to banks on these merchant rates as there is customer service element involved in these.

Till 1998, FEDAI prescribed what 'margins' are to be loaded by banks onto the ongoing interbank exchange rate for quoting to customers i.e. to arrive at the merchant rates. This was because, most customer affecting costs like interest rates were then controlled by regulators.

As a part of liberalization, banks got the freedom to quote their own rates. Since then, banks decide themselves what should be the margin depending on the bank's 'position'. The only rule that is still existing in the FEDAI rule book is rule 5A.8 which states that "Settlement of all merchant transactions shall be effected on the principle of rounding off the Rupee amounts to the nearest whole Rupee i.e., without paise". This means if an exporter or an individual has received USD 1234 and if the applicable exchange rate is 61.32, then the amount to be credited to customer's account is ₹ 75669 and not ₹ 75668.88, less charges if any. This rule will be similarly applicable for import or outward remittance transactions also. This rule is more a matter of common sense and does not have any meaningful impact on customer transactions. In fact in some of the banking software, amount is always rounded off.

After the discontinuation of gold standard in 1971 by USA, the foreign exchange market was in turmoil. Initially, RBI had kept sterling as the intervention currency pegging the rupee exchange rate for historical reasons and due to political legacy. Effective 1975, rupee was delinked from sterling and was linked to a basket of currencies. It should be noted that the concept of RBI/FEDAI advising the fixed exchange rate was discontinued long ago. The sterling schedule was abolished from the beginning of 1984. FEDAI issued detailed guidelines to banks on how to calculate exchange rates under the new freedom, the minimum & maximum profit margin and the maximum spread between the buying and selling rates. All these are now redundant now. There were

arguments for and against giving freedom to banks for loading margins by banks themselves on the ongoing interbank rate. However the liberalization wave overruled the skeptics.

The International Division of any bank calculates the merchant rates for variety of transactions like import bill, export bill, inward & outward remittance etc. and advises the same in the morning with standard spread loaded to all branches. It is called card rate. For a walk-in customer, for transactions of small value [what is small varies with the bank], this is applied.

However, for regular customers and for transactions of high value, always a better rate is sought from the dealing room. Card rates advised in the margin are generally not changed unless there is too much volatility.

4. EXCHANGE RATE FORECASTING

The foreign exchange market has changed dramatically over the past few years. The amounts traded each day in the foreign exchange market are now huge. In this increasingly challenging and competitive market, investors and traders need tools to select and analyze the right data from the vast amounts of data available to them to help them make good decisions. Corporates need to do the exchange rate forecasting for taking decisions regarding hedging, short-term financing, short-term investment, capital budgeting, earnings assessments and long-term financing.

Techniques of Exchange Rate Forecasting: There are numerous methods available for forecasting exchange rates. They can be categorized into four general groups- technical, fundamental, market-based, and mixed.

(a) Technical Forecasting: It involves the use of historical data to predict future values. For example time series models. Speculators may find the models useful for predicting day-to-day movements. However, since the models typically focus on the near future and rarely provide point or range estimates, they are of limited use to MNCs.

(b) Fundamental Forecasting: It is based on the fundamental relationships between economic variables and exchange rates. For example subjective assessments, quantitative measurements based on regression models and sensitivity analyses.

In general, fundamental forecasting is limited by:

- the uncertain timing of the impact of the factors,
- the need to forecast factors that have an immediate impact on exchange rates,
- the omission of factors that are not easily quantifiable, and
- changes in the sensitivity of currency movements to each factor over time.

(c) Market-Based Forecasting: It uses market indicators to develop forecasts. The current spot/forward rates are often used, since speculators will ensure that the current rates reflect the market expectation of the future exchange rate.

(d) Mixed Forecasting: It refers to the use of a combination of forecasting techniques. The actual forecast is a weighted average of the various forecasts developed.

5. EXCHANGE RATE DETERMINATION

An exchange rate is, simply, the price of one nation's currency in terms of another currency, often termed the reference currency. For example, the rupee/dollar exchange rate is just the number of rupee that one dollar will buy. If a dollar will buy 100 rupee, the exchange rate would be expressed as ₹ 100/$ and the rupee would be the reference currency.

Equivalently, the dollar/ rupee exchange rate is the number of dollars one rupee will buy. Continuing the previous example, the exchange rate would be $0.01/Rs (1/100) and the dollar would now be the reference currency. Exchange rates can be for spot or forward delivery.

The foreign exchange market includes both the spot and forward exchange rates. The spot rate is the rate paid for delivery within two business days after the day the transaction takes place. If the rate is quoted for delivery of foreign currency at some future date, it is called the forward rate. In the forward rate, the exchange rate is established at the time of the contract, though payment and delivery are not required until maturity. Forward rates are usually quoted for fixed periods of 30, 60, 90 or 180 days from the day of the contract.

(a) The Spot Market: The most common way of stating a foreign exchange quotation is in terms of the number of units of foreign currency needed to buy one unit of home currency. Thus, India quotes its exchange rates in terms of the amount of rupees that can be exchanged for one unit of foreign currency.

Illustration 2

If the Indian rupee is the home currency and the foreign currency is the US Dollar then what is the exchange rate between the rupee and the US dollar?

Solution

US$ 0.0217/₹1 reads "0.0217 US dollar per rupee." This means that for one Indian rupee one can buy 0.0217 US dollar.

In this method, known as the European terms, the rate is quoted in terms of the number of units of the foreign currency for one unit of the domestic currency. This is called an *indirect quote.*

The alternative method, called the American terms, expresses the home currency price of one unit of the foreign currency. This is called a *direct quote*.

This means the exchange rate between the US dollar and rupee can be expressed as:

₹ 46.08/US$ reads "₹ 46.08 per US dollar."

Hence, a relationship between US dollar and rupee can be expressed in two different ways which have the same meaning:

- One can buy 0.0217 US dollars for one Indian rupee.
- ₹ 46.08 Indian rupees are needed to buy one US dollar.

(b) The Forward Market: A forward exchange rate occurs when buyers and sellers of currencies agree to deliver the currency at some future date. They agree to transact a specific amount of currency at a specific rate at a specified future date. The forward exchange rate is set and agreed by the parties and remains fixed for the contract period regardless of the fluctuations in the spot exchange rates in future. The forward exchange transactions can be understood by an example.

A US exporter of computer peripherals might sell computer peripherals to a German importer with immediate delivery but not require payment for 60 days. The German importer has an obligation to pay the required dollars in 60 days, so he may enter into a contract with a trader (typically a local banker) to deliver Euros for dollars in 60 days at a forward rate – the rate today for future delivery.

So, a forward exchange contract implies a forward delivery at specified future date of one currency for a specified amount of another currency. The exchange rate is agreed today, though the actual transactions of buying and selling will take place on the specified date only. The forward rate is not the same as the spot exchange rate that will prevail in future. The actual spot rate that may prevail on the specified date is not known today and only the forward rate for that day is known. The actual spot rate on that day will depend upon the supply and demand forces on that day. The actual spot rate on that day may be lower or higher than the forward rate agreed today.

An Indian exporter of goods to London could enter into a forward contract with his banker to sell pound sterling 90 days from now. This contract can also be described as a contract to purchase Indian Rupees in exchange for delivery of pound sterling. In other words, foreign exchange markets are the only markets where barter happens – i.e., money is delivered in exchange for money!

6. EXCHANGE RATE THEORIES

There are three theories of exchange rate determination- Interest rate parity, Purchasing power parity and International Fisher effect.

6.1 Interest Rate Parity (IRP)

Interest rate parity is a theory which states that 'the size of the forward premium (or discount) should be equal to the interest rate differential between the two countries of concern". When interest rate parity exists, covered interest arbitrage (means foreign exchange risk is covered) is not feasible, because any interest rate advantage in the foreign country will be offset by the discount on the forward rate. Thus, the act of covered interest arbitrage would generate a return that is no higher than what would be generated by a domestic investment.

The Covered Interest Rate Parity equation is given by:

$$(1 + r_D) = \frac{F}{S}(1 + r_F)$$

Where,

$(1 + r_D)$ = Amount that an investor would get after a unit period by investing a rupee in the domestic market at r_D rate of interest and $\frac{F}{S}(1+r_F)$ is the amount that an investor by investing in the foreign market at r_F that the investment of one rupee yield same return in the domestic as well as in the foreign market.

The Uncovered Interest Rate Parity equation is given by:

$$r + r_D = \frac{S_1}{S}(1 + r_F)$$

Where,

S_1 = Expected future spot rate when the receipts denominated in foreign currency is converted into domestic currency.

Thus, it can be said that Covered Interest Arbitrage has an advantage as there is an incentive to invest in the higher-interest currency to the point where the discount of that currency in the forward market is less than the interest differentials. If the discount on the forward market of the currency with the higher interest rate becomes larger than the interest differential, then it pays to invest in the lower-interest currency and take advantage of the excessive forward premium on this currency.

6.2 Purchasing Power Parity (PPP)

Why is a dollar worth ₹ 48.80, JPY 122.18, etc. at some point in time? One possible answer is that these exchange rates reflect the relative purchasing powers of the currencies, i.e. the basket of goods that can be purchased with a dollar in the US will cost ₹ 48.80 in India and ¥ 122.18 in Japan.

Purchasing Power Parity theory focuses on the 'inflation – exchange rate' relationship. There are two forms of PPP theory:-

The ABSOLUTE FORM, also called the 'Law of One Price' suggests that "prices of similar products of two different countries should be equal when measured in a common currency". If a discrepancy in prices as measured by a common currency exists, the demand should shift so that these prices should converge.

An alternative version of the absolute form that accounts for the possibility of market imperfections such as transportation costs, tariffs, and quotas embeds the sectoral constant. It suggests that 'because of these market imperfections, prices of similar products of different countries will not necessarily be the same when measured in a common currency.' However, it states that the rate of

change in the prices of products should be somewhat similar when measured in a common currency, as long as the transportation costs and trade barriers are unchanged.

In Equilibrium Form:

$$S = \alpha \frac{P_D}{P_F}$$

Where,

S(₹/$) = spot rate

P_D = is the price level in India, the domestic market.

P_F = is the price level in the foreign market, the US in this case.

α = Sectoral price and sectoral shares constant.

For example, A cricket bat sells for ₹ 1000 in India. The transportation cost of one bat from Ludhiana to New York costs ₹ 100 and the import duty levied by the US on cricket bats is ₹ 200 per bat. Then the sectoral constant for adjustment would be 1000/1300 = 0.7692.

It becomes extremely messy if one were to deal with millions of products and millions of constants. One way to overcome this is to use a weighted basket of goods in the two countries represented by an index such as Consumer Price Index. However, even this could break down because the basket of goods consumed in a country like Finland would vary with the consumption pattern in a country such as Malaysia making the aggregation an extremely complicated exercise.

The RELATIVE FORM of the Purchasing Power Parity tries to overcome the problems of market imperfections and consumption patterns between different countries. A simple explanation of the Relative Purchase Power Parity is given below:

Assume the current exchange rate between INR and USD is ₹ 50 / $1. The inflation rates are 12% in India and 4% in the US. Therefore, a basket of goods in India, let us say costing now ₹ 50 will cost one year hence ₹ 50 x 1.12 = ₹ 56.00.A similar basket of goods in the US will cost USD 1.04 one year from now. If PPP holds, the exchange rate between USD and INR, one year hence, would be ₹ 56.00 = $1.04. This means, the exchange rate would be ₹ 53.8462 / $1, one year from now.This can also be worked backwards to say what should have been the exchange rate one year before, taking into account the inflation rates during last year and the current spot rate.

Expected spot rate = Current Spot Rate x expected difference in inflation rates

$$E(S_1) = S_0 \times \frac{(1 + I_d)}{(1 + 1_f)}$$

Where

$E(S_1)$ is the expected Spot rate in time period 1

S_0 is the current spot rate (Direct Quote)

I_d is the inflation in the domestic country (home country)

I_f is the inflation in the foreign country

According to Relative PPP, any differential exchange rate to the one propounded by the theory is the 'real appreciation' or 'real depreciation' of one currency over the other. For example, if the exchange rate between INR and USD one year ago was ₹ 45.00. If the rates of inflation in India and USA during the last one year were 10% and 2% respectively, the spot exchange rate between the two currencies today should be

S_0 = 45.00 x (1+10%)/(1+2%) = ₹ 48.53

However, if the actual exchange rate today is ₹ 50,00, then the real appreciation of the USD against INR is ₹ 1.47, which is 1.47/45.00 = 3.27%. And this appreciation of the USD against INR is explained by factors other than inflation.

PPP is more closely approximated in the long run than in the short run, and when disturbances are purely monetary in character.

6.3 International Fisher Effect (IFE)

International Fisher Effect theory uses interest rate rather than inflation rate differentials to explain why exchange rates change over time, but it is closely related to the Purchasing Power Parity (PPP) theory because interest rates are often highly correlated with inflation rates.

According to the International Fisher Effect, 'nominal risk-free interest rates contain a real rate of return and anticipated inflation'. This means if investors of all countries require the same real return, interest rate differentials between countries may be the result of differential in expected inflation.

The IFE theory suggests that foreign currencies with relatively high interest rates will depreciate because the high nominal interest rates reflect expected inflation. The nominal interest rate would also incorporate the default risk of an investment.

The IFE equation can be given by:

$$r_D - P_D = r_F - \Delta P_F$$

or

$$P_D - P_F = \Delta S = r_D - r_F$$

The above equation states that if there are no barriers to capital flows the investment will flow in such a manner that the real rate of return on investment will equalize. In fact, the equation represents the interaction between real sector, monetary sector and foreign exchange market.

If the IFE holds, then a strategy of borrowing in one country and investing the funds in another country should not provide a positive return on average. The reason is that exchange rates should

adjust to offset interest rate differentials on the average. As we know that purchasing power has not held over certain periods, and since the International Fisher Effect is based on Purchasing Power Parity (PPP). It does not consistently hold either, because there are factors other than inflation that affect exchange rates, the exchange rates do not adjust in accordance with the inflation differential.

6.4 Comparison of PPP, IRP and IFE Theories

All the above theories relate to the determination of exchange rates. Yet, they differ in their implications.

The theory of IRP focuses on why the forward rate differs from the spot rate and on the degree of difference that should exist. This relates to a specific point in time.

Conversely, PPP theory and IFE theory focuses on how a currency's spot rate will change over time. While PPP theory suggests that the spot rate will change in accordance with inflation differentials, IFE theory suggests that it will change in accordance with interest rate differentials. PPP is nevertheless related to IFE because inflation differentials influence the nominal interest rate differentials between two countries.

Theory	*Key Variables*	*Basis*	*Summary*
Interest Rate Parity (IRP)	Forward rate premium (or discount)	Interest rate differential	The forward rate of one currency will contain a premium (or discount) that is determined by the differential in interest rates between the two countries. As a result, covered interest arbitrage will provide a return that is no higher than a domestic return.
Purchasing Power Parity (PPP)	Percentage change in spot exchange rate.	Inflation rate differential.	The spot rate of one currency w.r.t. another will change in reaction to the differential in inflation rates between two countries. Consequently, the purchasing power for consumers when purchasing goods in their own country will be similar to their purchasing power when importing goods from foreign country.
International Fisher Effect (IFE)	Percentage change in spot	Interest rate differential	The spot rate of one currency w.r.t. another will change in

	exchange rate		accordance with the differential in interest rates between the two countries. Consequently, the return on uncovered foreign money market securities will on average be no higher than the return on domestic money market securities from the perspective of investors in the home country.

7. FOREIGN EXCHANGE MARKET

The foreign exchange market is the market in which individuals, firms and banks buy and sell foreign currencies or foreign exchange. The purpose of the foreign exchange market is to permit transfers of purchasing power denominated in one currency to another i.e. to trade one currency for another. For example, a Japanese exporter sells automobiles to a US dealer for dollars, and a US manufacturer sells machine tools to Japanese company for yen. Ultimately, however, the US company will be interested in receiving dollars, whereas the Japanese exporter will want yen. Because it would be inconvenient for the individual buyers and sellers of foreign exchange to seek out one another, a foreign exchange market has developed to act as an intermediary.

Transfer of purchasing power is necessary because international trade and capital transactions usually involve parties living in countries with different national currencies. Each party wants to trade and deal in his own currency but since the trade can be invoiced only in a single currency, the parties mutually agree on a currency beforehand. The currency agreed could also be any convenient third country currency such as the US dollar. For, if an Indian exporter sells machinery to a UK importer, the exporter could invoice in pound, rupees or any other convenient currency like the US dollar.

But why do individuals, firms and banks want to exchange one national currency for another? The demand for foreign currencies arises when tourists visit another country and need to exchange their national currency for the currency of the country they are visiting or when a domestic firm wants to import from other nations or when an individual wants to invest abroad and so on. On the other hand, a nation's supply of foreign currencies arises from foreign tourist expenditures in the nation, from export earnings, from receiving foreign investments, and so on. For example, suppose a US firm exporting to the UK is paid in pounds sterling (the UK currency). The US exporter will exchange the pounds for dollars at a commercial bank. The commercial bank will then sell these pounds for dollars to a US resident who is going to visit the UK or to a United States firm that wants to import from the UK and pay in pounds, or to a US investor who wants to invest in the UK and needs the pounds to make the investment.

Thus, a nation's commercial banks operate as clearing houses for the foreign exchange demanded and supplied in the course of foreign transactions by the nation's residents. Hence, four levels of transactor or participants can be identified in foreign exchange markets. At the first level, are tourists, importers, exporters, investors, etc. These are the immediate users and suppliers of foreign currencies. At the next or second level are the commercial banks which act as clearing houses between users and earners of foreign exchange. At the third level are foreign exchange brokers through whom the nation's commercial banks even out their foreign exchange inflows and outflows among themselves. Finally, at the fourth and highest level is the nation's central bank which acts as the lender or buyer of last resort when the nation's total foreign exchange earnings and expenditures are unequal. The central bank then either draws down its foreign exchange reserves or adds to them.

Market Participants

The participants in the foreign exchange market can be categorized as follows:

(i) **Non-bank Entities**: Many multinational companies exchange currencies to meet their import or export commitments or hedge their transactions against fluctuations in exchange rate. Even at the individual level, there is an exchange of currency as per the needs of the individual.

(ii) **Banks**: Banks also exchange currencies as per the requirements of their clients.

(iii) **Speculators**: This category includes commercial and investment banks, multinational companies and hedge funds that buy and sell currencies with a view to earn profit due to fluctuations in the exchange rates.

(iv) **Arbitrageurs**: This category includes those investors who make profit from price differential existing in two markets by simultaneously operating in two different markets.

(v) **Governments**: The governments participate in the foreign exchange market through the central banks. They constantly monitor the market and help in stabilizing the exchange rates.

8. FOREIGN EXCHANGE EXPOSURE

"An Exposure can be defined as a Contracted, Projected or Contingent Cash Flow whose magnitude is not certain at the moment. The magnitude depends on the value of variables such as Foreign Exchange rates and Interest rates."

In other words, exposure refers to those parts of a company's business that would be affected if exchange rate changes. Foreign exchange exposures arise from many different activities.

For example, travellers going to visit another country have the risk that if that country's currency appreciates against their own their trip will be more expensive.

An exporter who sells his product in foreign currency has the risk that if the value of that foreign currency falls then the revenues in the exporter's home currency will be lower.

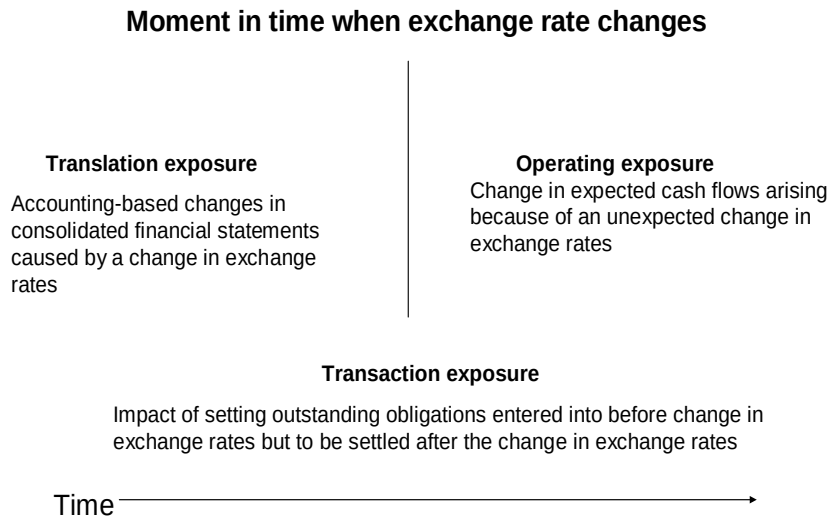
An importer who buys goods priced in foreign currency has the risk that the foreign currency will appreciate thereby making the local currency cost greater than expected.

Fund Managers and companies who own foreign assets are exposed to fall in the currencies where they own the assets. This is because if they were to sell those assets their exchange rate would have a negative effect on the home currency value.

Other foreign exchange exposures are less obvious and relate to the exporting and importing in ones local currency but where exchange rate movements are affecting the negotiated price.

8.1. Types of Exposures

The foreign exchange exposure may be classified under three broad categories:



8.1.1 Transaction Exposure

It measures the effect of an exchange rate change on outstanding obligations that existed before exchange rates changed but were settled after the exchange rate changes. Thus, it deals with cash flows that result from existing contractual obligations.

Example: If an Indian exporter has a receivable of $100,000 due in six months hence and if the dollar depreciates relative, to the rupee a cash loss occurs. Conversely, if the dollar appreciates relative to the rupee, a cash gain occurs.

The above example illustrates that whenever a firm has foreign currency denominated receivables or payables, it is subject to transaction exposure and their settlements will affect the firm's cash flow position.

It measures the changes in the value of outstanding financial obligation incurred prior to a change in exchange rates but not due to be settled until after the exchange rates change.

Thus, it deals with the changes in the cashflow which arise from existing contractual obligation.

In fact, the transaction exposures are the most common ones amongst all the exposures. Let's take an example of a company which exports to US, and the export receivables are also denominated in USD. While doing budgeting the company had assumed USDINR rate of 62 per USD. By the time the exchange inward remittance arrives. USDINR could move down to 57 leading to wiping off of commercial profit for exporter. Such transaction exposures arise whenever a business has foreign currency denominated receipts or payments. The risk is an adverse movement of the exchange rate from the time the transaction is budgeted till the time the exposure is extinguished by sale or purchase of the foreign currency against the domestic currency.

8.1.2 Translation Exposure

Also known as accounting exposure, it refers to gains or losses caused by the translation of foreign currency assets and liabilities into the currency of the parent company for consolidation purposes.

Translation exposure, also called as accounting exposure, is the potential for accounting derived changes in owner's equity to occur because of the need to "translate" foreign currency financial statements of foreign subsidiaries into a single reporting currency to prepare worldwide consolidated financial statements.

Translation exposures arise due to the need to "translate" foreign currency assets and liabilities into the home currency for the purpose of finalizing the accounts for any given period. A typical example of translation exposure is the treatment of foreign currency loans.

Consider that a company has taken a medium term loan to finance the import of capital goods worth dollars 1 million. When the import materialized, the exchange rate was, say, USD/INRR-55. The imported fixed asset was, therefore, capitalized in the books of the company at ₹ 550 lacs through the following accounting entry:

Debit fixed assets ₹ 550 lacs

Credit dollar loan ₹ 550 lacs

In the ordinary course, and assuming no change in the exchange rate, the company would have provided depreciation on the asset valued at ₹ 550 lacs, for finalizing its account for the year in which the asset was purchased.

However, what happens if at the time of finalization of the accounts the exchange rate has moved to say USD/INR-58. Now the dollar loan will have to be "translated" at ₹ 58, involving a "translation loss" of a ₹ 30 lacs. It shall have to be capitalized by increasing the book value of the asset, thus making the figure ₹ 380 lacs and consequently higher depreciation will have to be provided, thus reducing the net profit.

It will be readily seen that both transaction and translation exposures affect the bottom line of a company. The effect could be positive as well if the movement is favourable – i.e., in the cited examples, in case the USD would have appreciated in case of Transaction Exposure example, or the USD would have depreciated in case of Translation Exposure, for example, against the rupee.

An important observation is that the translation exposure, of course, becomes a transaction exposure at some stage: the dollar loan has to be repaid by undertaking the transaction of purchasing dollars.

8.1.3 Economic Exposure

It refers to the extent to which the economic value of a company can decline due to changes in exchange rate. It is the overall impact of exchange rate changes on the value of the firm. The essence of economic exposure is that exchange rate changes significantly alter the cost of a firm's inputs and the prices of its outputs and thereby influence its competitive position substantially.

Effects of Local Currency Fluctuations on Company's Economic Exposure (Cash inflow)

Variables influencing the inflow of cash in Local currency	*Revaluation impact*	*Devaluation impact*
Local sale, relative to foreign Competition in local currency	Decrease	Increase
Company's export in local currency	Decrease	Increase
Company's export in foreign currency	Decrease	Increase
Interest payments from foreign investments	Decrease	Increase

Effects of Local Currency Fluctuations on Company's Economic Exposure (Cash outflow)

Variables influencing the outflow of cash in local currency	*Revaluation impact*	*Devaluation impact*
Company's import of material the same denoted in local currency	Remain the same	Remain the same
Company's import of material denoted in foreign currency	Decrease	Increase
Interest on foreign debt	Decrease	Increase

9. HEDGING CURRENCY RISK

There are a range of hedging instruments that can be used to reduce risk. Broadly these techniques can be divided into

(A) Internal Techniques: These techniques explicitly do not involve transaction costs and can be used to completely or partially offset the exposure. These techniques can be further classified as follows:

(i) Invoicing in Domestic Currency: Companies engaged in exporting and importing, whether of goods or services, are concerned with decisions relating to the currency in which goods and services are invoked. Trading in a foreign currency gives rise to transaction exposure. Although trading purely in a company's home currency has the advantage of simplicity, it fails to take account of the fact that the currency in which goods are invoiced has become an essential aspect of the overall marketing package given to the customer. Sellers will usually wish to sell in their own currency or the currency in which they incur cost. This avoids foreign exchange exposure. But buyers' preferences may be for other currencies. Many markets, such as oil or aluminum, in effect require that sales be made in the same currency as that quoted by major competitors, which may not be the seller's own currency. In a buyer's market, sellers tend increasingly to invoice in the buyer's ideal currency. The closer the seller can approximate the buyer's aims, the greater chance he or she has to make the sale.

Should the seller elect to invoice in foreign currency, perhaps because the prospective customer prefers it that way or because sellers tend to follow market leader, then the seller should choose only a major currency in which there is an active forward market for maturities at least as long as the payment period. Currencies, which are of limited convertibility, chronically weak, or with only a limited forward market, should not be considered.

The seller's ideal currency is either his own, or one which is stable relative to it. But often the seller is forced to choose the market leader's currency. Whatever the chosen currency, it should certainly be one with a deep forward market. For the buyer, the ideal currency is usually its own or one that is stable relative to it, or it may be a currency of which the purchaser has reserves.

(ii) Leading and Lagging: Leading and Lagging refer to adjustments in the times of payments in foreign currencies. Leading is the payment before due date while lagging is delaying payment past the due date. These techniques are aimed at taking advantage of expected devaluation and/or revaluation of relevant currencies. Lead and lag payments are of special importance in the event that forward contracts remain inconclusive. For example, Subsidiary b in B country owes money to subsidiary a in country A with payment due in three months' time, and with the debt denominated in US dollar. On the other side, country B's currency is expected to devalue within three months against US dollar, vis-à-vis country A's currency. Under these circumstances, if company b leads -pays early - it will have to part with less of country B's currency to buy US dollars to make payment to company A. Therefore, lead is attractive for the company. When we take reverse the example-revaluation expectation- it could be attractive for lagging.

(iii) Netting: Netting involves associated companies, which trade with each other. The technique is simple. Group companies merely settle inter affiliate indebtedness for the net amount owing. Gross intra-group trade, receivables and payables are netted out. The simplest scheme is known as bilateral netting and involves pairs of companies. Each pair of associates nets out their own individual positions with each other and cash flows are reduced by the lower of each company's purchases from or sales to its netting partner. Bilateral netting involves no attempt to bring in the net positions of other group companies.

Netting basically reduces the number of inter company payments and receipts which pass over the foreign exchanges. Fairly straightforward to operate, the main practical problem in bilateral netting is usually the decision about which currency to use for settlement.

Netting reduces banking costs and increases central control of inter company settlements. The reduced number and amount of payments yield savings in terms of buy/sell spreads in the spot and forward markets and reduced bank charges.

(iv) Matching: Although netting and matching are terms, which are frequently used interchangeably, there are distinctions. Netting is a term applied to potential flows within a group of companies whereas matching can be applied to both intra-group and to third-party balancing.

Matching is a mechanism whereby a company matches its foreign currency inflows with its foreign currency outflows in respect of amount and approximate timing. Receipts in a particular currency are used to make payments in that currency thereby reducing the need for a group of companies to go through the foreign exchange markets to the unmatched portion of foreign currency cash flows.

The prerequisite for a matching operation is a two-way cash flow in the same foreign currency within a group of companies; this gives rise to a potential for natural matching. This should be distinguished from parallel matching, in which the matching is achieved with receipt and payment in different currencies but these currencies are expected to move closely together, near enough in parallel.

Both Netting and Matching presuppose that there are enabling Exchange Control regulations. For example, an MNC subsidiary in India cannot net its receivable(s) and payable(s) from/to its associated entities. Receivables have to be received separately and payables have to be paid separately.

(v) Price Variation: Price variation involves increasing selling prices to counter the adverse effects of exchange rate change. This tactic raises the question as to why the company has not already raised prices if it is able to do so. In some countries, price increases are the only legally available tactic of exposure management.

Let us now concentrate to price variation on inter company trade. Transfer pricing is the term used to refer to the pricing of goods and services, which change hands within a group of companies. As an exposure management technique, transfer price variation refers to the arbitrary pricing of inter company sales of goods and services at a higher or lower price than the fair price, arm's length price. This fair price will be the market price if there is an existing market or, if there is not, the price which would be charged to a third party customer. Taxation authorities, customs and excise departments and exchange control regulations in most countries require that the arm's length pricing be used.

(vi) Asset and Liability Management: This technique can be used to manage balance sheet, income statement or cash flow exposures. Concentration on cash flow exposure makes

economic sense but emphasis on pure translation exposure is misplaced. Hence our focus here is on asset liability management as a cash flow exposure management technique.

In essence, asset and liability management can involve aggressive or defensive postures. In the aggressive attitude, the firm simply increases exposed cash inflows denominated in currencies expected to be strong or increases exposed cash outflows denominated in weak currencies. By contrast, the defensive approach involves matching cash inflows and outflows according to their currency of denomination, irrespective of whether they are in strong or weak currencies.

(B) External Techniques: Under this category range of various financial products are used which can be categorized as follows:

(i) Money Market Hedging: At its simplest, a money market hedge is an agreement to exchange a certain amount of one currency for a fixed amount of another currency, at a particular date. For example, suppose a business owner in India expects to receive 1 Million USD in six months. This Owner could create an agreement now (today) to exchange 1Million USD for INR at roughly the current exchange rate. Thus, if the USD dropped in value by the time the business owner got the payment, he would still be able to exchange the payment for the original quantity of U.S. dollars specified.

Advantages and Disadvantages of Money Market Hedge: Following are the advantages and disadvantages of this technique of hedging.

Advantages

(a) Fixes the future rate, thus eliminating downside risk exposure

(b) Flexibility with regard to the amount to be covered

(c) Money market hedges may be feasible as a way of hedging for currencies where forward contracts are not available.

Disadvantages include:

(a) More complicated to organise than a forward contract

(b) Fixes the future rate - no opportunity to benefit from favourable movements in exchange rates.

(ii) Derivative Instruments: A derivatives transaction is a bilateral contract or payment exchange agreement whose value depends on - derives from - the value of an underlying asset, reference rate or index. Today, derivatives transactions cover a broad range of underlying - interest rates, exchange rates, commodities, equities and other indices.

In addition to privately negotiated, global transactions, derivatives also include standardized futures and options on futures that are actively traded on organized exchanges and securities such as call warrants.

The term derivative is also used to refer to a wide variety of other instruments. These have payoff characteristics, which reflect the fact that they include derivatives products as part of their make-up.

Transaction risk can also be hedged using a range of financial derivatives products which include: Forwards, futures, options, swaps, etc. These instruments are discussed in detailed manner in following pages.

10. FORWARD CONTRACT

The simplest form of derivatives is the forward contract. It obliges one party to buy, and the other to sell, a specified quantity of a nominated underlying financial instrument at a specific price, on a specified date in the future. There are markets for a multitude of underlying. Among these are the traditional agricultural or physical commodities, currencies (foreign exchange forwards) and interest rates (forward rate agreements - FRAs). The volume of trade in forward contracts is massive.

10.1 Forward Rate – Premium and Discount

The change in value in a forward contract is broadly equal to the change in value in the underlying. Forwards differ from options in that options carry a different payoff profile. Forward contracts are unique to every trade. They are customized to meet the specific requirements of each end-user. The characteristics of each transaction include the particular business, financial or risk-management targets of the counterparties. Forwards are not standardized. The terms in relation to contract size, delivery grade, location, delivery date and credit period are always negotiated.

In a forward contract, the buyer of the contract draws its value at maturity from its delivery terms or a cash settlement. On maturity, if the price of the underlying is higher than the contract price the buyer makes a profit. If the price is lower, the buyer suffers a loss. The gain to the buyer is a loss to the seller.

- *Forwards Rates:* The forward rate is different from the spot rate. Depending upon whether the forward rate is greater than the spot rate, given the currency in consideration, the forward may either be at a 'discount' or at a 'premium'. Forward premiums and discounts are usually expressed as an annual percentages of the difference between the spot and the forward rates.
- *Premium:* When a currency is costlier in forward or say, for a future value date, it is said to be at a premium. In the case of direct method of quotation, the premium is added to both the selling and buying rates.
- *Discount:* If the currency is cheaper in forward or for a future value date, it is said to be at a discount. In case of direct quotation the discount is deducted from both the selling and buying rate. The following example explains how to calculate Premium / Discount both under Indirect/Direct quotes.

To calculate the Premium or Discount of a currency vis-à-vis another, we need to find out how much each unit of the first currency can buy units of the second currency. For instance, if the Spot rate between INR and USD is ₹ 55 to a dollar and the six months forward rate is ₹ 60 to a dollar, it is clear the USD is strengthening against the Rupee and hence is at a premium. Which also means that Rupee is at discount.

The premium of USD against INR is ₹ 5 for six months in absolute terms. However, forward premium is always expressed as an annual percentage. Therefore, this premium is calculated as

[(Forward Rate – Spot rate) / (Spot rate)] x (12/6)

= (60 – 55)/(55) x 12/6 = 18.18%

Rupee is at discount and to calculate the discount, we need to find out how many dollars each Rupee can buy today and six months from now. Therefore, the Spot rate of USD in terms of INR today is USD 1/55 = $ 0.01818 and six months from now is USD 1/60 = $ 0.01667. The discount is calculated as:

[(Forward Rate – Spot rate) / (Spot rate)] x (12/6)

= (0.01667 – 0.01818) / 0.01818 x 12/6

= – 0.00151 / 0.01818 x 12/6 = – 16.61%

The minus sign implies that the Rupee is at discount.

Another important point to be noted in the above example, is that the forward premiums do not equal forward discount always. In the aforesaid example, for instance, the rupee is trading at a discount of 16.67% while the dollar is trading at a premium of 18.18%.

10.2 Fate of Forward Contracts

Whenever any forward contract is entered, normally it meets any of the following three fates.

(A) Delivery under the Contract

(B) Cancellation of the Contract

(C) Extension of the Contract

Further above of fates of forward contract can further classified into following sub-categories.

(A) Delivery under the Contract

- (i) Delivery on Due Date
- (ii) Early Delivery
- (iii) Late Delivery

(B) Cancellation of the Contract

(i) Cancellation on Due Date

(ii) Early Cancellation

(iii) Late Cancellation

(C) Extension of the Contract

(i) Extension on Due Date

(ii) Early Extension

(iii) Late Extension

Let us discuss each of above executions one by one.

Delivery on Due Date

This situation does not pose any problem as rate applied for the transaction would be rate originally agreed upon. Exchange shall take place at this rate irrespective of the spot rate prevailing.

Illustration 3

On 1st June 2015 the bank enters into a forward contract for 2 months for selling US$ 1,00,000 at₹ 65.5000. On 1st July 2015 the spot rate was ₹ 65.7500/65.2500. Calculate the amount to be debited in the customer's account.

Answer

The bank will apply rate originally agreed upon i.e. ₹ 65.5000 and will debit the account of the customer with ₹ 65,50,000.

Early Delivery

The bank may accept the request of customer of delivery at the before due date of forward contract provided the customer is ready to bear the loss if any that may accrue to the bank as a result of this. In addition to some prescribed fixed charges bank may also charge additional charges comprising of:

(a) *Swap Difference*: This difference can be loss/ gain to the bank. This arises on account of offsetting its position earlier created by early delivery as bank normally covers itself against the position taken in the original forward contract.

(b) *Interest on Outlay of Funds*: It might be possible early delivery request of a customer may result in outlay of funds. In such bank shall charge from the customer at a rate not less than prime lending rate for the period of early delivery to the original due date. However, if there is an inflow of funds the bank at its discretion may pass on interest to the customer at the rate applicable to term deposits for the same period.

Illustration 4

On 1 October 2015 Mr. X an exporter enters into a forward contract with a BNP Bank to sell US$ 1,00,000 on 31 December 2015 at ₹ 65.40/$. However, due to the request of the importer, Mr. X received amount on 28 November 2015. Mr. X requested the bank the take delivery of the remittance on 30 November 2015 i.e. before due date. The inter-banking rates on 28 November 2015 was as follows:

Spot	₹ 65.22/65.27
One Month Premium	10/15

If bank agrees to take early delivery then what will be net inflow to Mr. X assuming that the prevailing prime lending rate is 18%.

Solution

Bank will buy from customer at the agreed rate of ₹ 65.40. In addition to the same if bank will charge/ pay swap difference and interest on outlay funds.

(a)	Swap Difference	
	Bank Sells at Spot Rate on 28 November 2015	₹ 65.22
	Bank Buys at Forward Rate of 31 December 2015 (65.27 + 0.15)	₹ 65.42
	Swap Loss per US$	₹ 00.20
	Swap loss for US$ 1,00,000	₹ 20,000
(b)	Interest on Outlay Funds	
	On 28th November Bank sells at	₹ 65.22
	It buys from customer at	₹ 65.40
	Outlay of Funds per US$	₹ 00.18
	Interest on Outlay fund for US$ 1,00,000 for 31 days (US$100000 x 00.18 x 31/365 x 18%)	₹ 275.00
(c)	Charges for early delivery	
	Swap loss	₹ 20,000.00
	Interest on Outlay fund for US$ 1,00,000 for 31 days	₹ 275.00
		₹ 20,275.00
(d)	Net Inflow to Mr. X	
	Amount received on sale (₹ 65.40 x 1,00,000)	₹ 65,40,000
	Less: Charges for early delivery payable to bank	(₹ 20,275)
		₹ 65,19,725

Late Delivery

In case of late delivery current rate prevailing on such date of delivery shall be applied. However, before this delivery (execution) takes place the provisions of Automatic Cancellation (discussed later on) shall be applied.

Cancellation on Due Date

In case of cancellation on due date in addition of flat charges (if any) the difference between contracted rate and the cancellation rate (reverse action of original contract) is charged from/ paid to the customer.

Illustration 5

On 15th January 2015 you as a banker booked a forward contract for US$ 250000 for your import customer deliverable on 15th March 2015 at ₹ 65.3450. On due date customer request you to cancel the contract. On this date quotation for US$ in the inter-bank market is as follows:

Spot	₹ 65.2900/2975 per US$
Spot/ April	3000/ 3100
Spot/ May	6000/ 6100

Assuming that the flat charges for the cancellation is ₹ 100 and exchange margin is 0.10%, then determine the cancellation charges payable by the customer.

Solution

Bank will buy from customer at the agreed rate of ₹ 65.40.

Since this is sale contract the contract shall be cancelled at ready buying rate on the date of cancellation as follows:

Spot Buying Rate on 15 March 2015	₹ 65.2900
Less: Exchange Margin	₹ 0.0653
	₹ 65.2247
Rounded to ₹ 65.2250	
Dollar sold to customer at	₹ 65.3450
Dollar bought from customer	₹ 65.2250
Net amount payable by the customer per US$	₹ 0.1200
Amount payable by the customer	
Flat Charges	₹ 100.00
Cancellation Charges (₹ 0.12 x 250000)	₹30,000.00
	₹30,100.00

Early Cancellation

If a forward is required to be cancelled earlier than the due date of forward contract same shall be cancelled at opposite rate of original contract of the date that synchronises with the date of original forward contract.

Illustration 6

You as a banker has entered into a 3 month's forward contract with your customer to purchase AUD 1,00,000 at the rate of ₹ 47.2500. However after 2 months your customer comes to you and requests cancellation of the contract. On this date quotation for AUD in the market is as follows:

Spot	₹ 47.3000/3500 per AUD
1 month forward	₹ 47.4500/5200 per AUD

Determine the cancellation charges payable by the customer.

Solution

The contract shall be cancelled at the 1 month forward sale rate of ₹ 47.5200 as follows:

AUD bought from customer under original forward contract at	₹ 47.2500
On cancellation it is sold to him at	₹ 47.5200
Net amount payable by customer per AUD	₹ 00.2700

Thus total cancellation charges payable by the customer ₹ 27,000

Late Cancellation

In case of late cancellation of Forward Contract the provisions of Automatic Cancellation (discussed later on) shall be applied.

Extension on Due Date

It might also be possible that an exporter may not be able to export goods on the due date. Similarly it might also be possible that an importer may not to pay on due date. In both of these situations an extension of contract for selling and buying contract is warranted. Accordingly, if earlier contract is extended first it shall be cancelled and rebooked for the new delivery period. In case extension is on due date it shall be cancelled at spot rate as like cancellation on due date (discussed earlier) and new contract shall be rebooked at the forward rate for the new delivery period.

Illustration 7

Suppose you are a banker and one of your export customer has booked a US$ 1,00,000 forward sale contract for 2 months with you at the rate of ₹ 62.5200 and simultaneously you covered yourself in the interbank market at ₹ 62.5900. However on due date, after 2 months your customer

comes to you and requests for cancellation of the contract and also requests for extension of the contract by one month. On this date quotation for US$ in the market was as follows:

Spot	₹ 62.7200/62.6800
1 month forward	₹ 62.6400/62.7400

Determine the extension charges payable by the customer assuming exchange margin of 0.10% on buying as well as selling.

Solution

Cancellation

First the original contract shall be cancelled as follows:

US$/₹ Spot Selling Rate	₹ 62.7200
Add: Margin @ 0.10%	₹ 0.06272
Net amount payable by customer per US$	₹ 62.78272
Rounded off	₹ 62.7825
Bank buys US$ under original contract at	₹ 62.5200
Bank Sells at	₹ 62.7825
	₹ 0.2675

Thus total cancellation charges payable by the customer for US$ 1,00,000 is ₹ 26,750.

Rebooking

Forward US$/₹ Buying Rate	₹ 62.6400
Less: Margin @ 0.10%	₹ 0.06264
Net amount payable by customer per US$	₹ 62.57736
Rounded off	₹ 62.5775

Extension before Due Date

In case any request to extend the contract is received before due date of maturity of forward contract, first the original contract would be cancelled at the relevant forward rate as in case of cancellation of contract before due date and shall be rebooked at the current forward rate of the forward period.

Illustration 8

Suppose you as a banker entered into a forward purchase contract for US$ 50,000 on 5th March with an export customer for 3 months at the rate of ₹ 59.6000. On the same day you also covered yourself in the market at ₹ 60.6025. However on 5th May your customer comes to you and requests extension of the contract to 5thJuly. On this date (5th May) quotation for US$ in the market is as follows:

Spot	₹ 59.1300/1400 per US$

Spot/ 5th June	₹ 59.2300/2425 per US$
Spot/ 5thJuly	₹ 59.6300/6425 per US$

Assuming a margin 0.10% on buying and selling, determine the extension charges payable by the customer and the new rate quoted to the customer.

Solution

(a) Cancellation of Original Contract

The forward purchase contract shall be cancelled at the for the forward sale rate for delivery June.

Interbank forward selling rate	₹ 59.2425
Add: Exchange Margin	₹ 0.0592
Net amount payable by customer per US$	₹ 59.3017
Rounded off, the rate applicable is ₹ 59.3000	
Buying US$ under original contract at original rate	₹ 59.6000
Selling rate to cancel the contract	₹ 59.3000
Difference per US$	₹ 00.3000

Exchange difference for US$ 50,000 payable to the customer is ₹ 15,000.

(b) Rate for booking new contract

The forward contract shall be rebooked with the delivery 15th July as follows:

Forward buying rate (5th July)	₹ 59.6300
Less: Exchange Margin	₹ 0.0596
Net amount payable by customer per US$	₹ 59.5704
Rounded off to ₹ 59.5700	

Late Extension

In case of late extension current rate prevailing on such date of delivery shall be applied. However, before this delivery the provisions of Automatic Cancellation (discussed later on) shall be applied.

Automatic Cancellation

As per FEDAI Rule 8 a forward contract which remains overdue without any instructions from the customers on or before due date shall stand automatically cancelled on 15th day from the date of maturity. Though customer is liable to pay the exchange difference arising there from but not entitled for the profit resulting from this cancellation.

For late delivery and extension after due date as mentioned above the contract shall be treated as fresh contract and appropriate rates prevailing on such date shall be applicable as mentioned below:

1. Late Delivery: In this case the relevant spot rate prevailing on the such date shall be applicable.
2. Extension after Due Date: In this case relevant forward rate for the period desired shall be applicable.

As mentioned earlier in both of above case cancellation charges shall be payable consisting of following:

(i) *Exchange Difference:* The difference between Spot Rate of offsetting position (cancellation rate) on the date of cancellation of contract after due date or 15 days (whichever is earlier) and original rate contracted for.

(ii) *Swap Loss:* The loss arises on account of offsetting its position created by early delivery as bank normally covers itself against the position taken in the original forward contract. This position is taken at the spot rate on the date of cancellation earliest forward rate of offsetting position.

(iii) *Interest on Outlay of Funds:* Interest on the difference between the rate entered by the bank in the interbank market and actual spot rate on the due date of contract of the opposite position multiplied by the amount of foreign currency amount involved. This interest shall be calculated for the period from the due date of maturity of the contract and the actual date of cancellation of the contract or 15 days whichever is later.

Please note in above in any case there is profit by the bank on any course of action same shall not be passed on the customer as normally passed cancellation and extension on or before due dates.

Illustration 9

An importer booked a forward contract with his bank on 10th April for USD 2,00,000 due on 10th June @ ₹ 64.4000. The bank covered its position in the market at ₹ 64.2800.

The exchange rates for dollar in the interbank market on 10th June and 20th June were:

	10th June	20th June
Spot USD 1=	₹ 63.8000/8200	₹ 63.6800/7200
Spot/June	₹ 63.9200/9500	₹ 63.8000/8500
July	₹ 64.0500/0900	₹ 63.9300/9900
August	₹ 64.3000/3500	₹ 64.1800/2500
September	₹ 64.6000/6600	₹ 64.4800/5600

Exchange Margin 0.10% and interest on outlay of funds @ 12%. The importer requested on 20th June for extension of contract with due date on 10th August.

Rates rounded to 4 decimal in multiples of 0.0025.

On 10th June, Bank Swaps by selling spot and buying one month forward.

Calculate:

(i) Cancellation rate

(ii) Amount payable on $ 2,00,000

(iii) Swap loss

(iv) Interest on outlay of funds, if any

(v) New contract rate

(vi) Total Cost

Solution

(i) Cancellation Rate:

The forward sale contract shall be cancelled at Spot TT Purchase for $ prevailing on the date of cancellation as follows:

$/ ₹ Market Buying Rate	₹ 63.6800
Less: Exchange Margin @ 0.10%	₹ 0.0636
	₹ 63.6163

Rounded off to ₹ 63.6175

(ii) Amount payable on $ 2,00,000

Bank sells $2,00,000 @ ₹ 64.4000	₹ 1,28,80,000
Bank buys $2,00,000 @ ₹ 63.6163	₹ 1,27,23,260
Amount payable by customer	₹ 1,56,740

(iii) Swap Loss

On 10th June the bank does a swap sale of $ at market buying rate of ₹ 63.8000 and forward purchase for June at market selling rate of ₹ 63.9500.

Bank buys at	₹ 63.9500
Bank sells at	₹ 63.8000
Amount payable by customer	₹ 0.1500

Swap Loss for $ 2,00,000 in ₹ = ₹ 30,000

(iv) Interest on Outlay of Funds

On 10th April, the bank receives delivery under cover contract at ₹ 64.2800 and sell spot at ₹ 63.8000.

Bank buys at	₹ 64.2800
Bank sells at	₹ 63.8000
Amount payable by customer	₹ 0.4800

Outlay for $ 2,00,000 in ₹ 96,000

Interest on ₹ 96,000 @ 12% for 10 days ₹ 320

(v) New Contract Rate

The contract will be extended at current rate

$/ ₹ Market forward selling Rate for August	₹ 64.2500
Add: Exchange Margin @ 0.10%	₹ 0.0643
	₹ 64.3143

Rounded off to ₹ 64.3150

(vi) Total Cost

Cancellation Charges	₹ 1,56,740.00
Swap Loss	₹ 30,000.00
Interest	₹ 320.00
	₹ 1,87,060.00

10.3 Non-deliverable Forward Contract

A cash-settled, short-term forward contract on a thinly traded or non-convertible foreign currency, where the profit or loss at the time at the settlement date is calculated by taking the difference between the agreed upon exchange rate and the sport rate at the time of settlement, for an agreed upon notional amount of funds.

All NDFs have a fixing date and a settlement date. The fixing date is the date at which the difference between the prevailing market exchange rate and the agreed upon exchange rate is calculated. The settlement date is the date by which the payment of the difference is due to the party receiving payment.

NDFs are commonly quoted for time periods of one month up to one year, and are normally quoted and settled in U.S. dollars. They have become a popular instrument for corporations seeking to hedge exposure to foreign currencies that are not internationally traded.

10.4 Rollover of Deliverable Forward Contract

Rollover of Deliverable Forward Contract is a Contract wherein, as an Exporter, you have no Foreign Currency to Deliver at maturity and as an Importer you have no Local Currency to deliver at maturity. As an Exporter or Importer you would like to rollover the contract which effectively means spot cancellation and booking of new contract for later date.

The rationale behind the rollover is:

- Non receipt of Foreign Currency from client (export perspective),
- Shortage of local currencies (Import perspective) ,
- Non-agreement of payment with clients,
- Non availability of longer period forward contracts as normally forward contracts are available maximum for one year and to hedge the exposure for the period more than one roll over contract shall be used.

11. FUTURES CONTRACTS

A basic futures contract is very similar to the forward contract in its obligation and payoff profile.

There are some important distinctions between futures and forwards and swaps.

- The contract terms of futures are standardized. These encompass:
  - Quantity and quality of the underlying;
  - Time and place of delivery;
  - Method of payment.
- Credit risk is standardized as this is greatly reduced by marking the contract to market on a daily basis with daily checking of position.
- Futures are smaller in contract size than forwards and swaps, which means that they are available to a wider business market.

A financial futures contract is purchased or sold through a broker. It is a commitment to make or take delivery of a specified financial instrument, or perform a particular service, at predetermined date in the future. The price of the contract is established at the outset.

Distinction between Futures and Forward Contracts

There are major differences between the traditional forward contract and a futures contract. These are tabulated below:

Feature	*Forward Contract*	*Futures Contract*
Amount	Flexible	Standard amount

Maturity	Any valid business date agreed to by the two parties	Standard date. Usually one delivery date such as the second Tuesday of every month
Furthest maturity date	Open	12 months forward
Currencies traded	All currencies	Majors
Cross rates	Available in one contract; Multiple contracts avoided	Usually requires two contracts
Market-place	Global network	Regular markets – futures market and exchanges
Price fluctuations	No daily limit in many currencies	Daily price limit set by exchange
Risk	Depends on counter party	Minimal due to margin requirements
Honouring of contract	By taking and giving delivery	Mostly by a reverse transaction
Cash flow	None until maturity date	Initial margin plus ongoing variation margin because of market to market rate and final payment on maturity date
Trading hours	24 hours a day	4 – 8 hours trading sessions

12. OPTION CONTRACTS

An option is a contract which has one or other of two key attributes:

- to buy **(call option)**;
- or to sell **(put option**).

The purchaser is called the buyer or holder; the seller is called the writer or grantor. The premium may be expressed as a percentage of the price per unit of the underlying.

The holder of an ***American option*** has the right to exercise the contract at any stage during the period of the option, whereas the holder of a ***European option*** can exercise his right only at the end of the period.

During or at the end of the contract period (depending on the type of the option)the holder can do as he pleases. He can buy or sell (as the case may be) the underlying, let the contract expire or sell the option contract itself in the market.

Call Option: It is a contract that gives the buyer the right, but not the obligation, to buy a specified number of units of commodity or a foreign currency from the seller of option at a fixed price on or up to a specific date.

Put Option: It is a contract that gives the buyer the right, but not the obligation, to sell a specified number of units of commodity or a foreign currency to a seller of option at a fixed price on or up to a specific date.

Distinction between Options and Futures

There are certain fundamental differences between a futures and an option contract. Let us look at the main comparative features given below:

	Options	***Futures***
(a)	Only the seller (writer) is obliged to perform	Both the parties are obligated to perform.
(b)	Premium is paid by the buyer to the seller at the inception of the contract	No premium is paid by any party.
(c)	Loss is restricted while there is unlimited gain potential for the option buyer.	There is potential/risk for unlimited gain/loss for the futures buyer.
(d)	An American option contract can be exercised any time during its period by the buyer.	A futures contract has to be honoured by both the parties only on the date specified.

Options Vs Futures: Gain and Losses in Different Circumstances

Price Movement	***Type of Position Held***					
	Call buyer	*Long Futures Position*	*Call Seller*	*Put Buyer*	*Short Futures Position*	*Put Seller*
Price rises	Unlimited gain	Unlimited gain	Unlimited loss	Limited loss	Unlimited loss	Limited gain
Price falls	Limited loss	Unlimited loss*	Limited gain	Unlimited gain*	Unlimited gain*	Unlimited loss*
Price unchanged	Limited loss	No gain or loss	Limited gain	Limited loss	No Gain or loss	Limited gain

Note: Transaction Costs are ignored.

*Since the price of any commodity; share are financial instrument cannot go below zero, there is technically a 'limit' to the gain/loss when the price falls. For practical purposes, this is largely irrelevant.

13. SWAP CONTRACTS

Swaps are infinitely flexible. In technical terms they are a method of exchanging the underlying economic basis of a debt or asset without affecting the underlying principal obligation on the debt or asset.

A swap transaction commits the participants to exchange cash flows at specified intervals, which are called payment or settlement dates. Cash flows are either fixed or calculated for specific dates by multiplying the quantity of the underlying by specified reference rates or prices.

The vast majority of swaps are classified into the following groups:

- Interest rate;
- Currency;
- Commodity;
- Equity.

The notional principal (i.e. the face value of a security) on all these, except currency swaps, is used to calculate the payment stream but not exchanged. Interim payments are usually netted - the difference is paid by one party to the other.

Like forwards, the main users of swaps are large multinational banks or corporations. Swaps create credit exposures and are individually designed to meet the risk-management objectives of the participants.

13.1 Interest Rate Swaps

Interest Rate Swap has been covered in greater details in the Chapter 12 of this Study Material. Please refer the same from there.

13.2 Currency Swaps

It involve an exchange of liabilities between currencies. A currency swap can consist of three stages:

- A spot exchange of principal - this forms part of the swap agreement as a similar effect can be obtained by using the spot foreign exchange market.
- Continuing exchange of interest payments during the term of the swap - this represents a series of forward foreign exchange contracts during the term of the swap contract. The contract is typically fixed at the same exchange rate as the spot rate used at the outset of the swap.
- Re-exchange of principal on maturity.

A currency swap has the following benefits:

- Treasurers can hedge currency risk.
- It can provide considerable cost savings. A strong borrower in the Japanese Yen market may be interested in borrowing in the American USD markets where his credit rating may not be as good as it is in Tokyo. Such a borrower could get a better US dollar rate by raising funds first in the Tokyo market and then swapping Yen for US dollars.
- The swap market permits funds to be accessed in currencies, which may otherwise command a high premium.
- It offers diversification of borrowings.

A more complex version of a currency swap is a currency coupon swap, which swaps a fixed-or-floating rate interest payment in one currency fora floating rate payment in another. These are also known as *Circus Swaps.*

In a currency swap the principal sum is usually exchanged:

- At the start;
- At the end;
- At a combination of both; or
- Neither.

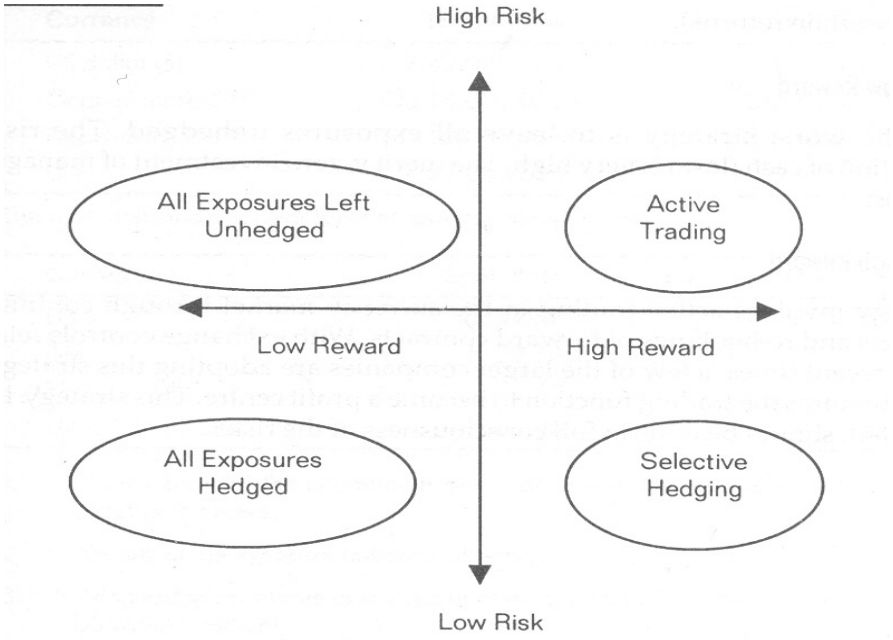
Many swaps are linked to the issue of a Eurobond. An issuer offers a bond in a currency and instrument where it has the greatest competitive advantage. It then asks the underwriter of the bond to provide it with a swap to convert funds into the required type.

13.3 Equity Swaps

An equity swap is an arrangement in which total return on equity or equity index in the form of dividend and capital is exchanged with either a fixed or floating rate of interest.

14. STRATEGIES FOR EXPOSURE MANAGEMENT

A company's attitude towards risk, financial strength, nature of business, vulnerability to adverse movements, etc shapes its exposure management strategies. There can be no single strategy which is appropriate to all businesses. Four separate strategy options are feasible for exposure management.



Exposure Management Strategies

14.1 Low Risk: Low Reward

This option involves automatic hedging of exposures in the forward market as soon as they arise, irrespective of the attractiveness or otherwise of the forward rate. The merits of this approach are that yields and costs of the transaction are known and there is little risk of cash flow destabilization. Again, this option doesn't require any investment of management time or effort. The negative side is that automatic hedging at whatever rates are available is hardly likely to result into optimum costs. At least some management seems to prefer this strategy on the grounds that an active management of exposures is not really their business. In the floating rate era, currencies outside their home countries, in terms of their exchange rate, have assumed the characteristics of commodities. And business whose costs depend significantly on commodity prices can hardly afford not to take views on the price of the commodity. Hence this does not seem to be an optimum strategy.

14.2 Low Risk: Reasonable Reward

This strategy requires selective hedging of exposures whenever forward rates are attractive but keeping exposures open whenever they are not. Successful pursuit of this strategy requires quantification of expectations about the future and the rewards would depend upon the accuracy of the prediction. This option is similar to an investment strategy of a combination of bonds and equities with the proportion of the two components depending on the attractiveness of prices. In foreign exchange exposure terms, hedged positions are similar to bonds (known costs or yields) and unhedged ones to equities (uncertain returns).

14.3 High Risk: Low Reward

Perhaps the worst strategy is to leave all exposures unhedged. The risk of destabilization of cash flows is very high. The merit is zero investment of managerial time or effort.

14.4 High Risk: High Reward

This strategy involves active trading in the currency market through continuous cancellations and re-bookings of forward contracts. With exchange controls relaxed in India in recent times, a few of the larger companies are adopting this strategy. In effect, this requires the trading function to become a profit centre. This strategy, if it has to be adopted, should be done in full consciousness of the risks.

15. CONCLUSION

Thus, on account of increased globalization of financial markets, risk management has gained more importance. The benefits of the increased flow of capital between nations include a better international allocation of capital and greater opportunities to diversify risk. However, globalization of investment has meant new risks from exchange rates, political actions and increased interdependence on financial conditions of different countries.

All these factors- increase in exchange rate risk, growth in international trade, globalization of financial markets, increase in the volatility of exchange rates and growth of multinational and transnational corporations- combine to make it imperative for today's financial managers to study the factors behind the risks of international trade and investment, and the methods of reducing these risks.

TEST YOUR KNOWLEDGE

Theoretical Questions

1. "Operations in foreign exchange market are exposed to a number of risks." Discuss.
2. What do you mean by Nostro, Vostro and Loro Accounts?

Practical Questions

1. The price of a bond just before a year of maturity is $ 5,000. Its redemption value is $ 5,250 at the end of the said period. Interest is $ 350 p.a. The Dollar appreciates by 2% during the said period. Calculate the rate of return.

2. ABC Ltd. of UK has exported goods worth Can $ 5,00,000 receivable in 6 months. The exporter wants to hedge the receipt in the forward market. The following information is available:

Spot Exchange Rate Can $ 2.5/£

Interest Rate in UK	12%
Interest Rate In Canada	15%

The forward rates truly reflect the interest rates differential. Find out the gain/loss to UK exporter if Can $ spot rates (i) declines 2%, (ii) gains 4% or (iii) remains unchanged over next 6 months.

3. On January 28, 2013 an importer customer requested a Bank to remit Singapore Dollar (SGD) 2,500,000 under an irrevocable Letter of Credit (LC). However, due to unavoidable factors, the Bank could effect the remittances only on February 4, 2013. The inter-bank market rates were as follows:

	January 28, 2013	February 4, 2013
US$ 1=	₹ 45.85/45.90	₹ 45.91/45.97
GBP £ 1=	US$ 1.7840/1.7850	US$ 1.7765/1.7775
GBP £ 1=	SGD 3.1575/3.1590	SGD 3. 1380/3.1390

The Bank wishes to retain an exchange margin of 0.125%

Required:

How much does the customer stand to gain or lose due to the delay?(Note: Calculate the rate in multiples of 0.0001)

4. In March, 2009, the Multinational Industries make the following assessment of dollar rates per British pound to prevail as on 1.9.2009:

$/Pound	*Probability*
1.60	0.15
1.70	0.20
1.80	0.25
1.90	0.20
2.00	0.20

(i) What is the expected spot rate for 1.9.2009?

(ii) If, as of March, 2009, the 6-month forward rate is $ 1.80, should the firm sell forward its pound receivables due in September, 2009?

5. An Indian exporting firm, Rohit and Bros., would be covering itself against a likely depreciation of pound sterling. The following data is given:

Receivables of Rohit and Bros : £500,000

Spot rate	:	₹ 56.00/£
Payment date	:	3-months
3 months interest rate	:	India : 12 per cent per annum
	:	UK : 5 per cent per annum

What should the exporter do?

6. The rate of inflation in India is 8% per annum and in the U.S.A. it is 4%. The current spot rate for USD in India is ₹ 46. What will be the expected rate after 1 year and after 4 years applying the Purchasing Power Parity Theory.

7. On April 1, 3 months interest rate in the UK £ and US $ are 7.5% and 3.5% per annum respectively. The UK £/US $ spot rate is 0.7570. What would be the forward rate for US $ for delivery on 30th June?

8. ABC Technologic is expecting to receive a sum of US$ 4,00,000 after 3 months. The company decided to go for future contract to hedge against the risk. The standard size of future contract available in the market is $1000. As on date spot and futures $ contract are quoting at ₹ 44.00 &₹ 45.00 respectively. Suppose after 3 months the company closes out its position futures are quoting at ₹ 44.50 and spot rate is also quoting at ₹ 44.50. You are required to calculate effective realization for the company while selling the receivable. Also calculate how company has been benefitted by using the future option.

9. XYZ Ltd. a US firm will need £ 3,00,000 in 180 days. In this connection, the following information is available:

Spot rate 1 £ = $ 2.00

180 days forward rate of £ as of today = $1.96

Interest rates are as follows:

	U.K.	US
180 days deposit rate	4.5%	5%
180 days borrowing rate	5%	5.5%

A call option on £ that expires in 180 days has an exercise price of $ 1.97 and a premium of $ 0.04.

XYZ Ltd. has forecasted the spot rates 180 days hence as below:

Future rate	Probability
$ 1.91	25%
$ 1.95	60%
$ 2.05	15%

Which of the following strategies would be most preferable to XYZ Ltd.?

(a) A forward contract;

(b) A money market hedge;

(c) An option contract;

(d) No hedging.

Show calculations in each case

10. A Ltd. of U.K. has imported some chemical worth of USD 3,64,897 from one of the U.S. suppliers. The amount is payable in six months time. The relevant spot and forward rates are:

Spot rate	USD 1.5617-1.5673
6 months' forward rate	USD 1.5455 –1.5609

The borrowing rates in U.K. and U.S. are 7% and 6% respectively and the deposit rates are 5.5% and 4.5% respectively.

Currency options are available under which one option contract is for GBP 12,500. The option premium for GBP at a strike price of USD 1.70/GBP is USD 0.037 (call option) and USD 0.096 (put option) for 6 months period.

The company has 3 choices:

(i) Forward cover

(ii) Money market cover, and

(iii) Currency option

Which of the alternatives is preferable by the company?

ANSWERS/ SOLUTIONS

Answers to Theoretical Questions

1. Please refer paragraph 8.1

2. Please refer paragraph 2.

Answers to the Practical Questions

1. Here we can assume two cases (i) If investor is US investor then there will be no impact of appreciation in $. (ii) If investor is from any other nation other than US say Indian then there will be impact of $ appreciation on his returns.

First we shall compute return on bond which will be common for both investors.

$$\text{Return} = \frac{(\text{Price at end - Price at begining}) + \text{Interest}}{\text{Price at begining}}$$

$$= \frac{(5250 - 5000) + 350}{5000}$$

$$= \frac{250 + 350}{5000} = 0.12 \text{ say } 12\%$$

(i) For US investor the return shall be 12% and there will be no impact of appreciation in $.

(ii) If $ appreciate by 2% then return for non-US investor shall be:

Return x 1.02 = 0.12 x 1.02=0.1224 i.e. 12.24%

Alternatively it can also be considered that $ appreciation will be applicable to the amount of principal as well. The answer therefore could also be

(1+0.12)(1+0.02) -1 =1.12X1.02 - 1 = 0.1424 i.e. 14.24%

2. Forward Rate = $\frac{2.50\,(1 + 0.075)}{(1 + 0.060)}$ = Can$ 2.535/£

(i) If spot rate decline by 2%

Spot Rate = Can$ 2.50 x 1.02 = Can$ 2.55/£

	£
£ receipt as per Forward Rate (Can $ 5,00,000/ Can$ 2.535)	1,97,239
£ receipt as per Spot Rate (Can $ 5,00,000/ Can$ 2.55)	1,96,078
Gain due to forward contract	1,161

(ii) If spot rate gains by 4%

Spot Rate = Can$ 2.50 x 0.96 = Can$ 2.40/£

	£
£ receipt as per Forward Rate (Can $ 5,00,000/ Can$ 2.535)	1,97,239
£ receipt as per Spot Rate (Can $ 5,00,000/ Can$ 2.40)	2,08,333
Loss due to forward contract	11,094

(iii) If spot rate remains unchanged

	£
£ receipt as per Forward Rate (Can $ 5,00,000/ Can$ 2.535)	1,97,239

£ receipt as per Spot Rate (Can $ 5,00,000/ Can$ 2.50)	2,00,000
Loss due to forward contract	2,761

3. On January 28, 2013 the importer customer requested to remit SGD 25 lakhs.

To consider sell rate for the bank:

US $	=	₹45.90
Pound 1	=	US$ 1.7850
Pound 1	=	SGD 3.1575
Therefore, SGD 1	=	$\frac{₹\ 45.90 * 1.7850}{SGD\ 3.1575}$
SGD 1	=	₹25.9482
Add: Exchange margin (0.125%)		₹ 0.0324
		₹ 25.9806

On February 4, 2013 the rates are

US $	=	₹ 45.97
Pound 1	=	US$ 1.7775
Pound 1	=	SGD 3.1380
Therefore, SGD 1	=	$\frac{₹\ 45.97 * 1.7775}{SGD\ 3.1380}$
SGD 1	=	₹ 26.0394
Add: Exchange margin (0.125%)		₹ 0.0325
		₹ 26.0719

Hence, loss to the importer

= SGD 25,00,000 (₹26.0719 – ₹25.9806)= ₹2,28,250

4. (i) Calculation of expected spot rate for September, 2009:

$ for £	*Probability*	*Expected $/£*
(1)	*(2)*	*(1) × (2) = (3)*
1.60	0.15	0.24
1.70	0.20	0.34
1.80	0.25	0.45
1.90	0.20	0.38

2.00	0.20 1.00	0.40 EV = 1.81

Therefore, the expected spot value of $ for £ for September, 2009 would be $ 1.81.

(ii) If the six-month forward rate is $ 1.80, the expected profits of the firm can be maximised by retaining its pounds receivable.

5. The only thing lefts Rohit and Bros to cover the risk in the money market. The following steps are required to be taken:

(i) Borrow pound sterling for 3- months. The borrowing has to be such that at the end of three months, the amount becomes £ 500,000. Say, the amount borrowed is £ x. Therefore

$$x\left[1+0.05\times\frac{3}{12}\right]=500{,}000 \text{ or } x = £493{,}827$$

(ii) Convert the borrowed sum into rupees at the spot rate. This gives: £493,827 × ₹ 56 = ₹ 27,654,312

(iii) The sum thus obtained is placed in the money market at 12 per cent to obtain at the end of 3- months:

$$S = ₹\ 27{,}654{,}312 \times \left[1+0.12\times\frac{3}{12}\right] = ₹\ 28{,}483{,}941$$

(iv) The sum of £500,000 received from the client at the end of 3- months is used to refund the loan taken earlier.

From the calculations. It is clear that the money market operation has resulted into a net gain of ₹ 483,941 (₹ 28,483,941 – ₹ 500,000 × 56).

If pound sterling has depreciated in the meantime. The gain would be even bigger.

6.

End of Year	₹	₹/*USD*
1	$₹46.00 \times \frac{(1+0.08)}{(1+0.04)}$	47.77
2	$₹47.77 \times \frac{(1+0.08)}{(1+0.04)}$	49.61
3	$₹49.61 \times \frac{(1+0.08)}{(1+0.04)}$	51.52

4	₹51.52 x $\frac{(1+0.08)}{(1+0.04)}$	53.50

7. As per interest rate parity

$$S_1 = S_0\left[\frac{1+\text{in A}}{1+\text{in B}}\right]$$

$$S_1 = £0.7570\left[\frac{1+(0.075)\times 3/12}{1+(0.035)\times 3/12}\right]$$

$$= £0.7570\left[\frac{1.01875}{1.00875}\right]$$

= £0.7570 × 1.0099 = £0.7645

= UK £0.7645 / US$

8. The company can hedge position by selling future contracts as it will receive amount from outside.

Number of Contracts = $\frac{\$4,00,000}{\$1,000}$ = 400 contracts

Gain by trading in futures = (₹ 45 – ₹ 44.50) 4,00,000= ₹ 2,00,000

Net Inflow after after 3 months = ₹ 44.50 x ₹ 4,00,000+ 2,00,000 = ₹ 1,80,00,000

Effective Price realization = $\frac{₹1,80,00,000}{\$4,00,000}$ = ₹ 45 Per US$

9. **(a)** Forward contract: Dollar needed in 180 days = £3,00,000 x $ 1.96 = $5,88,000/-

(b) Money market hedge: Borrow $, convert to £, invest £, repay $ loan in 180 days

Amount in £ to be invested = 3,00,000/1.045 = £ 2,87,081

Amount of $ needed to convert into £ = 2,87,081 x 2 = $ 5,74,162

Interest and principal on $ loan after 180 days = $5,74,162 x 1.055 = $ 6,05,741

(c) **Call option:**

Expected Spot rate in 180 days	*Prem. /unit*	*Exercise Option*	*Total price per unit*	*Total price for £3,00,000xi*	*Prob. Pi*	*pixi*
1.91	0.04	No	1.95	5,85,000	0.25	1,46,250

1.95	0.04	No	1.99	5,97,000	0.60	3,58,200
2.05	0.04	Yes	2.01*	6,03,000	0.15	90,450
						5,94,900
Add: Interest on Premium @ 5.5% (12,000 x 5.5%)						660
						5,95,560

* ($1.97 + $0.04)

(d) No hedge option:

Expected Future spot rate	*Dollar needed Xi*	*Prob. Pi*	*Pi xi*
1.91	5,73,000	0.25	1,43,250
1.95	5,85,000	0.60	3,51,000
2.05	6,15,000	0.15	92,250
			5,86,500

The probability distribution of outcomes for no hedge strategy appears to be most preferable because least number of $ are needed under this option to arrange £3,00,000.

10. In the given case, the exchange rates are indirect. These can be converted into direct rates as follows:

Spot rate

GBP = $\frac{1}{\text{USD1.5617}}$ to $\frac{1}{\text{USD1.5673}}$

USD = GBP 0.64033 - GBP 0.63804

6 months' forward rate

GBP = $\frac{1}{\text{USD1.5455}}$ to $\frac{1}{\text{USD1.5609}}$

USD = GBP 0.64704 - GBP 0.64066

Payoff in 3 alternatives

i. Forward Cover

Amount payable	USD 3,64,897
Forward rate	GBP 0.64704
Payable in GBP	GBP 2,36,103

ii. Money market Cover

Amount payable	USD 3,64,897
PV @ 4.5% for 6 months i.e. $\frac{1}{1.0225}$ = 0.9779951	USD 3,56,867
Spot rate purchase	GBP 0.64033
Borrow GBP 3,56,867 x 0.64033	GBP 2,28,512
Interest for 6 months @ 7 %	7,998
	-
Payable after 6 months	GBP 2,36,510

iii. Currency options

Amount payable	USD 3,64,897
Unit in Options contract	GBP 12,500
Value in USD at strike rate of 1.70 (GBP 12,500 x 1.70)	USD 21,250
Number of contracts USD 3,64,897/ USD 21,250	17.17
Exposure covered USD 21,250 x 17	USD 3,61,250
Exposure to be covered by Forward (USD 3,64,897 – USD 3,61,250)	USD 3,647
Options premium 17 x GBP 12,500 x 0.096	USD 20,400
Premium in GBP (USD 20,400 x 0.64033)	GBP 13,063
Total payment in currency option	
Payment under option (17 x 12,500)	GBP 2,12,500
Premium payable	GBP 13,063
Payment for forward cover (USD 3,647 x 0.64704)	GBP 2,360
	GBP 2,27,923

Thus total payment in:

(i)	Forward Cover	2,36,103 GBP
(ii)	Money Market	2,36,510 GBP
(iii)	Currency Option	2,27,923 GBP

The company should take currency option for hedging the risk.

Note: Even interest on Option Premium can also be considered in the above solution.

CHAPTER 10

INTERNATIONAL FINANCIAL MANAGEMENT

LEARNING OUTCOMES

After going through the chapter student shall be able to understand

- International Capital Budgeting
- International Sources of Finance
- International Working Capital Management
  - (a) Multinational Cash Management
  - (b) Multinational Receivable Management
  - (c) Multinational Inventory Management

1. INTERNATIONAL CAPITAL BUDGETING

1.1 Complexities Involved

Multinational Capital Budgeting has to take into consideration the different factors and variables which affect a foreign project and are complex in nature than domestic projects. The factors crucial in such a situation are:

(a) Cash flows from foreign projects have to be converted into the currency of the parent organization.

(b) Parent cash flows are quite different from project cash flows

(c) Profits remitted to the parent firm are subject to tax in the home country as well as the host country

(d) Effect of foreign exchange risk on the parent firm's cash flow

(e) Changes in rates of inflation causing a shift in the competitive environment and thereby affecting cash flows over a specific time period

(f) Restrictions imposed on cash flow distribution generated from foreign projects by the host country

(g) Initial investment in the host country to benefit from the release of blocked funds

(h) Political risk in the form of changed political events reduce the possibility of expected cash flows

(i) Concessions/benefits provided by the host country ensures the upsurge in the profitability position of the foreign project

(j) Estimation of the terminal value in multinational capital budgeting is difficult since the buyers in the parent company have divergent views on acquisition of the project.

1.2 Problems Affecting Foreign Investment Analysis

The various types of problems faced in International Capital Budgeting analysis are as follows:

(1) Multinational companies investing elsewhere are subjected to foreign exchange risk in the sense that currency appreciates/ depreciates over a span of time. To include foreign exchange risk in the cash flow estimates of any project, it is necessary to forecast the inflation rate in the host country during the lifetime of the project. Adjustments for inflation are made in the cash flows depicted in local currency. The cash flows are converted in parent country's currency at the spot exchange rate multiplied by the expected depreciation rate obtained from purchasing power parity.

(2) Due to restrictions imposed on transfer of profits, depreciation charges and technical differences exist between project cash flows and cash flows obtained by the parent organization. Such restriction can be diluted by the application of techniques viz internal transfer prices, overhead payments. Adjustment for blocked funds depends on its opportunity cost, a vital issue in capital budgeting process.

(3) In multinational capital budgeting, after tax cash flows need to be considered for project evaluation. The presence of two tax regimes along with other factors such as remittances to the parent firm in the form of royalties, dividends, management fees etc, tax provisions with held in the host country, presence of tax treaties, tax discrimination pursued by the host country between transfer of realized profits vis-à-vis local re-investment of such profits cause serious impediments to multinational capital budgeting process. MNCs are in a position to reduce overall tax burden through the system of transfer pricing.

For computation of actual after tax cash flows accruing to the parent firm, higher of home/ host

country tax rate is used. If the project becomes feasible then it is acceptable under a more favourable tax regime. If not feasible, then, other tax saving aspects need to be incorporated in order to find out whether the project crosses the hurdle rate.

1.3 Project vis-a-vis Parent Cash Flows

There exists a big difference between the project and parent cash flows due to tax rules, exchange controls. Management and royalty payments are returns to the parent firm. The basis on which a project shall be evaluated depend on one's own cash flows, cash flows accruing to the parent firm or both.

Evaluation of a project on the basis of own cash flows entails that the project should compete favourably with domestic firms and earn a return higher than the local competitors. If not, the shareholders and management of the parent company shall invest in the equity/government bonds of domestic firms. A comparison cannot be made since foreign projects replace imports and are not competitors with existing local firms. Project evaluation based on local cash flows avoid currency conversion and eliminates problems associated with fluctuating exchange rate changes.

For evaluation of foreign project from the parent firm's angle, both operating and financial cash flows actually remitted to it form the yardstick for the firm's performance and the basis for distribution of dividends to the shareholders and repayment of debt/interest to lenders. An investment has to be evaluated on basis of net after tax operating cash flows generated by the project. As both types of cash flows (operating and financial) are clubbed together, it is essential to see that financial cash flows are not mixed up with operating cash flows.

1.4 Discount Rate and Adjusting Cash Flows

An important aspect in multinational capital budgeting is to adjust cash flows or the discount rate for the additional risk arising from foreign location of the project. Earlier MNCs adjusted the discount rate upwards for riskier projects as they considered uncertainties in political environment and foreign exchange fluctuations. The MNCs considered adjusting the discount rate to be popular as the rate of return of a project should be in conformity with the degree of risk. It is not proper to combine all risks into a single discount rate. Political risk/uncertainties attached to a project relate to possible adverse effects which might occur in future but cannot be foreseen at present. So adjusting discount rates for political risk penalises early cash flows more than distant cash flows. Also adjusting discount rate to offset exchange risk only when adverse exchange rate movements are expected is not proper since a MNC can gain from favourable currency movements during the life of the project on many occasions. Instead of adjusting discount rate while considering risk it is worthwhile to adjust cash flows. The annual cash flows are discounted at a rate applicable to the project either at that of the host country or parent country. Probability with certainty equivalent method along with decision tree analysis are used for economic and financial forecasting. Cash flows generated by the project and remitted to the parent during each period are adjusted for political risk, exchange rate and other uncertainties by converting them into certainty equivalents.

1.5 Adjusted Present Value (APV)

APV is used in evaluating foreign projects. The APV model is a value additive approach to capital budgeting process i.e. each cash flow is considered individually and discounted at a rate consistent with risk involved in the cash flow.

Different components of the project's cash flow have to be discounted separately.

The APV method uses different discount rates for different segments of the total cash flows depending on the degree of certainty attached with each cash flow. The financial analyst tests the basic viability of the foreign project before accounting for all complexities. If the project is feasible no further evaluation based on accounting for other cash flows is done. If not feasible, an additional evaluation is done taking into consideration the other complexities.

The APV model is represented as follows.

$$-I_0 + \sum_{t=1}^{n} \frac{X_t}{(1+k^*)^t} + \sum_{t=1}^{n} \frac{T_t}{(1+i_d)^t} + \sum_{t=1}^{n} \frac{S_t}{(1+i_d)^t}$$

Where I_0 →Present Value of Investment Outlay

$\frac{X_t}{(1+k^*)^t}$ →Present Value of Operating Cash Flow

$\frac{T_t}{(1+i_d)^t}$ →Present Value of Interest Tax Shields

$\frac{S_t}{(1+i_d)^t}$ →Present Value of Interest Subsidies

T_t →Tax Saving in year t due to financial mix adopted

S_t →Before tax value of interests subsidies (on home currency) in year t due to project specific financing

i_d →Before tax cost of dollar dept (home currency)

The initial investment will be net of any 'Blocked Funds' that can be made use of by the parent company for investment in the project. 'Blocked Funds' are balances held in foreign countries that cannot be remitted to the parent due to Exchange Control regulations. These are 'direct blocked funds'. Apart from this, it is quite possible that significant costs in the form of local taxes or withholding taxes arise at the time of remittance of the funds to the parent country. Such 'blocked funds' are indirect. If a parent company can release such 'Blocked Funds' in one country for the investment in a overseas project, then such amounts will go to reduce the 'Cost of Investment Outlay'.

The last two terms are discounted at the before tax cost of debt to reflect the relative cash flows due to tax and interest savings.

1.6 Scenarios

Following three illustrations are based on three different scenarios:

1.6.1 A foreign company is investing in India

Illustration 1

Perfect Inc., a U.S. based Pharmaceutical Company has received an offer from Aidscure Ltd., a company engaged in manufacturing of drugs to cure Dengue, to set up a manufacturing unit in Baddi (H.P.), India in a joint venture.

As per the Joint Venture agreement, Perfect Inc. will receive 55% share of revenues plus a royalty @ US $0.01 per bottle. The initial investment will be ₹200 crores for machinery and factory. The scrap value of machinery and factory is estimated at the end of five (5) year to be ₹5 crores. The machinery is depreciable @ 20% on the value net of salvage value using Straight Line Method. An initial working capital to the tune of ₹50 crores shall be required and thereafter ₹5 crores each year.

As per GOI directions, it is estimated that the price per bottle will be ₹7.50 and production will be 24 crores bottles per year. The price in addition to inflation of respective years shall be increased by ₹1 each year. The production cost shall be 40% of the revenues.

The applicable tax rate in India is 30% and 35% in US and there is Double Taxation Avoidance Agreement between India and US. According to the agreement tax credit shall be given in US for the tax paid in India. In both the countries, taxes shall be paid in the following year in which profit have arisen.

The Spot rate of $ is ₹57. The inflation in India is 6% (expected to decrease by 0.50% every year) and 5% in US.

As per the policy of GOI, only 50% of the share can be remitted in the year in which they are earned and remaining in the following year.

Though WACC of Perfect Inc. is 13% but due to risky nature of the project it expects a return of 15%.

Determine whether Perfect Inc. should invest in the project or not (from subsidiary point of view).

Solution

Working Notes:

1. Estimated Exchange Rates (Using PPP Theory)

Year	0	1	2	3	4	5	6
Exchange rate *	57	57.54	57.82	57.82	57.54	56.99	56.18

2. Share in sales

Year	1	2	3	4	5
Annual Units in crores	24	24	24	24	24
Price per bottle (₹)	7.50	8.50	9.50	10.50	11.50
Price fluctuating Inflation Rate	6.00%	5.50%	5.00%	4.50%	4.00%
Inflated Price (₹)	7.95	8.97	9.98	10.97	11.96
Inflated Sales Revenue (₹ Crore)	190.80	215.28	239.52	263.28	287.04
Sales share @55%	104.94	118.40	131.74	144.80	157.87

3. Royalty Payment

Year	1	2	3	4	5
Annual Units in crores	24	24	24	24	24
Royalty in $	0.01	0.01	0.01	0.01	0.01
Total Royalty ($ Crore)	0.24	0.24	0.24	0.24	0.24
Exchange Rate	57.54	57.82	57.82	57.54	56.99
Total Royalty (₹ Crore)	13.81	13.88	13.88	13.81	13.68

4. Tax Liability

(₹ Crore)

Year	1	2	3	4	5
Sales Share	104.94	118.40	131.74	144.80	157.87
Total Royalty	13.81	13.88	13.88	13.81	13.68
Total Income	118.75	132.28	145.61	158.61	171.55
Less: Expenses					
Production Cost (Sales share x 40%)	41.98	47.36	52.69	57.92	63.15
Depreciation (195 x 20%)	39.00	39.00	39.00	39.00	39.00
PBT	37.77	45.92	53.92	61.69	69.40
Tax on Profit @30%	11.33	13.78	16.18	18.51	20.82
Net Profit	26.44	32.14	37.74	43.18	48.58

5. Free Cash Flow

(₹ Crore)

Year	0	1	2	3	4	5	6
Sales Share	0.00	104.94	118.40	131.74	144.80	157.87	0.00

Total Royalty	0.00	13.81	13.88	13.88	13.81	13.68	0.00
Production Cost	0.00	-41.98	-47.36	-52.69	-57.92	-63.15	0.00
Initial Outlay	-200.00	0.00	0.00	0.00	0.00	0.00	0.00
Working Capital	-50.00	-5.00	-5.00	-5.00	-5.00	70.00	0.00
Scrap Value	0.00	0.00	0.00	0.00	0.00	5.00	0.00
Tax on Profit	0.00	0.00	-11.33	-13.78	-16.18	-18.51	-20.82
Free Cash Flow	**-250.00**	**71.77**	**68.59**	**74.15**	**79.51**	**164.89**	**-20.82**

6. Remittance of Cash Flows

(₹ Crore)

Year	0	1	2	3	4	5	6
Free Cash Flow	-250.00	71.77	68.59	74.15	79.51	164.89	-20.82
50% of Current Year Cash Flow	0.00	35.89	34.29	37.07	39.76	82.45	0.00
Previous year remaining cash flow	0.00	0.00	35.88	34.30	37.08	39.75	82.44
Total Remittance	**-250.00**	**35.88**	**70.17**	**71.37**	**76.84**	**122.20**	**61.62**

NPV of Project under Appraisal

Year	0	1	2	3	4	5	6
Total Remittance (₹ Crore)	-250.00	35.88	70.17	71.37	76.84	122.20	61.62
Exchange Rate	57.00	57.54	57.82	57.82	57.54	56.99	56.18
Remittance ($ mn)	-43.86	6.24	12.14	12.34	13.35	21.44	10.97
US Tax @35% ($ mn)	0.00	0.00	2.18	4.25	4.32	4.67	7.50
Indian Tax ($ mn)	0.00	0.00	1.96	2.38	2.82	3.25	3.71
Net Tax ($ mn)	0.00	0.00	0.22	1.87	1.51	1.42	3.79
Net Cash Flow ($ mn)	-43.86	6.24	11.92	10.47	11.84	20.02	7.18
PVF @ 15%	1.000	0.870	0.756	0.658	0.572	0.497	0.432
Present Value ($ mn)	-43.86	5.43	9.01	6.89	6.77	9.95	3.10
Net Present Value ($ mn)							= -2.71

Decision: Since NPV of the project is negative, Perfect inc. should not invest in the project.

* Estimated exchange rates have been calculated by using the following formula:

Expected spot rate = Current Spot Rate x expected difference in inflation rates

$$E(S_1) = S_0 \times \frac{(1 + I_d)}{(1 + 1_f)}$$

Where

$E(S_1)$ is the expected Spot rate in time period 1

S_0 is the current spot rate (Direct Quote)

I_d is the inflation in the domestic country (home country)

I_f is the inflation in the foreign country

1.6.2 An Indian Company is investing in foreign country by raising fund in the same country

Illustration 2

Its Entertainment Ltd., an Indian Amusement Company is happy with the success of its Water Park in India. The company wants to repeat its success in Nepal also where it is planning to establish a Grand Water Park with world class amenities. The company is also encouraged by a marketing research report on which it has just spent ₹ 20,00,000 lacs.

The estimated cost of construction would be Nepali Rupee (NPR) 450 crores and it would be completed in one years time. Half of the construction cost will be paid in the beginning and rest at the end of year. In addition, working capital requirement would be NPR 65 crores from the year end one. The after tax realizable value of fixed assets after four years of operation is expected to be NPR 250 crores. Under the Foreign Capital Encouragement Policy of Nepal, company is allowed to claim 20% depreciation allowance per year on reducing balance basis subject to maximum capital limit of NPR 200 crore. The company can raise loan for theme park in Nepal @ 9%.

The water park will have a maximum capacity of 20,000 visitors per day. On an average, it is expected to achieve 70% capacity for first operational four years. The entry ticket is expected to be NPR 220 per person. In addition to entry tickets revenue, the company could earn revenue from sale of food and beverages and fancy gift items. The average sales expected to be NPR 150 per visitor for food and beverages and NPR 50 per visitor for fancy gift items. The sales margin on food and beverages and fancy gift items is 20% and 50% respectively. The park would open for 360 days a year.

The annual staffing cost would be NPR 65 crores per annum. The annual insurance cost would be NPR 5 crores. The other running and maintenance costs are expected to be NPR 25 crores in the first year of operation which is expected to increase NPR 4 crores every year. The company would apportion existing overheads to the tune of NPR 5 crores to the park.

All costs and receipts (excluding construction costs, assets realizable value and other running and maintenance costs) mentioned above are at current prices (i.e. 0 point of time) which are expected

to increase by 5% per year.

The current spot rate is NPR 1.60 per ₹. The tax rate in India is 30% and in Nepal it is 20%.

The current WACC of the company is 12%. The average market return is 11% and interest rate on treasury bond is 8%. The company's current equity beta is 0.45. The company's funding ratio for the Water Park would be 55% equity and 45% debt.

Being a tourist Place, the amusement industry in Nepal is competitive and very different from its Indian counterpart. The company has gathered the relevant information about its nearest competitor in Nepal. The competitor's market value of the equity is NPR 1850 crores and the debt is NPR 510 crores and the equity beta is 1.35.

State whether Its Entertainment Ltd. should undertake Water Park project in Nepal or not.

Solution

Working Notes:

1. Calculation of Cost of Funds/ Discount Rate

Competing Company's Information	
Equity Market Value	1850.00
Debt Market Value	510.00
Equity Beta	1.35

Assuming debt to be risk free i.e. beta is zero, the beta of competitor is un-geared as follows:

$$\text{Asset Beta} = \text{Equity Beta} \times \frac{E}{E + D(1-t)} = 1.35 \times \frac{1850}{1850 + 510(1-0.20)} = 1.106$$

Equity beta for Its Entertainment Ltd. in Nepal

Assets beta in Nepal	1.106
Ratio of funding in Nepal	
Equity	55.00%
Debt	45.00%

1. $1.106 = \text{Equity Beta} \times \frac{55}{55 + 45(1-0.30)}$

Equity Beta = 1.74

Cost of Equity as per CAPM

Market Return 11.00%

Risk free return 8.00%

Cost of Equity = Risk free return + β (Market Return - Risk free return)

= 8.00% + 1.74(11.00% - 8.00%) = 13.22%

WACC = 13.22% x 0.55 + 9%(1- 0.20) x 0.45 = 10.51%

2. Present Value Factors at the discount rate of 10.51%

Year	0	1	2	3	4	5
PVAF	1.000	0.905	0.819	0.741	0.670	0.607

3. Calculation of Capital Allowances

Year	1	2	3	4
Opening Balance (NPR Crore)	200.00	160.00	128.00	102.40
Less: Depreciation (NPR Crore)	40.00	32.00	25.60	20.48
Closing Balance (NPR Crore)	160.00	128.00	102.40	81.92

Calculation of Present of Free Cash Flow

Year	0	1	2	3	4	5
Expected Annual visitors			5040000	5040000	5040000	5040000
Entry ticket price per visitor (NPR)			242.55	254.68	267.41	280.78
Profit from sale of Food and Beverages per visitor (NPR)			33.08	34.73	36.47	38.29
Profit from sale of Fancy Gift Items per visitor (NPR)			27.56	28.94	30.39	31.91
Revenue per visitor (NPR)			303.19	318.35	334.27	350.98
Total Revenue (NPR crores)			152.81	160.45	168.47	176.89
Less:						
Annual Staffing Cost (NPR crores)			71.66	75.25	79.01	82.96
Annual Insurance Costs (NPR crores)			5.51	5.79	6.08	6.38

Other running and maintenance costs (NPR crores)			25.00	29.00	33.00	37.00
Depreciation Allowances (NPR crores)			40.00	32.00	25.60	20.48
Total Expenses (NPR crores)			142.17	142.04	143.69	146.82
PBT (NPR crores)			10.64	18.41	24.78	30.07
Tax on Profit (NPR crores)			2.13	3.68	4.96	6.01
Net Profit (NPR crores)			8.51	14.73	19.82	24.06
Add: Depreciation Allowances (NPR crores)			40	32	25.6	20.48
Park Construction Cost (NPR crores)	-225	-225				
After tax assets realisation value (NPR crores)						250
Working capital (NPR crores)		-65.00	-3.25	-3.41	-3.58	75.25
Net cash Flow (NPR crores)	-225.00	-290.00	45.26	43.32	41.84	369.79
PVF at discount rate	1.00	0.905	0.819	0.741	0.670	0.607
Present Values (NPR crores)	-225.00	-262.45	37.07	32.10	28.03	224.46

Net Present Value (NPR crores) -165.79

1.6.3 An Indian Company is investing in foreign country by raising fund in different country through the mode of Global Depository Receipts (GDRs)

Illustration 3

Opus Technologies Ltd., an Indian IT company is planning to make an investment through a wholly owned subsidiary in a software project in China with a shelf life of two years. The inflation in China is estimated as 8 percent. Operating cash flows are received at the year end.

For the project an initial investment of Chinese Yuan (CN¥) 30,00,000 will be in land. The land will be sold after the completion of project at estimated value of CN¥ 35,00,000. The project also requires an office complex at cost of CN¥ 15,00,000 payable at the beginning of project. The

complex will be depreciated on straight-line basis over two years to a zero salvage value. This complex is expected to fetch CN¥ 5,00,000 at the end of project.

The company is planning to raise the required funds through GDR issue in Mauritius. Each GDR will have 5 common equity shares of the company as underlying security which are currently trading at ₹ 200 per share (Face Value = ₹10) in the domestic market. The company has currently paid the dividend of 25% which is expected to grow at 10% p.a. The total issue cost is estimated to be 1 percent of issue size.

The annual sales is expected to be 10,000 units at the rate of CN¥ 500 per unit. The price of unit is expected to rise at the rate of inflation. Variable operating costs are 40 percent of sales. Fixed operating costs will be CN¥ 22,00,000 per year and expected to rise at the rate of inflation.

The tax rate applicable in China for income and capital gain is 25 percent and as per GOI Policy no further tax shall be payable in India. The current spot rate of CN¥ 1 is ₹ 9.50. The nominal interest rate in India and China is 12% and 10% respectively and the international parity conditions hold

You are required to

(a) Identify expected future cash flows in China and determine NPV of the project in CN¥.

(b) Determine whether Opus Technologies should go for the project or not assuming that there neither there is restriction on the transfer of funds from China to India nor any charges/taxes payable on the transfer of funds.

Solution

Working Notes:

1. Calculation of Cost of Capital (GDR)

Current Dividend (D_0)	2.50
Expected Divedend (D_1)	2.75
Net Proceeds (Rs. 200 per share – 1%)	198.00
Growth Rate	10.00%

$$k_e = \frac{2.75}{198} + 0.10 = 0.1139 \text{ i.e. } 11.39\%$$

2. Calculation of Expected Exchange Rate as per Interest Rate Parity

YEAR	EXPECTED RATE
1	$= 9.50 \times \frac{(1+0.12)}{(1+0.10)} = 9.67$

2	$= 9.50 \times \frac{(1+0.12)^2}{(1+0.10)^2} = 9.85$

3. Realization on the disposal of Land net of Tax

	CN¥
Sale value at the end of project	3500000.00
Cost of Land	3000000.00
Capital Gain	500000.00
Tax paid	125000.00
Amount realized net of tax	3375000.00

4. Realization on the disposal of Office Complex

	(CN¥)
Sale value at the end of project	500000.00
WDV	0.00
Capital Gain	500000.00
Tax paid	125000.00
Amount realized net of tax (A)	375000.00

5. Computation of Annual Cash Inflows

Year	**1**	**2**
Annual Units	10000	10000
Price per bottle (CN¥)	540.00	583.20
Annual Revenue (CN¥)	5400000.00	5832000.00
Less: Expenses		
Variable operating cost (CN¥)	2160000.00	2332800.00
Depreciation (CN¥)	750000.00	750000.00
Fixed Cost per annum (CN¥)	2376000.00	2566080.00
PBT (CN¥)	114000.00	183120.00
Tax on Profit (CN¥)	28500.00	45780.00
Net Profit (CN¥)	85500.00	137340.00
Add: Depreciation (CN¥)	750000.00	750000.00
Cash Flow	835500.00	887340.00

(a) Computation of NPV of the project in CN¥

(CN¥)

Year	0	1	2
Initial Investment	-4500000.00		
Annual Cash Inflows		835500.00	887340.00
Realization on the disposal of Land net of Tax			3375000.00
Realization on the disposal of Office Complex			375000.00
Total	-4500000.00	835500.00	4637340.00
PVF @11.39%	1.000	0.898	0.806
PV of Cash Flows	-4500000.00	750279.00	3737696.00
NPV			-12,025

(b) Evaluation of Project from Opus Point of View

(i) Assuming that inflow funds are transferred in the year in which same are generated i.e. first year and second year.

Year	0	1	2
Cash Flows (CN¥)	-4500000.00	835500.00	4637340.00
Exchange Rate (₹/ CN¥)	9.50	9.67	9.85
Cash Flows (₹)	-42750000.00	8079285.00	45677799.00
PVF @ 12%	1.00	0.893	0.797
	-42750000.00	7214802.00	36405206.00
NPV			870008.00

(ii) Assuming that inflow funds are transferred at the end of the project i.e. second year.

Year	0	2
Cash Flows (CN¥)	-4500000.00	5472840.00
Exchange Rate (₹./ CN¥)	9.50	9.85
Cash Flows (₹)	-42750000.00	53907474.00
PVF	1.00	0.797
	-42750000.00	42964257.00
NPV		214257.00

Though in terms of CN¥ the NPV of the project is negative but in Rs. it has positive NPV due to weakening of Rs. in comparison of CN¥. Thus, Opus can accept the project.

2. INTERNATIONAL SOURCES OF FINANCE

Indian companies have been able to tap global markets to raise foreign currency funds by issuing various types of financial instruments which are discussed as follows:

2.1 Foreign Currency Convertible Bonds (FCCBs)

A type of convertible bond issued in a currency different than the issuer's domestic currency. In other words, the money being raised by the issuing company is in the form of a foreign currency. A convertible bond is a mix between a debt and equity instrument. It acts like a bond by making regular coupon and principal payments, but these bonds also give the bondholder the option to convert the bond into stock.

These types of bonds are attractive to both investors and issuers. The investors receive the safety of guaranteed payments on the bond and are also able to take advantage of any large price appreciation in the company's stock. (Bondholders take advantage of this appreciation by means of warrants attached to the bonds, which are activated when the price of the stock reaches a certain point.) Due to the equity side of the bond, which adds value, the coupon payments on the bond are lower for the company, thereby reducing its debt-financing costs.

Advantages of FCCBs

(i) The convertible bond gives the investor the flexibility to convert the bond into equity at a price or redeem the bond at the end of a specified period, normally three years if the price of the share has not met his expectations.

(ii) Companies prefer bonds as it leads to delayed dilution of equity and allows company to avoid any current dilution in earnings per share that a further issuance of equity would cause.

(iii) FCCBs are easily marketable as investors enjoys option of conversion into equity if resulting to capital appreciation. Further investor is assured of a minimum fixed interest earnings.

Disadvantages of FCCBs

(i) Exchange risk is more in FCCBs as interest on bonds would be payable in foreign currency. Thus companies with low debt equity ratios, large forex earnings potential only opt for FCCBs.

(ii) FCCBs mean creation of more debt and a forex outgo in terms of interest which is in foreign exchange.

(iii) In the case of convertible bonds, the interest rate is low, say around 3–4% but there is

exchange risk on the interest payment as well as re-payment if the bonds are not converted into equity shares. The only major advantage would be that where the company has a high rate of growth in earnings and the conversion takes place subsequently, the price at which shares can be issued can be higher than the current market price.

2.2 American Depository Receipts (ADRs)

Depository receipts issued by a company in the United States of America (USA) is known as American Depository Receipts (ADRs). Such receipts must be issued in accordance with the provisions stipulated by the Securities and Exchange Commission of USA (SEC) which are very stringent.

An ADR is generally created by the deposit of the securities of a non-United States company with a custodian bank in the country of incorporation of the issuing company. The custodian bank informs the depository in the United States that the ADRs can be issued. ADRs are United States dollar denominated and are traded in the same way as are the securities of United States companies. The ADR holder is entitled to the same rights and advantages as owners of the underlying securities in the home country. Several variations on ADRs have developed over time to meet more specialized demands in different markets. One such variation is the GDR which are identical in structure to an ADR, the only difference being that they can be traded in more than one currency and within as well as outside the United States.

2.3 Global Depository Receipts (GDRs)

A depository receipt is basically a negotiable certificate, denominated in a currency not native to the issuer, that represents the company's publicly - traded local currency equity shares. Most GDRs are denominated in USD, while a few are denominated in Euro and Pound Sterling. The Depository Receipts issued in the US are called American Depository Receipts (ADRs), which anyway are denominated in USD and outside of USA, these are called GDRs. In theory, though a depository receipt can also represent a debt instrument, in practice it rarely does. DRs (depository receipts) are created when the local currency shares of an Indian company are delivered to the depository's local custodian bank, against which the Depository bank (such as the Bank of New York) issues depository receipts in US dollar. These depository receipts may trade freely in the overseas markets like any other dollar-denominated security, either on a foreign stock exchange, or in the over-the-counter market, or among a restricted group such as Qualified Institutional Buyers (QIBs). Indian issues have taken the form of GDRs to reflect the fact that they are marketed globally, rather than in a specific country or market.

Through the issue of depository receipts, companies in India have been able to tap global equity market to raise foreign currency funds by way of equity. Quite apart from the specific needs that Indian companies may have for equity capital in preference to debt and the perceived advantages of raising equity over debt in general (no repayment of "principal" and generally lower servicing costs, etc.) the fact of the matter is quite simple, that no other form of term foreign exchange funding has been available. In addition, it has been perceived that a GDR issue has been able to fetch higher prices from international investors (even when Indian issues were being sold at a

discount to the prevailing domestic share prices) than those that a domestic public issue would have been able to extract from Indian investors.

- **Impact of GDRs on Indian Capital Market**

  Since the inception of GDRs a remarkable change in Indian capital market has been observed as follows:

  (i) Indian stock market to some extent is shifting from Bombay to Luxemburg.

  (ii) There is arbitrage possibility in GDR issues.

  (iii) Indian stock market is no longer independent from the rest of the world. This puts additional strain on the investors as they now need to keep updated with world wide economic events.

  (iv) Indian retail investors are completely sidelined. GDRs/Foreign Institutional Investors' placements + free pricing implies that retail investors can no longer expect to make easy money on heavily discounted rights/public issues.

  As a result of introduction of GDRs a considerable foreign investment has flown into India.

- **Markets of GDRs**

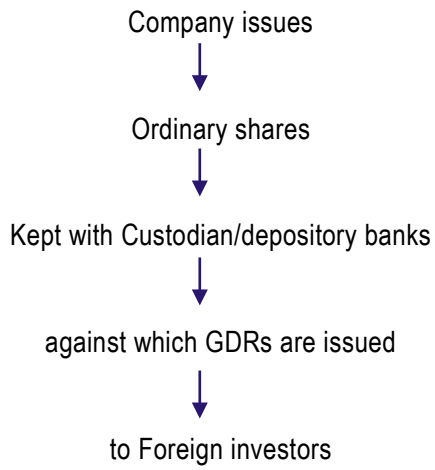
  (i) GDR's are sold primarily to institutional investors.

  (ii) Demand is likely to be dominated by emerging market funds.

  (iii) Switching by foreign institutional investors from ordinary shares into GDRs is likely.

  (iv) Major demand is also in UK, USA (Qualified Institutional Buyers), South East Asia (Hong kong, Singapore), and to some extent continental Europe (principally France and Switzerland).

- **Mechanism of GDR:** The mechanics of a GDR issue may be described with the help of following diagram.



Characteristics

(i) Holders of GDRs participate in the economic benefits of being ordinary shareholders, though they do not have voting rights.

(ii) GDRs are settled through CEDEL & Euro-clear international book entry systems.

(iii) GDRs are listed on the Luxemburg stock exchange.

(iv) Trading takes place between professional market makers on an OTC (over the counter) basis.

(v) The instruments are freely traded.

(vi) They are marketed globally without being confined to borders of any market or country as it can be traded in more than one currency.

(vii) Investors earn fixed income by way of dividends which are paid in issuer currency converted into dollars by depository and paid to investors and hence exchange risk is with investor.

(viii) As far as the case of liquidation of GDRs is concerned, an investor may get the GDR cancelled any time after a cooling off period of 45 days. A non-resident holder of GDRs may ask the overseas bank (depository) to redeem (cancel) the GDRs In that case overseas depository bank shall request the domestic custodians bank to cancel the GDR and to get the corresponding underlying shares released in favour of non-resident investor. The price of the ordinary shares of the issuing company prevailing in the Bombay Stock Exchange or the National Stock Exchange on the date of advice of redemption shall be taken as the cost of acquisition of the underlying ordinary share.

Illustration 4

X Ltd. is interested in expanding its operation and planning to install manufacturing plant at US. For the proposed project it requires a fund of $ 10 million (net of issue expenses/ floatation cost). The estimated floatation cost is 2%. To finance this project it proposes to issue GDRs.

You as financial consultant is required to compute the number of GDRs to be issued and cost of the GD R with the help of following additional information.

1. Expected market price of share at the time of issue of GDR is ₹ 250 (Face Value ₹ 100)

2 Shares shall underly each GDR and shall be priced at 10% discount to market price.

3 Expected exchange rate ₹ 60/$.

4 Dividend expected to be paid is 20% with growth rate 12%.

Solution

Net Issue Size = $10 million

$$\text{Gross Issue} = \frac{\$10\,\text{million}}{0.98} = \$\ 10.204\ \text{million}$$

Issue Price per GDR in ₹ (200 x 2 x 90%)	₹ 450
Issue Price per GDR in $ (₹ 450/ ₹ 60)	$ 7.50
Dividend Per GDR (D_1) (₹ 20 x 2)	₹ 40
Net Proceeds Per GDR (₹ 450 x 0.98)	₹ 441.00

(a) Number of GDR to be issued

$$\frac{\$10.204 \text{ million}}{\$7.50} = 1.3605 \text{ million}$$

(b) Cost of GDR to Odessa Ltd.

$$k_e = \frac{60.00}{441.00} + 0.12 = 21.07\%$$

2.4 Euro-Convertible Bonds (ECBs)

A convertible bond is a debt instrument which gives the holders of the bond an option to convert the bond into a predetermined number of equity shares of the company. Usually, the price of the equity shares at the time of conversion will have a premium element. The bonds carry a fixed rate of interest. If the issuer company desires, the issue of such bonds may carry two options viz.

(i) Call Options: (Issuer's option) - where the terms of issue of the bonds contain a provision for call option, the issuer company has the option of calling (buying) the bonds for redemption before the date of maturity of the bonds. Where the issuer's share price has appreciated substantially, i.e. far in excess of the redemption value of the bonds, the issuer company can exercise the option. This call option forces the investors to convert the bonds into equity. Usually, such a case arises when the share prices reach a stage near 130% to 150% of the conversion price.

(ii) Put options - A provision of put option gives the holder of the bonds a right to put (sell)his bonds back to the issuer company at a pre-determined price and date. In case of Euro-convertible bonds, the payment of interest on and the redemption of the bonds will be made by the issuer company in US dollars.

2.5 Other Sources

- ***Euro Bonds:*** Plain Euro-bonds are nothing but debt instruments. These are not very attractive for an investor who desires to have valuable additions to his investments.
- ***Euro-Convertible Zero Bonds:*** These bonds are structured as a convertible bond. No interest is payable on the bonds. But conversion of bonds takes place on maturity at a pre-determined price. Usually there is a 5 years maturity period and they are treated as a deferred equity issue.

- ***Euro-bonds with Equity Warrants*:** These bonds carry a coupon rate determined by the market rates. The warrants are detachable. Pure bonds are traded at a discount. Fixed income funds' managements may like to invest for the purposes of regular income.
- ***Syndicated bank loans:*** One of the earlier ways of raising funds in the form of large loans from banks with good credit rating, can be arranged in reasonably short time and with few formalities. The maturity of the loan can be for a duration of 5 to 10 years. The interest rate is generally set with reference to an index, say, LIBOR plus a spread which depends upon the credit rating of the borrower. Some covenants are laid down by the lending institution like maintenance of key financial ratios.
- ***Euro-bonds*:** These are basically debt instruments denominated in a currency issued outside the country of that currency for examples Yen bond floated in France. Primary attraction of these bonds is the refuge from tax and regulations and provide scope for arbitraging yields. These are usually bearer bonds and can take the form of

  (i) Traditional fixed rate bonds.

  (ii) Floating rate Notes.(FRNs)

  (iii) Convertible Bonds.
- ***Foreign Bonds*:** Foreign bonds are denominated in a currency which is foreign to the borrower and sold at the country of that currency. Such bonds are always subject to the restrictions and are placed by that country on the foreigners funds.
- ***Euro Commercial Papers*:** These are short term money market securities usually issued at a discount, for maturities less than one year.
- ***Credit Instruments:*** The foregoing discussion relating to foreign exchange risk management and international capital market shows that foreign exchange operations of banks consist primarily of purchase and sale of credit instruments. There are many types of credit instruments used in effecting foreign remittances. They differ in the speed, with which money can be received by the creditor at the other end after it has been paid in by the debtor at his end. The price or the rate of each instrument, therefore, varies with extent of the loss of interest and risk of loss involved. There are, therefore, different rates of exchange applicable to different types of credit instruments.

3. INTERNATIONAL WORKING CAPITAL MANAGEMENT

3.1 International Working Capital

The management of working capital in an international firm is much more complex as compared to a domestic one. The reasons for such complexity are:

(1) A multinational firm has a wider option for financing its current assets. A MNC has funds

flowing in from different parts of international financial markets. Therefore, it may choose to avail financing either locally or from global financial markets. Such an opportunity does not exist for pure domestic firms.

(2) Interest and tax rates vary from one country to the other. A Treasurer associated with a multinational firm has to consider the interest/ tax rate differentials while financing current assets. This is not the case for domestic firms.

(3) A multinational firm is confronted with foreign exchange risk due to the value of inflow/outflow of funds as well as the value of import/export are influenced by exchange rate variations. Restrictions imposed by the home or host country government towards movement of cash and inventory on account of political considerations affect the growth of MNCs. Domestic firm limit their operations within the country and do not face such problems.

(4) With limited knowledge of the politico-economic conditions prevailing in different host countries, a Manager of a multinational firm often finds it difficult to manage working capital of different units of the firm operating in these countries. The pace of development taking place in the communication system has to some extent eased this problem.

(5) In countries which operate on full capital convertibility, a MNC can move its funds from one location to another and thus mobilize and 'position' the funds in the most efficient way possible. Such freedom may not be available for MNCs operating in countries that have not subscribed to full capital convertibility (like India).

A study of International Working Capital Management requires knowledge of Multinational Cash Management, International Inventory Management and International Receivables Management.

3.2 Multinational Cash Management

MNCs are very much concerned with effective cash management. International money managers follow the traditional objectives of cash management viz.

(1) effectively managing and controlling cash resources of the company as well as

(2) achieving optimum utilization and conservation of funds.

The former objective can be attained by improving cash collections and disbursements and by making an accurate and timely forecast of cash flow pattern. The latter objective can be reached by making money available as and when needed, minimising the cash balance level and increasing the risk adjusted return on funds that is to be invested.

International Cash Management requires Multinational firms to adhere to the extant rules and regulations in various countries that they operate in. Apart from these rules and regulations, they would be required to follow the relevant forex market practices and conventions which may not be practiced in their parent countries. A host of factors curtail the area of operations of an international money manager e.g. restrictions on FDI, repatriation of foreign sales proceeds to the

home country within a specified time limit and the, problem of blocked funds. Such restrictions hinder the movement of funds across national borders and the manager has to plan beforehand the possibility of such situation arising on a country to country basis. Other complications in the form of multiple tax jurisdictions and currencies and absence of internationally integrated exchange facilities result in shifting of cash from one location to another to overcome these difficulties.

The main objectives of an effective system of international cash management are:

(1) To minimise currency exposure risk.

(2) To minimise overall cash requirements of the company as a whole without disturbing smooth operations of the subsidiary or its affiliate.

(3) To minimise transaction costs.

(4) To minimise country's political risk.

(5) To take advantage of economies of scale as well as reap benefits of superior knowledge.

The objectives are conflicting in nature as minimising of transaction costs require cash balance to be kept in the currency in which they are received thereby contradicting both currency and political exposure requirements.

A centralized cash management group is required to monitor and manage parent subsidiary and inter-subsidiary cash flows. Centralization needs centralization of information, reports and decision making process relating to cash mobilisation, movement and investment. This system benefits individual subsidiaries which require funds or are exposed to exchange rate risk.

A centralised cash system helps MNCs as follows:

(a) To maintain minimum cash balance during the year.

(b) To manage judiciously liquidity requirements of the centre.

(c) To optimally use various hedging strategies so that MNC's foreign exchange exposure is minimised.

(d) To aid the centre to generate maximum returns by investing all cash resources optimally.

(e) To aid the centre to take advantage of multinational netting so that transaction costs and currency exposure are minimised.

(f) To make maximum utilization of transfer pricing mechanism so that the firm enhances its profitability and growth.

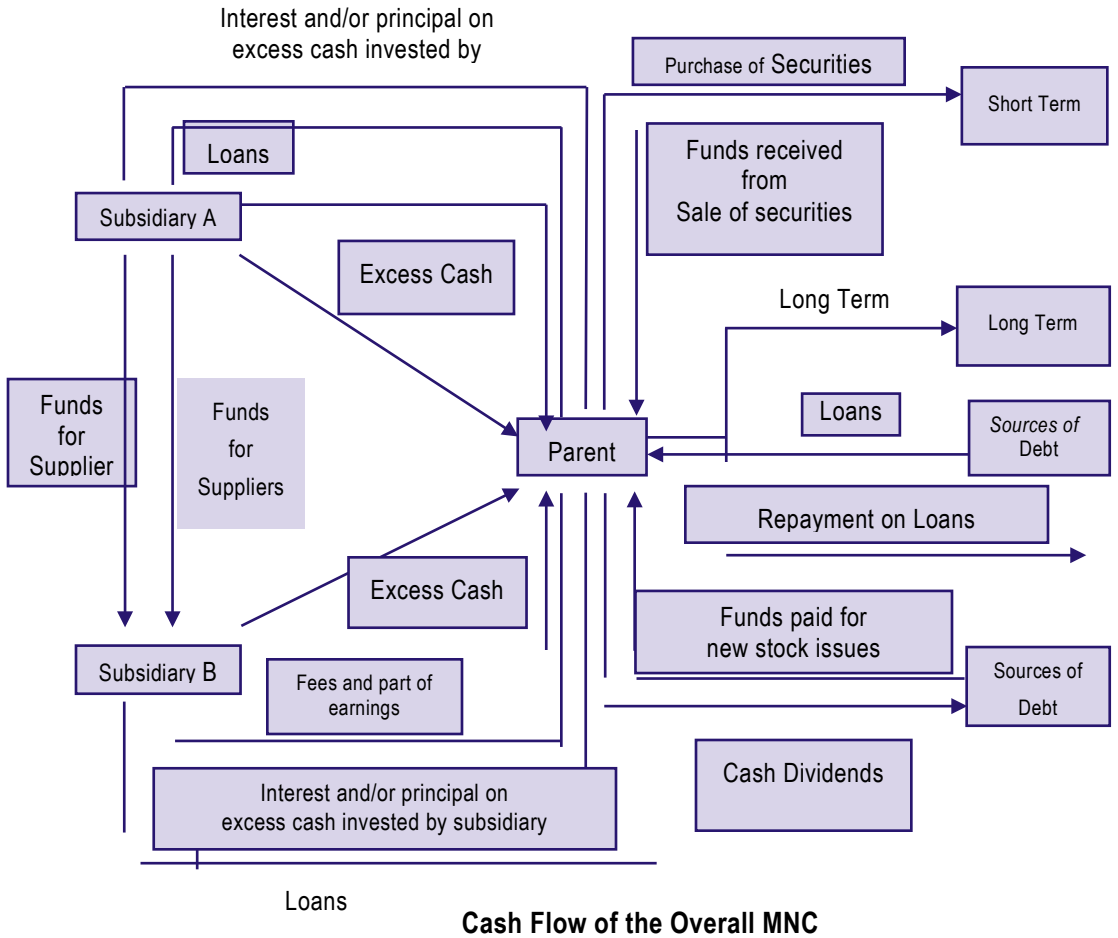
(g) To exploit currency movement correlations:

  (i) Payables & receivables in different currencies having positive correlations

  (ii) Payables of different currencies having negative correlations

(iii) Pooling of funds allows for reduced holding – the variance of the total cash flows for the entire group will be smaller than the sum of the individual variances

Consider an MNC with two subsidiaries in different countries. The two subsidiaries periodically send fees and dividends to the parent as well as send excess cash – all of them represent incoming cash to the parent while the cash outflows to the subsidiaries include loans and return on cash invested by them. As subsidiaries purchase supplies from each other they have cash flows between themselves.



Cash Flow of the Overall MNC

International Cash Management has two basic objectives:

1. Optimising Cash Flow movements.
2. Investing excess cash.

As no single strategy of international cash management can help in achieving both these objectives together, its task on such aspects becomes very challenging.

There are numerous ways of optimising cash inflows:

1. Accelerating cash inflows.
2. Managing blocked funds.
3. Leading and Lagging strategy.
4. Using netting to reduce overall transaction costs by eliminating number of unnecessary conversions and transfer of currencies.
5. Minimising tax on cash flow through international transfer pricing.

3.3 Accelerating Cash Inflows

Faster recovery of cash inflows helps the firm to use them whenever required or to invest them for better returns. Customers all over the world are instructed to send their payments to lockboxes set up at various locations, thereby reducing the time and transaction costs involved in collecting payments. Also, through pre-authorized payment, an organization may be allowed to charge the customer's bank account up to some limit.

3.4 Managing Blocked Funds

The host country may block funds of the subsidiary to be sent to the parent or make sure that earnings generated by the subsidiary be reinvested locally before being remitted to the parent so that jobs are created and unemployment reduced. The subsidiary may be instructed to obtain bank finance locally for the parent firm so that blocked funds may be utilised to pay off bank loans.

The parent company has to assess the potential of future funds blockage in a foreign country. MNCs have to be aware of political risks cropping up due to unexpected blockage of funds and devise ways to benefit their shareholders by using different methods for moving blocked funds through transfer pricing strategies, direct negotiations, leading and lagging and so on.

3.5 Minimising Tax on Cash Flows through Transfer Pricing Mechanism

Large entities having many divisions require goods and services to be transferred frequently from one division to another. The profits of different divisions are determined by the price to be charged by the transferor division to the transferee division. The higher the transfer price, the larger will be the gross profit of the transferor division with respect to the transferee division. The position gets complicated for MNCs due to exchange restrictions, inflation differentials, import duties, tax rate differentials between two nations, quotas imposed by host country, etc.

3.6 Leading and Lagging

This technique is used by subsidiaries for optimizing cash flow movements by adjusting the timing of payments to determine expectations about future currency movements. MNCs accelerate (lead) or delay (lag) the timing of foreign currency payments through adjustment of the credit terms

extended by one unit to another. The technique helps to reduce foreign exchange exposure or to increase available working capital. Firms accelerate payments of hard currency payables and delay payments of soft currency payables in order to reduce foreign exchange exposure. A MNC in the USA has subsidiaries all over the world. A subsidiary in India purchases its supplies from another subsidiary in Japan. If the Indian subsidiary expects the rupee to fall against the yen, then it shall be the objective of that firm to accelerate the timing of its payment before the rupee depreciates. Such a strategy is called Leading. On the other hand, if the Indian subsidiary expects the rupee to rise against the yen then it shall be the objective of that firm to delay the timing of its payment before the rupee appreciates. Such a strategy is called Lagging. MNCs should be aware of the government restrictions in such countries before availing such strategies.

3.7 Netting

It is a technique of optimising cash flow movements with the combined efforts of the subsidiaries thereby reducing administrative and transaction costs resulting from currency conversion. There is a co-ordinated international interchange of materials, finished products and parts among the different units of MNC with many subsidiaries buying /selling from/to each other. Netting helps in minimising the total volume of inter-company fund flow.

Advantages derived from netting system includes*:*

1) Reduces the number of cross-border transactions between subsidiaries thereby decreasing the overall administrative costs of such cash transfers

2) Reduces the need for foreign exchange conversion and hence decreases transaction costs associated with foreign exchange conversion.

3) Improves cash flow forecasting since net cash transfers are made at the end of each period

4) Gives an accurate report and settles accounts through co-ordinated efforts among all subsidiaries

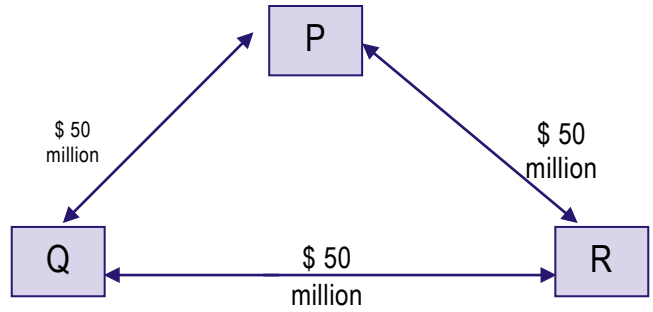
There are two types of Netting:

1. **Bilateral Netting System** – It involves transactions between the parent and a subsidiary or between two subsidiaries. If subsidiary X purchases $ 20 million worth of goods from subsidiary Y and subsidiary Y in turn buy $ 30 million worth of goods from subsidiary X, then the combined flows add up to $ 50 million. But in bilateral netting system subsidiary Y would pay subsidiary X only $10 million. Thus, bilateral netting reduces the number of foreign exchange transactions and also the costs associated with foreign exchange conversion. A more complex situation arises among the parent firm and several subsidiaries paving the way to multinational netting system.

2. **Multilateral Netting System** – Each affiliate nets all its inter affiliate receipts against all its disbursements. It transfers or receives the balance on the position of it being a net receiver or a payer thereby resulting in savings in transfer / exchange costs. For an effective

multilateral netting system, these should be a centralised communication system along with disciplined subsidiaries. This type of system calls for the consolidation of information and net cash flow positions for each pair of subsidiaries.

Subsidiary P sells $ 50 million worth of goods to Subsidiary Q, Subsidiary Q sells $ 50 million worth of goods to Subsidiary R and Subsidiary R sells $ 50 million worth of goods to Subsidiary P. Through multilateral netting inter affiliate fund transfers are completely eliminated.



The netting system uses a matrix of receivables and payables to determine the net receipt / net payment position of each affiliate at the date of clearing. A US parent company has subsidiaries in France, Germany, UK and Italy. The amounts due to and from the affiliates is converted into a common currency viz. US dollar and entered in the following matrix.

Inter Subsidiary Payments Matrix (US $ Thousands)

		Paying affiliate				
		France	Germany	UK	Italy	Total
Receiving affiliate	France	---	40	60	100	200
	Germany	60	---	40	80	180
	UK	80	60	---	70	210
	Italy	100	30	60	---	190
	Total	240	130	160	250	**780**

Without netting, the total payments are $ 780 Thousands. Through multinational netting these transfers will be reduced to $ 100 Thousands, a net reduction of 87%. Also currency conversion costs are significantly reduced. The transformed matrix after consolidation and net payments in both directions convert all figures to US dollar equivalents to the below form:

Netting Schedule (US $ Thousands)

	Receipt	Payment	Net Receipt	Net Payments
France	200	240	---	40
Germany	180	130	50	---

UK	210	160	50	---
Italy	190	250	---	60
			100	**100**

3.8 Investing Excess Cash

Euro Currency market accommodates excess cash in international money market. Euro Dollar deposits offer MNCs higher yield than bank deposits in US. The MNCs use the Euro Currency market for temporary use of funds, purchase of foreign treasury bills / commercial paper. Through better telecommunication system and integration of various money markets in different countries, access to the securities in foreign markets has become easier.

Through a centralized cash management strategy, MNCs pool together excess funds from subsidiaries enabling them to earn higher returns due to the larger deposits lying with them. Sometimes a separate investment account is maintained for all subsidiaries so that short term financing needs of one can be met by the other subsidiary without incurring transaction costs charged by banks for exchanging currencies. Such an approach leads to an excessive transaction costs. The centralized system helps to convert the excess funds pooled together into a single currency for investments thereby involving considerable transaction cost and a cost benefit analysis should be made to find out whether the benefits reaped are not offset by the transaction costs incurred. A question may arise as to how MNCs will utilise their excess funds once they have used them to meet short term financing needs. This is vital since some currencies may provide a higher interest rate or may appreciate considerably. So deposits made in such currencies will be attractive. Again MNCs may go in for foreign currency deposit which may give an effective yield higher than domestic deposit so as to overcome exchange rate risk. Forecasting of exchange rate fluctuations need to be calculated in this respect so that a comparative study can be effectively made. Lastly an MNC can go for a diversification of its portfolio in different countries having different currencies because of the exchange rate fluctuations taking place and at the same time avoid the possibility of incurring substantial losses that may arise due to sudden currency depreciation.

3.9 International Inventory Management

An international firm possesses normally a bigger stock than EOQ and this process is known as stock piling. The different units of a firm get a large part of their inventory from sister units in different countries. This is possible in a vertical set up. For political disturbance there will be bottlenecks in import. If the currency of the importing country depreciates, imports will be costlier thereby giving rise to stock piling. To take a decision against stock piling the firm has to weigh the cumulative carrying cost vis-à-vis expected increase in the price of input due to changes in exchange rate. If the probability of interruption in supply is very high, the firm may opt for stock piling even if it is not justified on account of higher cost.

Also in case of global firms, lead time is larger on various units as they are located far off in different parts of the globe. Even if they reach the port in time, a lot of customs formalities have to be carried out. Due to these factors, re-order point for international firm lies much earlier. The final decision depends on the quantity of goods to be imported and how much of them are locally available. Relying on imports varies from unit to unit but it is very much large for a vertical set up.

3.10 International Receivables Management

Credit Sales lead to the emergence of account receivables. There are two types of such sales viz. Inter firm Sales and Intra firm Sales in the global aspect.

In case of Inter firm Sales, the currency in which the transaction should be denominated and the terms of payment need proper attention. With regard to currency denomination, the exporter is interested to denominate the transaction in a strong currency while the importer wants to get it denominated in weak currency. The exporter may be willing to invoice the transaction in the weak currency even for a long period if it has debt in that currency. This is due to sale proceeds being used to retire debts without loss on account of exchange rate changes. With regard to terms of payment, the exporter does not provide a longer period of credit and ventures to get the export proceeds quickly in order to invoice the transaction in a weak currency. If the credit term is liberal the exporter is able to borrow currency from the bank on the basis of bills receivables. Also credit terms may be liberal in cases where competition in the market is keen compelling the exporter to finance a part of the importer's inventory. Such an action from the exporter helps to expand sales in a big way.

In case of Intra firm sales, the focus is on global allocation of firm's resources. Different parts of the same product are produced in different units established in different countries and exported to the assembly units leading to a large size of receivables. The question of quick or delayed payment does not affect the firm as both the seller and the buyer are from the same firm though the one having cash surplus will make early payments while the other having cash crunch will make late payments. This is a case of intra firm allocation of resources where leads and lags explained earlier will be taken recourse to.

TEST YOUR KNOWLEDGE

Theoretical Questions

1. Write a short note on Instruments of International Finance.
2. What is the impact of GDRs on Indian Capital Market?

ANSWERS/ SOLUTIONS

Answers to Theoretical Questions

1. Please refer paragraph 2
2. Please refer paragraph 2.3

CHAPTER 11

INTEREST RATE RISK MANAGEMENT

LEARNING OUTCOMES

After going through the chapter student shall be able to understand:

- Interest Rate Risk
- Hedging Interest Rate Risk
  - (a) Traditional Methods
  - (b) Modern Methods including Interest Rate Derivatives

1. INTRODUCTION

Companies with low profit margins and high capital expenses may be extremely sensitive to interest rate increases. Interest rate derivatives are valuable tools in managing risks. Derivatives are powerful tools that mitigate risk and build value. They help companies to develop a risk mitigation strategy.

Interest rate is the cost of borrowing money and the compensation for the service and risk of lending money. Interest rates are always changing, and different types of loans offer various interest rates. The lender of money takes a risk because the borrower may not pay back the loan. Thus, interest provides a certain compensation for bearing risk.

Coupled with the risk of default is the risk of inflation. When you lend money now, the prices of goods and services may go up by the time you are paid back, so your money's original purchasing power would decrease. Thus, interest protects against future rises in inflation. A lender such as a bank uses the interest to process account costs as well.

1.1 How interest rates are determined

The factors affecting interest rates are largely macro-economic in nature:

(a) Supply and Demand: Demand/supply of money- When economic growth is high, demand for money increases, pushing the interest rates up and vice versa.

(b) Inflation - The higher the inflation rate, the more interest rates are likely to rise.

(c) Government- Government is the biggest borrower. The level of borrowing also determines the interest rates. Central bank i.e. RBI by either printing more notes or through its Open Market Operations (OMO) changes the key rates (CRR, SLR and bank rates) depending on the state of the economy or to combat inflation.

1.2 Interest Rate Risk

Interest risk is the change in prices of bonds that could occur because of change in interest rates. It also considers change in impact on interest income due to changes in the rate of interest. In other words, price as well as reinvestment risks require focus. Insofar as the terms for which interest rates were fixed on deposits differed from those for which they fixed on assets, banks incurred interest rate risk i.e., they stood to make gains or losses with every change in the level of interest rates.

1.3 Types of Interest Rate Risk

Various types of Interest rate risk faced by companies/ banks are as follows:

1.3.1 Gap Exposure

A gap or mismatch risk arises from holding assets and liabilities and off-balance sheet items with different principal amounts, maturity dates or re-pricing dates, thereby creating exposure to unexpected changes in the level of market interest rates. This exposure is more important in relation to banking business.

The positive Gap indicates that banks have more interest Rate Sensitive Assets (RSAs) than interest Rate Sensitive Liabilities (RSLs). A positive or asset sensitive Gap means that an increase in market interest rates could cause an increase in Net Interest Income (NII). Conversely, a negative or liability sensitive Gap implies that the banks' NII could decline as a result of decrease in market interest rates.

A negative gap indicates that banks have more RSLs than RSAs. The Gap is used as a measure of interest rate sensitivity.

Positive or Negative Gap is multiplied by the assumed interest rate changes to derive the Earnings at Risk (EaR). The EaR method facilitates to estimate how much the earnings might be impacted by an adverse movement in interest rates. The changes in interest rate could be estimated on the basis of past trends, forecasting of interest rates, etc. The banks should fix EaR which could be

based on last/current year's income and a trigger point at which the line management should adopt on-or off-balance sheet hedging strategies may be clearly defined.

Gap calculations can be augmented by information on the average coupon on assets and liabilities in each time band and the same could be used to calculate estimates of the level of NII from positions maturing or due for repricing within a given time-band, which would then provide a scale to assess the changes in income implied by the gap analysis.

The periodic gap analysis indicates the interest rate risk exposure of banks over distinct maturities and suggests magnitude of portfolio changes necessary to alter the risk profile.

However, the Gap report quantifies only the time difference between re-pricing dates of assets and liabilities but fails to measure the impact of basis and embedded option risks. The Gap report also fails to measure the entire impact of a change in interest rate (Gap report assumes that all assets and liabilities are matured or re-priced simultaneously) within a given time-band and effect of changes in interest rates on the economic or market value of assets, liabilities and off-balance sheet position. It also does not take into account any differences in the timing of payments that might occur as a result of changes in interest rate environment. Further, the assumption of parallel shift in yield curves seldom happen in the financial market. The Gap report also fails to capture variability in non-interest revenue and expenses, a potentially important source of risk to current income.

1.3.2 Basis Risk

Market interest rates of various instruments seldom change by the same degree during a given period of time. The risk that the interest rate of different assets, liabilities and off-balance sheet items may change in different magnitude is termed as basis risk. For example, while assets may be benchmarked to Fixed Rate of Interest, liabilities may be benchmarked to floating rate of interest. The degree of basis risk is fairly high in respect of banks that create composite assets out of composite liabilities. The Loan book in India is funded out of a composite liability portfolio and is exposed to a considerable degree of basis risk. The basis risk is quite visible in volatile interest rate scenarios.

When the variation in market interest rate causes the NII to expand, the banks have experienced favourable basis shifts and if the interest rate movement causes the NII to contract, the basis has moved against the banks.

1.3.3 Embedded Option Risk

Significant changes in market interest rates create another source of risk to banks' profitability by encouraging prepayment of cash credit/demand loans/term loans and exercise of call/put options on bonds/debentures and/or premature withdrawal of term deposits before their stated maturities. The embedded option risk is becoming a reality in India and is experienced in volatile situations. The faster and higher the magnitude of changes in interest rate, the greater will be the embedded option risk to the banks' NII. Thus, banks should evolve scientific techniques to estimate the

probable embedded options and adjust the Gap statements (Liquidity and Interest Rate Sensitivity) to realistically estimate the risk profiles in their balance sheet. Banks should also endeavour to stipulate appropriate penalties based on opportunity costs to stem the exercise of options, which is always to the disadvantage of banks.

1.3.4 Yield Curve Risk

The movements in yield curve are rather frequent when the economy moves through business cycles. Thus, banks should evaluate the movement in yield curves and the impact of that on the portfolio values and income.

1.3.5 Price Risk

Price risk occurs when assets are sold before their stated maturities. In the financial market, bond prices and yields are inversely related. The price risk is closely associated with the trading book, which is created for making profit out of short-term movements in interest rates.

Banks which have an active trading book should, therefore, formulate policies to limit the portfolio size, holding period, duration, defeasance period, stop loss limits, marking to market, etc.

1.3.6 Reinvestment Risk

Uncertainty with regard to interest rate at which the future cash flows could be reinvested is called reinvestment risk. Any mismatches in cash flows would expose the banks to variations in NII as the market interest rates move in different directions.

1.3.7 Net Interest Position Risk

The size of non-paying liabilities is one of the significant factors contributing towards profitability of banks. Where banks have more earning assets than paying liabilities, interest rate risk arises when the market interest rates adjust downwards. Thus, banks with positive net interest positions will experience a reduction in NII as the market interest rate declines and increases when interest rate rises. Thus, large float is a natural hedge against the variations in interest rates.

1.4 Measuring Interest Rate Risk

Before interest rate risk could be managed, they should be identified and quantified. Unless the quantum of IRR inherent in the balance sheet is identified, it is impossible to measure the degree of risks to which banks are exposed. It is also equally impossible to develop effective risk management strategies/hedging techniques without being able to understand the correct risk position of banks.

The IRR measurement system should address all material sources of interest rate risk including gap or mismatch, basis, embedded option, yield curve, price, reinvestment and net interest position risks exposures. The IRR measurement system should also take into account the specific characteristics of each individual interest rate sensitive position and should capture in detail the full range of potential movements in interest rates.

There are different techniques for measurement of interest rate risk, ranging from the traditional Maturity Gap Analysis (to measure the interest rate sensitivity of earnings), Duration (to measure interest rate sensitivity of capital), Simulation and Value at Risk.

While these methods highlight different facets of interest rate risk, many banks use them in combination, or use hybrid methods that combine features of all the techniques. Generally, the approach towards measurement and hedging of IRR varies with the segmentation of the balance sheet. In a well-functioning risk management system, banks broadly position their balance sheet into Trading and Investment or Banking Books. While the assets in the trading book are held primarily for generating profit on short-term differences in prices/yields, the banking book comprises assets and liabilities, which are contracted basically on account of relationship or for steady income and statutory obligations and are generally held till maturity. Thus, while the price risk is the prime concern of banks in trading book, the earnings or economic value changes are the main focus of banking book.

2. HEDGING INTEREST RATE RISK

Methods of Hedging of Interest Rate Risk can be broadly divided into following two categories:

(A) Traditional Methods: These methods can further be classified in following categories:

- i. Asset and Liability Management (ALM)
- ii. Forward Rate Agreement (FRA)

(B) Modern Methods: These methods can further be classified in following categories:

- i. Interest Rate Futures (IRF)
- ii. Interest Rate Options (IRO)
- iii. Interest Rate Swaps

2.1 Traditional Methods

Now let us discuss some of the traditional methods of hedging interest rate risk.

2.1.1 Asset and Liability Management (ALM)

Asset-Liability Management (ALM) is one of the important tools of risk management in commercial banks of India. Indian banking industry is exposed to a number of risks prevailing in the market such as market risk, financial risk, interest rate risk etc. The net income of the banks is very sensitive to these factors or risks. For this purpose, Reserve bank of India (RBI), regulator of Indian banking industry evolved the tool known as ALM.

ALM is a comprehensive and dynamic framework for measuring, monitoring and managing the market risk of a bank. It is the management of structure of balance sheet (liabilities and assets) in such a way that the net earnings from interest are maximized within the overall risk preference (present and future) of the institutions. The ALM functions extend to liquidly risk management,

management of market risk, trading risk management, funding and capital planning and profit planning and growth projection.

The concept of ALM is of recent origin in India. It has been introduced in Indian Banking industry w.e.f. 1st April, 1999. ALM is concerned with risk management and provides a comprehensive and dynamic framework for measuring, monitoring and managing liquidity, interest rate, foreign exchange and equity and commodity price risks of a bank that needs to be closely integrated with the bank's business strategy. Asset-liability management basically refers to the process by which an institution manages its balance sheet in order to allow for alternative interest rate and liquidity scenarios.

Banks and other financial institutions provide services which expose them to various kinds of risks like credit risk, interest risk, and liquidity risk. Asset liability management is an approach that provides institutions with protection that makes such risk acceptable. Asset-liability management models enable institutions to measure and monitor risk, and provide suitable strategies for their management.

It is therefore appropriate for institutions (banks, finance companies, leasing companies, insurance companies, and others) to focus on asset-liability management when they face financial risks of different types. Asset-liability management includes not only a formalization of this understanding, but also a way to quantify and manage these risks. Further, even in the absence of a formal asset-liability management program, the understanding of these concepts is of value to an institution as it provides a truer picture of the risk/reward trade-off in which the institution is engaged.

Asset-liability management is a first step in the long-term strategic planning process.
Therefore, it can be considered as a planning function for an intermediate term. In a sense, the various aspects of balance sheet management deal with planning as well as direction and control of the levels, changes and mixes of assets, liabilities, and capital.

A sound investment decision depends on the correct use and evaluation of the rate of return. Some of the different concepts of return are given as below:

2.1.2 Forward Rate Agreements (FRAs)

A Forward Rate Agreement (FRA) is an agreement between two parties through which a borrower/ lender protects itself from the unfavourable changes to the interest rate. Unlike futures FRAs are not traded on an exchange thus are called OTC product. Following are main features of FRA.

- Normally it is used by banks to fix interest costs on anticipated future deposits or interest revenues on variable-rate loans indexed to LIBOR.
- It is an off Balance Sheet instrument.
- It does not involve any transfer of principal. The principal amount of the agreement is termed "notional" because, while it determines the amount of the payment, actual exchange

of the principal never takes place.

- It is settled at maturity in cash representing the profit or loss. A bank that sells an FRA agrees to pay the buyer the increased interest cost on some "notional" principal amount if some specified maturity of LIBOR is above a stipulated "forward rate" on the contract maturity or settlement date. Conversely, the buyer agrees to pay the seller any decrease in interest cost if market interest rates fall below the forward rate.
- Final settlement of the amounts owed by the parties to an FRA is determined by the formula

$$Payment = \frac{(N)(RR - FR)(dtm/DY)}{[1 + RR(dtm/DY)]} \times 100$$

Where,

N = the notional principal amount of the agreement;

RR = Reference Rate for the maturity specified by the contract prevailing on the contract settlement date; typically LIBOR or MIBOR

FR = Agreed-upon Forward Rate; and

dtm = maturity of the forward rate, specified in days (FRA Days)

DY = Day count basis applicable to money market transactions which could be 360or 365 days.

If LIBOR > FR the seller owes the payment to the buyer, and if LIBOR<FR the buyer owes the seller the absolute value of the payment amount determined by the above formula.

- The differential amount is discounted at post change (actual) interest rate as it is settled in the beginning of the period not at the end.

Example

Suppose two banks enter into an agreement specifying:

- a forward rate of 5 percent on a Eurodollar deposit with a three-month maturity;
- a $1 million notional principal; and settlement in one month.

Such an agreement is termed a 1x4 FRA because it fixes the interest rate for a deposit to be placed after one month and maturing four months after the date the contract is negotiated.

If the three-month LIBOR is 6 percent on the contract settlement date, the seller would owe the buyer the difference between 6 and 5 percent interest on $1 million for a period of 90 days.

Every 1 basis point change in the interest rate payable on a principal of $1 million for a 90-day maturity changes interest cost by $25, so that the increase in the interest cost on a three-month Eurodollar deposit over the specified forward rate in this case is $25 x 100 basis points = $2,500.

The $2,500 difference in interest costs calculated above is discounted back three months using the actual three-month LIBOR prevailing on the settlement date.

Thus, if 90-day LIBOR turns out to be 6 percent on the contract maturity date the buyer would receive $2,463.05 = $2,500/[1 + 0.06(90/360)].

2.2 Modern Methods

Now let us discuss some of the modern methods of hedging interest rate risk.

2.2.1 Interest Rate Futures

As per Investopedia, an interest rate future is a futures contract with an underlying instrument that pays interest. An interest rate future is a contract between the buyer and seller agreeing to the future delivery of any interest-bearing asset. The interest rate future allows the buyer and seller to lock in the price of the interest-bearing asset for a future date.

Interest rate futures are used to hedge against the risk that interest rates will move in an adverse direction, causing a cost to the company.

For example, borrowers face the risk of interest rates rising. Futures use the inverse relationship between interest rates and bond prices to hedge against the risk of rising interest rates.

A borrower will enter to sell a future today. Then if interest rates rise in the future, the value of the future will fall (as it is linked to the underlying asset, bond prices), and hence a profit can be made when closing out of the future (i.e. buying the future).

Currently, Interest Rate Futures segment of NSE offers two instruments i.e. Futures on 6 year, 10 year and 13 year Government of India Security and 91-day Government of India Treasury Bill (91DTB).

Bonds form the underlying instruments, not the interest rate. Further, IRF, settlement is done at two levels:

- Mark-to-Market settlement done on a daily basis and
- physical delivery which happens on any day in the expiry month.

Final settlement can happen only on the expiry date. Price of IRF determined by demand and supply Interest rates are inversely related to prices of underlying bonds. In IRF following are two important terms:

(a) Conversion factor: All the deliverable bonds have different maturities and coupon rates. To make them comparable to each other, and also with the notional bond, RBI introduced Conversion Factor. Conversion factor for each deliverable bond and for each expiry at the time of introduction of the contract is being published by NSE.

(Conversion Factor) x (futures price) = actual delivery price for a given deliverable bond.

(b) Cheapest to Deliver (CTD): The CTD is the bond that minimizes difference between the quoted Spot Price of bond and the Futures Settlement Price (adjusted by the conversion factor). It is called CTD bond because it is the least expensive bond in the basket of deliverable bonds.

CTD bond is determined by the difference between cost of acquiring the bonds for delivery and the price received by delivering the acquired bond. This difference gives the profit / loss of the seller of the futures.

Profit of seller of futures = (Futures Settlement Price x Conversion factor) – Quoted Spot Price of Deliverable Bond

Loss of Seller of futures = Quoted Spot Price of deliverable bond – (Futures Settlement Price x

Conversion factor)
That bond is chosen as CTD bond which either maximizes the profit or minimizes the loss.

2.2.2 Interest Rate Options

Also known as Interest Rate Guarantee (IRG) as option is a right not an obligation and acts as insurance by allowing businesses to protect themselves against adverse interest rate movements while allowing them to benefit from favourable movements.

It should be noted that the IRO is basically a series of FRAs which are exercisable at predetermined bench marked interest rates on each period say 3 months, 6 months etc. Some of the important types of Interest Rate Options are as follows:

2.2.2.1 Cap Option

Also called Call Option, the buyer of an interest rate cap pays the seller a premium in return for the right to receive the difference in the interest cost on some notional principal amount any time a specified index of market interest rates rises above a stipulated "cap rate." The buyer bears no obligation or liability if interest rates fall below the cap rate, however. Thus, a cap resembles an option in that it represents a right rather than an obligation to the buyer.

Caps evolved from interest rate guarantees that fixed a maximum level of interest payable on floating-rate loans. The advent of trading in over-the-counter interest rate caps dates back to 1985, when banks began to strip such guarantees from floating-rate notes to sell to the market. The leveraged buyout boom of the 1980s spurred the evolution of the market for interest rate caps. Firms engaged in leveraged buyouts typically took on large quantities of short-term debt, which made them vulnerable to financial distress in the event of a rise in interest rates. As a result, lenders began requiring such borrowers to buy interest-rate caps to reduce the risk of financial distress. More recently, trading activity in interest rate caps has declined as the number of new leveraged buyouts has fallen. An interest rate cap is characterized by:

- a notional principal amount upon which interest payments are based;
- an interest rate benchmark say LIBOR, MIBOR, PLR etc. for typically some specified maturity period;

- a cap rate, which is equivalent to a strike or exercise price on an option; and
- the period of the agreement, including payment dates and interest rate reset dates.

Payment schedules for interest rate caps follow conventions in the interest rate swap market. Payment amounts are determined by the value of the benchmark rate on a series of interest rate reset dates. Intervals between interest rate reset dates and scheduled payment dates typically coincide with the term of the benchmark interest rate.

If the specified market index is above the cap rate, the seller pays the buyer the difference in interest cost on the next payment date. The amount of the payment is determined by the formula

(N) max (0, r - r_c)(d_t/No. of days a year),

where

N is the notional principal amount of the agreement,

r is the actual spot rate on the reset date

r_c is the cap rate (expressed as a decimal), and

d_t is the number of days from the interest rate reset date to the payment date.

Example

Consider a one-year interest rate cap that specifies a notional principal amount of $1 million and a six-month LIBOR cap rate of 5 percent. Assume the agreement covers a period starting January 15 through the following January 15 with the interest rate to be reset on July 15. The first period of a cap agreement typically is excluded from the agreement as it is known on the date of agreement. Hence, the cap buyer will be entitled to a payment only if the six-month LIBOR exceeds 5 percent on the July 15 interest rate reset date. Suppose that six-month LIBOR is 5.5 percent on July 15. Then, on the following January 15 (184 days after the July 15 reset date) the seller will owe the buyer.

$2,555.56 = ($1,000,000)(0.055 - 0.050)(184/360).

2.2.2.2 Floor Option:

It is an OTC instrument that protects the buyer of the floor from losses arising from a decrease in interest rates. The seller of the floor compensates the buyer with a pay off when the interest rate falls below the strike rate of the floor.

If the benchmark rate is below the floor rate on the interest rate reset date the buyer receives a payment of, which is equivalent to the payoff from selling an FRA at a forward rate. On the other hand, if the index rate is above the floor rate the buyer receives no payment and loses the premium paid to the seller. Thus, a floor effectively gives the buyer the right, but not the obligation, to sell an FRA, which makes it equivalent to a European put option on an FRA. More generally, a

multi-period floor can be viewed as a bundle of European-style put options on a sequence of FRAs maturing on a succession of future maturity dates.

The payment received by the buyer of an interest rate floor is determined by the formula

$$(N) \max(0, r_f - r)(d_t/\text{No. of days a year}),$$

Where,

N is the notional principal amount of the agreement,

r is the actual spot rate on the reset date

r_f is the floor rate or strike price, and

d_t is the number of days from the last interest rate reset date to the payment date.

2.2.2.3 Interest Rate Collars:

It is a combination of a Cap and Floor. The purchaser of a Collar buys a Cap and simultaneously sells a Floor. A Collar has the effect of locking its purchases into a floating rate of interest that is bounded on both high side and the low side.

Although buying a collar limits a borrower's ability to benefit from a significant decline in market interest rates, it has the advantage of being less expensive than buying a cap alone because the borrower earns premium income from the sale of the floor that offsets the cost of the cap. A zero-cost collar results when the premium earned by selling a floor exactly offsets the cap premium.

The amount of the payment due to or owed by a buyer of an interest rate collar is determined by the expression

$$(N)[\max(0, r - r_c) - \max(0, r_f - r)](d_t/\text{No. of days a year}),$$

Where,

N is the notional principal amount of the agreement,

r is the actual spot rate on the reset date

r_c is the cap rate,

r_f is the floor rate, and

d_t is the term of the index in days.

2.2.3 Interest Rate Swaps

In an interest rate swap, the parties to the agreement, termed the swap counterparties, agree to exchange payments indexed to two different interest rates. Total payments are determined by the specified notional principal amount of the swap, which is never actually exchanged.

2.2.3.1 Swap Dealers

The intermediary collected a brokerage fee as compensation, but did not maintain a continuing role once the transaction was completed. The contract was between the two ultimate swap users, who exchanged payments directly.

2.2.3.2 A fixed/floating swap is characterized by:

- a fixed interest rate;
- a variable or floating interest rate which is periodically reset;
- a notional principal amount upon which total interest payments are based; and
- the term of the agreement, including a schedule of interest rate reset dates (that is, dates when the value of the interest rate used to determine floating-rate payments is determined) and payment dates.

2.2.3.3 Timing of Payments

A swap is negotiated on its "trade date" and settlement takes effect two days later called "settlement date."

2.2.3.4 Price Quotation

The convention in the swap market is to quote the fixed interest rate as an All-In-Cost (AIC), which means that the fixed interest rate is quoted relative to a flat floating-rate index.

2.2.3.5 Types of Swap

(a) Plain Vanilla Swap: Also called Generic Swap and it involves the exchange of a fixed rate loan to a floating rate loan. Floating rate basis can be LIBOR, MIBOR, Prime Lending Rate etc.

For example, Fixed interest payments on a generic swap are calculated assuming each month has 30 days and the quoted interest rate is based on a 360-day year. Given an All-In-Cost of the swap, the semiannual fixed-rate payment would be:

$$(N)(AIC)(180/360),$$

Where,

N denotes the notional principal amount of the agreement.

AIC denotes the fixed rate

Then, the floating-rate receipt is determined by the formula:

$$(N)(R)(d_t/360)$$

Where,

d_t denote the number of days since the last settlement date

R denotes the reference rate such as LIBOR, MIBOR etc.

(b) Basis Rate Swap: Also, called Non-Generic Swap. Similar to plain vanilla swap with the difference payments based on the difference between two different variable rates. For example one rate may be 1 month LIBOR and other may be 3-month LIBOR. In other words two legs of swap are floating but measured against different benchmarks.

(c) Asset Swap: Like plain vanilla swaps with the difference that it is the exchange fixed rate investments such as bonds which pay a guaranteed coupon rate with floating rate investments such as an index.

(d) Amortising Swap: An interest rate swap in which the notional principal for the interest payments declines during the life of the swap. They are particularly useful for borrowers who have issued redeemable bonds or debentures. It enables them to interest rate hedging with redemption profile of bonds or debentures.

2.2.4 Swaptions

An interest rate swaption is simply an option on an interest rate swap. It gives the holder the right but not the obligation to enter into an interest rate swap at a specific date in the future, at a particular fixed rate and for a specified term.

There are two types of swaption contracts: -

- A **fixed rate payer swaption** gives the owner of the swaption the right but not the obligation to enter into a swap where they pay the fixed leg and receive the floating leg.
- A **fixed rate receiver swaption** gives the owner of the swaption the right but not the obligation to enter into a swap in which they will receive the fixed leg, and pay the floating leg.

2.2.4.1 Principal Features of Swaptions

A. A swaption is effectively an option on a forward-start IRS, where exact terms such as the fixed rate of interest, the floating reference interest rate and the tenor of the IRS are established upon conclusion of the swaption contract.

B. A 3-month into 5-year swaption would therefore be seen as an option to enter into a 5-year IRS, 3 months from now.

C. The 'option period' refers to the time which elapses between the transaction date and the expiry date.

D. The swaption premium is expressed as basis points.

E. Swaptions can be cash-settled; therefore at expiry they are marked to market off the applicable forward curve at that time and the difference is settled in cash.

2.2.4.2 Pricing of Swaptions

The pricing methodology depends upon setting up a model of probability distribution of the forward zero-coupon curve which undoes a Market process.

2.2.4.3 Uses of Swaptions

a) Swaptions can be applied in a variety of ways for both active traders as well as for corporate treasurers.

b) Swap traders can use them for speculation purposes or to hedge a portion of their swap books.

c) Swaptions have become useful tools for hedging embedded optionality which is common to the natural course of many businesses.

d) Swaptions are useful to borrowers targeting an acceptable borrowing rate.

e) Swaptions are also useful to those businesses tendering for contracts.

f) Swaptions also provide protection on callable/puttable bond issues.

TEST YOUR KNOWLEDGE

Theoretical Questions

1. Write a short note on Forward Rate Agreements.
2. What do you know about swaptions and their uses?

Practical Questions

1. Derivative Bank entered into a plain vanilla swap through on OIS (Overnight Index Swap) on a principal of ₹ 10 crores and agreed to receive MIBOR overnight floating rate for a fixed payment on the principal. The swap was entered into on Monday, 2nd August, 2010 and was to commence on 3rd August, 2010 and run for a period of 7 days.

Respective MIBOR rates for Tuesday to Monday were:

7.75%,8.15%,8.12%,7.95%,7.98%,8.15%.

If Derivative Bank received ₹ 317 net on settlement, calculate Fixed rate and interest under both legs.

Notes:

(i) Sunday is Holiday.

(ii) Work in rounded rupees and avoid decimal working.

2. M/s. Parker & Co. is contemplating to borrow an amount of ₹60 crores for a Period of 3 months in the coming 6 month's time from now. The current rate of interest is 9% p.a., but it may go up in 6 month's time. The company wants to hedge itself against the likely increase in interest rate.

   The Company's Bankers quoted an FRA (Forward Rate Agreement) at 9.30%p.a.

   What will be the Final settlement amount, if the actual rate of interest after 6 months happens to be (i) 9.60% p.a. and (ii) 8.80% p.a.?

ANSWERS/ SOLUTIONS

Answers to Theoretical Questions

1. Please refer paragraph 2.1.2

2. Please refer paragraph 2.2.4

Answers to the Practical Questions

1.

Day	Principal (₹)	MIBOR (%)	Interest (₹)
Tuesday	10,00,00,000	7.75	21,233
Wednesday	10,00,21,233	8.15	22,334
Thursday	10,00,43,567	8.12	22,256
Friday	10,00,65,823	7.95	21,795
Saturday & Sunday (*)	10,00,87,618	7.98	43,764
Monday	10,01,31,382	8.15	22,358
Total Interest @ Floating			1,53,740
Less: Net Received			317
Expected Interest @ fixed			1,53,423
Thus Fixed Rate of Interest			0.07999914
Approx.			8%

(*) i.e. interest for two days.

Note: Alternatively, answer can also be calculated on the basis of 360 days in a year.

2. Final settlement amount shall be computed by using formula:

$$= \frac{(N)(RR - FR)(dtm/DY)}{[1 + RR(dtm/DY)]}$$

Where,

N = the notional principal amount of the agreement;

RR = Reference Rate for the maturity specified by the contract prevailing on the contract settlement date;

FR = Agreed-upon Forward Rate; and

dtm = maturity of the forward rate, specified in days (FRA Days)

DY = Day count basis applicable to money market transactions which could be 360or 365 days.

Accordingly,

If actual rate of interest after 6 months happens to be 9.60%

$$= \frac{(₹60\,crore)(0.096-0.093)(3/12)}{[1+0.096(3/12)]}$$

$$= \frac{(₹60\,crore)(0.00075)}{1.024} = ₹\ 4,39,453$$

Thus banker will pay Parker & Co. a sum of ₹ 4,39,453

If actual rate of interest after 6 months happens to be 8.80%

$$= \frac{(₹60\,crore)(0.088-0.093)(3/12)}{[1+0.088(3/12)]}$$

$$= \frac{(₹60\,crore)(-0.00125)}{1.022} = -₹\ 7,33,855$$

Thus Parker & Co. will pay banker a sum of ₹ 7,33,855

Note: It might be possible that students may solve the question on basis of days instead of months (as considered in above calculations). Further there may be also possibility that the FRA days and Day Count convention may be taken in various plausible combinations such as 90 days/360 days, 90 days/ 365 days, 91 days/360 days or 91 days/365days.

CHAPTER 12

CORPORATE VALUATION

LEARNING OUTCOMES

After going through the chapter student shall be able to understand

- ❑ Conceptual Framework of Valuation
- ❑ Approaches/ Methods of Valuation
  - (a) Assets Based Valuation Model
  - (b) Earning Based Models
  - (c) Cash Flow Based Models
  - (d) Measuring Cost of Equity
    - Capital Asset Pricing Model (CAPM)
    - Arbitrage Pricing Theory
    - Estimating Beta of an unlisted company
  - (e) Relative Valuation
    - -Steps involved in Relative Valuation
    - -Equity Valuation Multiples
    - -Enterprise Valuation Multiple
  - (f) Other Approaches to Value Measurement
    - -Economic Value Added (EVA)
    - -Market Value Added (MVA)
    - -Shareholder Value Analysis (SVA)
  - (g) Arriving at Fair Value

1. CONCEPTUAL FRAMEWORK OF VALUATION

The basic purpose of any enterprise is to earn profits in order to sustain itself and promote growth. Managements across the world endeavor in this aspect – be it be a sole proprietorship concern or a multinational giant having its foothold across geographies.

Corporate valuation can be traced back to centuries ago when the United East India Company (referred to as 'Dutch East India Company' by the Britishers) was the first corporation to be valued and an IPO was launched. The East India Company too stands as a fine example of a corporatized way of doing world trade, and perhaps the earliest of institutions to focus on wealth maximization, albeit in unethical ways. Today, almost every enterprise that generates a positive cash flow and generates suitable employment opportunities feels the pressing need to 'value' itself – be it for going to the local bank for debt financing, or for assessing an initial public offering.

It is obvious that the more an enterprise grows, the more the number of stakeholders it adds in its progress to growth. Presentation of annual financial statements in the annual body meeting, publishing quarterly results for the street – all these become the staple diet for stakeholders who sow the seeds of capital in the enterprise and in turn, wait for the enterprise to multiply its progressive potencies. In a relative world, this persisting curiosity of the stakeholders to understand the 'true worth' of their enterprise becomes translated to the concept of 'valuation'. Add to it, the market analysts, financial intermediaries, and let's not forget the academicians, and what we have is a handful of valuation approaches that have been painstakingly and meticulously crafted for valuing the correct worth of the enterprise at hand. In a true sense, valuation imbibes both the science and the art of itself per se. As it stands today, valuation has become an inseparable part of strategic financial management.

To elaborate, the need of a proper assessment of an enterprise's value can be typically for:

(a) Information for its internal stakeholders,

(b) Comparison with similar enterprises for understanding management efficiency,

(c) Future public listing of the enterprise,

(d) Strategic planning, for e.g. finding out the value driver of the enterprise, or for a correct deployment of surplus cash,

(e) Ball park price (i.e. an approximate price) for acquisition, etc.

2. IMPORTANT TERMS ASSOCIATED WITH VALUATION

It's imperative to understand the important terms that we would come across and will be used widely in any valuation model. Some of the terms have indeed evolved over a period of time and continued usage, and now stand on their own as precursor to application of the actual valuation model itself.

2.1 The Concept of PV (Present Value) of cash flows:

As we know that a receipt of ₹ 1,000 twelve months hence would not be the same as of today, because of concept of Time Value of Money. Accordingly, the discounted value of ₹ 1,000 a year at the rate of 10% shall be ₹ 909 approximately.

2.2 The Concept of IRR (Internal Rate of Return):

IRR is the discount rate that will equate the net present value (NPV) of all cash flows from a particular investment or project to zero. We can also visualize IRR as an interest rate that will get the NPVs to equal to the investment – the higher the IRR of a project, the more likely it gets selected for further investments.

2.3 ROI (Return on investment):

Simply put, ROI is the return over the investment made in an entity from a stakeholder point of view. A simple example would be where the stakeholder has sold shares valued at 1400, invested initially at 1000; the ROI would be the return divided by the investment cost, which would be (1400-1000)/1000 = 40% in this case. You would have noted that the 40% is the return on cash investment for this standalone transaction, primarily signifying the absolute rate of return on liquidating his holdings. But if the stakeholder sells his shares that was held by him from the past several years, he would try to calculate the ROI by taking into account the time value of money. This would imply that the ROI gets 'adjusted' over the period of his holdings. So, if a stakeholder had worth 1000 of shares at the beginning of the year and he makes an additional investment of 200 during the year, and his investment is valued at 2000 at the end of the year, his ROI would be calculated as returns divided by the average investment held during the year. His returns would be (2000-1200 = 800) and the average investment would be [(1000+1200)/2] = 1100 for the year. Accordingly, his ROI will be 800/1100 = 72%. The average cost of investments is arrived at to recognize the timing of the investment. In this case, the stakeholder may also calculate the actual days of the additional investment, to arrive at the exact ROI. However, stakeholders who are multiple investments and portfolios will use the average cost of investments as illustrated above.

From an entity's point of view, the most significant use of ROI would be to calculate the returns generated by each individual / incremental investment on a project or different projects. Thus, a company that has initiated a couple of projects during the year towards new business lines can implement the ROI concept to calculate the returns on the investment and take further decisions based on the same. Note that ROI is a historical ratio, so naturally the decision can either only be a course corrective action, or channeling further investments into the more successful business line.

By now you will appreciate that essentially we are viewing ROI as a performance measure ratio in the corporate scenario; which also brings us to an interesting question –how about measuring returns against the total investments, or simply put, the total 'assets' held by the enterprise? After

all, it is imperative that all assets are put forth and only for the purpose of wealth maximization and fullest returns, right? And that's precisely the concepts seen below.

2.4 Perpetual Growth Rate (Gordon Model)

As discussed earlier Gordon's model assumes a perpetual growth in dividend; thereby a potential investor eyeing stable inflows will take the latest Dividend payout and factor it with his expected rate of return. However, this model is not widely used by potential investors for one - there are more parameters which need to be factored in, and secondly, dividends rarely grow perpetually at a steady rate. However, this model is the darling of academicians as it can neatly fit into a 'constant rate' model for deliberation purposes.

2.5 The term 'TV' (Terminal Value)

Terminal' refers to the 'end' of something – in the valuation world, to 'terminate' would be to exit out of a particular investment or line of business. So, when an investor decides to pull out and book profits, he would not only be expecting a fair value of the value created, but also would definitely look to the 'horizon' and evaluate the future cash flows, to incorporate them into his 'selling price'. Hence, terminal value (TV) is also referred to as the 'horizon' value that the investor will forecast for valuing his investment at the exit point. Mostly TV is estimated using a perpetual growth model as per the Gordon model. We will see the practical usage of TV in the illustrations in the chapters that follow.

3. APPROACHES/ METHODS OF VALUATION

There are three approaches to valuing an enterprise:

(a) Assets Based Valuation Model

(b) Earning Based Models

(c) Cash Flow Based Models

Let's see these in detail as below:

3.1 Asset Based Approach

This approach is the standard asset value based approach where the starting point is the latest set of financial statements. A perusal of the same would help form an opinion on the type of the assets held by the enterprise and the book value of same. The assets can be tangible or intangible, and will be referred to as 'Non-Current assets' in the financials. A part of the assets would always be residing in the working capital cycle referred to as 'Net current assets', - the current assets needs to be net off with current liabilities (the payables side of the supply chain). We can depict the above with in a diagram as follows:

Total Assets	=	Fixed Assets + Intangible Assets + (Current Assets *minus* Current Liabilities)

From the 'Total Assets' derived, the value of debt should be subtracted as these are to be repaid off. The net result arrived at will be the book value of the enterprise. Book Value can be depicted as follows:

Book Value = Total Assets minus Long Term Debt

This can also be equated to share capital plus free reserves.

However, the book value approach will not essentially represent the true price of the assets because:

(a) Tangible assets may be undervalued or even overvalued

(b) Intangible assets may no longer be of actual saleable worth in the market

(c) Long term debt may have a terminal payout that needs to be catered to

So, in reality, the book value is always adjusted to such factors to assess the 'net realizable value' of the assets and hence is called as the 'Adjusted Book Value' approach.

In the below example we see that the realizable values are different as compared to the book values:

		Book Values	Net Realizable Values
Share Capital			
5000 equity shares of ₹ 10 each		50,000	50,000
Reserves and Surplus			
Free Reserves	30,000		
Revaluation Reserves	20,000	50,000	25,000
Long Term Debt			
(Term Loan from ZB Bank)		10,000	10,000
Current Liabilities		10,000	15,000
Total		**120,000**	**100,000**

Non Current Assets			
PPE	50,000		
Licenses	10,000	60,000	50,000
Current Assets			
Sundry Debtors	50,000		40,000
Cash	10,000	60,000	10,000
Total		**120,000**	**100,000**

The net book value in the above example would thus be total net realizable assets (100 thousands) minus the net liabilities (25 thousands) = 75 thousands, translating to ₹ 15 per share. (75 thousands/5000 equity shares)

Conclusions: The asset based approach can depict the enterprise's net worth fairly correctly using the fundamental principle of 'going concern'. However, it suffers from a major drawback – It fails to consider the ability of the enterprise to generate future revenues and how the market dynamics will affect the future operations and cash flow.

3.2 Income based Approach

This approach looks to overcome the drawbacks of using the asset-backed valuation approach by referring to the earning potential and using a multiplier - 'capitalization rate'. Earnings can best be depicted by EBITDA (Earnings before interest, taxes, depreciation and amortization), and capitalization rate will be computed either using the CAPM model discussed later in this chapter, or as multiples approach.

Example: Suppose A Ltd. made a Gross Profit of ₹ 1,000 000 and indirect expenses of ₹ 400 000. You are required to determine the Earning Value of the company as well per share (assuming number of shares as 100000). You further assume as follow:

Risk Free Return	4.5%
Market Rate of Return	12%
Beta	0.9

Solution

	₹ ('000s)
Gross Profit	1,000
Less: Indirect Expenses	(400)
EBIDTA	600

Capitalization Rate [4.5% + 0.9 (12% - 4.5%)]	11.25%
Earnings Value (600 /11.25%) of A Ltd.	5,333.33
No. of Shares	100
Earning Value Per Share	₹ 53.33

The EV obtained above will be divided by the number of shares to arrive at the value per share.

Another way to calculate the value of a business would be to take the EV/EBITDA multiple approach. It is a very popular method amongst analysts world over, as it overcomes most of the deficiencies in valuation. The term 'Enterprise Value' can be understood as the value of an entity as a whole for all classes of investors, as opposed to 'Equity Value' which focuses purely on shareholder value. Enterprise Value is also commonly referred to as 'Firm Value' or 'Total Enterprise Value (TEV)'.

We can approach Enterprise Value (EV) in two ways –

(a) Take Entity Value as the base, and then adjust for debt values for arriving the 'EV';

or

(b) Take a balance sheet based approach, and arrive at EV.

Approach (a):

Taking the same example we took in the income based approach, we work out the 'Equity Value' as follows:

Step I: Calculate the capitalized value at a multiple of, say, 5 for the industry as follows:

	₹ ('000s)
EBIDTA	600
EBIDTA multiple	5
Capitalized Value	**3,000**

Step II: Suppose if there is a debt of ₹ 300 000 and surplus fund to the tune of ₹ 500 000. To compute the equity value reduce the debt and add the surplus funds (cash and cash equivalents will represent shareholders' pool for dividend distribution). The result is as follows:

	₹ ('000s)
Capitalized Value	3,000
Less: Debt	(300)
Add: Surplus funds	500
Equity Value	**3,200**

The multiple can be compared to similar sector companies and the higher the multiple, the more chances that it may be overvalued. Conversely, a lower multiple may represent an undervalued stock, which may turn out to be a multi-bagger.

Approach (b): Let us discuss this approach with another example as follows:

Example

The balance sheet of HKurp Ltd is as follows:

Non Current Assets	1000
Current Assets	
Trade Receivables	500
Cash and cash equivalents	500
	2000
Shareholders' funds	800
Long Term Debt	200
Current Liabilities and Provisions	1000
	2000

The shares are actively traded and the Current Market Price (CMP) is 12 per share. Shareholder funds represent 70 shares of 10 each and rest is retained earnings.

Solution

Shares outstanding	70
CMP	12
Market Capitalization	**840**
Add: Debt	200
Less: Cash & Cash equivalents	-500
Enterprise Value (EV)	**540**

A couple of interesting details need to be spelled out here –

1. Enterprise Value calculated above is more from a point of view of arriving at an 'acquisition price' for a going concern that a potential buyer would provide, and,
2. Since we are using market cap, the message is loud and clear – market is intelligent. So it follows naturally that the CMP has already factored in past and future earnings, unsystematic risks and even systematic risks, and is continually adjusted for new or incremental price sensitive factors.

Of course, both the above points can be countered by arguing

a) that the long-term investor who is looking for a stable dividend payout will not bother too much on market cap, and,

b) the market need not know the best, if the stock is a small or a mid cap one.

However, the later argument can be overcome by drawing comparisons to similar industries in the same space.

3.3 Cash flow based approach

As opposed to the asset based and income based approaches, the cash flow approach takes into account the quantum of free cash that is available in future periods, and discounting the same appropriately to match to the flow's risk. Variant of this approach in context of equity has been discussed earlier in the chapter of Security Valuation.

Simply speaking, if the present value arrived post application of the discount rate is more than the current cost of investment, the valuation of the enterprise is attractive to both stakeholders as well as externally interested parties (like stock analysts). It attempts to overcome the problem of over-reliance on historical data as seen in both the previous methods. There are essentially five steps in performing DCF based valuation:

a) Arriving at the 'Free Cash Flow'

b) Forecasting of future cash flows (also called projected future cash flows)

c) Determining the discount rate based on the cost of capital

d) Finding out the Terminal Value (TV) of the enterprise

e) Finding out the present values of both the free cash flows and the TV, and interpretation of the results.

Let's take an example, with assumed figures, to understand how the DCF method works:

Step a:

	INR ('000s)	
Computation of free cash flows	**2016-17**	**Remarks**
EAT (Earning After Taxes)	600	
Less: One time incomes	(200)	One time events to be eliminated
Add: One time expenses	100	One time events to be eliminated
Add: Depreciation	100	Depreciation is a book entry
Free Cash Flow	**600**	

Step b:

Assumptions to arrive at Adjusted Free Cash Flow as below:

Free Cash Flow estimated to grow @ 5% p.a.

Suitable assumptions to be made for changes in WC and investments in FA

	Projected (in INR '000s)		
	2017-18	**2018-19**	**2019-20**
Free Cash Flow (5 % increment Y-o-Y)	600	630	662
Less: Changes in Working Capital Cycle	(50)	(30)	10
Less: Investment in Fixed assets	(50)	(50)	(20)
Adjusted Free Cash Flow	**500**	**550**	**652**

Step c:

	Discounted Cash Flows (in INR '000s)		
	2017-18	**2018-19**	**2019-20**
WACC (assumed)	8%	8%	8%
WACC (taken to 1)	1.08	1.17	1.26
Present Value of Cash flow	**463**	**472**	**517**

Step d:

Terminal Value: The perpetual growth that will be achieved after year 3 onwards is assumed @ 3%

Therefore, TV = (Cf at Year 3 * growth rate) / (WACC - growth rate) = (517*1.03)/(0.08 - 0.03) = **10653.94**

Step e:

Total DCF of enterprise = 12,106 thousands (PV of cash flows arrived in above table plus the TV arrived)

In other words, the value of the enterprise for a potential acquisition is 12106 thousands.

Author's note: the DCF being the most popularly used model, has got many variations introduced to it, one of them being the valuation of the TV. TV is calculated using the perpetual method, Gordon Growth Model. Besides, the FCF (free cash flow) can also be considered to be Unlevered FCF (in case of debt managed companies).

The DCF is indeed a revolutionary model for valuation as FCFs truly represent the intrinsic value of an entity. However, the whole calculation gravitates heavily on the WACC and the TV. In fact in many cases the TV is found to be a significant portion in final value arrived by DCF. This means

that the growth rate and underlying assumptions need to be thoroughly validated to deny any room for margin of error of judgment.

4. MEASURING COST OF EQUITY

4.1 Capital Assets Pricing Model (CAPM)

An alternative way to look at value of an investment or a portfolio is to view returns as a direct benefit of assuming risks. As discussed earlier the CAPM model is represented by the below formula:

$R = r_f + \beta (r_m - r_f)$

Where R = expected rate of return

r_f = risk free rate of return

β = Beta value of the stock

R_m = market rate of return

4.2 Arbitrage Pricing Model

It is obvious that the CAPM has gained massive popularity due to its 'intuitive based approach' of classifying risks into 2 buckets – 'a risk free part' and 'the risk part that is relative to the market index'. However, this is also its greatest inherent weakness - the oversimplification of risks.

In the 1970's Mr. Stephen Alan Ross, professor and economist, introduced the concept of 'multiple factors' that can influence the risk component – motley of 'macro-economic factors'. So, the basic idea is to breakdown risks into individual identifiable elements that influence the overall risk in a proportion (called 'factor'), and each factor gets assigned its own beta; and the sum total of all the assets' 'sensitivities' to 'n' factors will give the 'expected rate of return for the asset'.

In a simplistic way, if a particular asset, say a stock, has its major influencers as the 'interest rate fluctuations' and the 'sectoral growth rate', then the stocks' return would be calculated by using the Arbitrage Pricing Theory (APT)in the following manner:

a) Calculate the risk premium for both these two risk factors (beta for the risk factor 1 – interest rate, and beta of the risk factor 2 – sector growth rate; and,

b) Adding the risk free rate of return.

Thus, the formula for APT is represented as –

$R_f + \beta_1(RP_1) + \beta_2(RP_2) + \ldots \beta_j(RP_n)$

It is thereby clear that APT strives to model E(R) as 'a linear function of various macro-economic factors' where sensitivity to changes in each factor is represented by a factor-specific beta coefficient. Note that the APT by itself doesn't provide for the macro-economic factors that will be

needed to be tested for its sensitivity – however these have to be judicially developed by the financial analysts keeping in mind the economy they are put in.

4.3 Estimating Beta and Valuation of Unlisted Companies

You would have by this time realized the fact that 'information' holds the key to a successful valuation of an enterprise. The above valuation approaches we have seen viz. asset based, earnings based and cash flow based, can be applied freely for publicly traded companies where key information as regards to earnings, assets employed, and board's opinion on future potential and growth areas are readily available. Already, audited financial statements are widely used by financial analysts for various fund and brokerage houses to prepare their 'review scorecards' that will help the investor to decide whether to hold or sell the scripts on the trade bourses.

However, in a developing economy like India, where there are many privately held firms into e-retail, service management, hospitality, and such other sunrise sectors that are holding out a lot of promise and are increasingly getting attention as 'dark horse' by venture capitalists, angel investors etc; the moot question is how to value these entities in the absence of publicly available information? There are many a time that the directors of these companies do approach CAs for getting a 'valuation' done. The qualified accountant in private companies will also be involved in the valuation process. What needs to be appreciated is that valuation is indeed an onerous task, but if meticulously approached, can yield many dividends.

The biggest challenge in calculation of the 'value' of a privately held enterprise is arriving at the 'beta' for the private firm. We have to keep in mind that most of the publicly listed companies have leveraged capital, whereas the privately owned firms may not have either zero or insignificant amounts of debt. However, the strategic investor looking for stake would always like to grow it further on leveraged funds going forward. In fact this is the precisely the way forward – to raise funds thru corporate bonds and debt instruments. But as of the valuation date, the fact remains that the beta will have to reflect the 'unleveraged' position, and hence, we would use the 'unlevered beta', as opposed to levered beta.

With this in mind, let's proceed thru the intricacies involved:

Step I: Take the industry beta - the beta of similar listed companies would be good starting point. As stated above, the levered beta should be converted into unlevered to remove the impact of debt. The formula to be used is:

Unlevered beta = levered beta / 1 + (1 - tax rate) x (debt / equity)

Suppose you are unable to find out a straight benchmark beta. So, how to proceed? The next alternative then is to find the 'best fit'. Identify a 'peer group' of companies that operate in the same risk range and then recalibrate the underlying parameters such as earnings to sales, scale of operations etc, to find out the enterprise value. Multiple based on EV will give a more accurate figure of the firm value.

Step II: You need to be acutely aware that unlike listed companies, the financial statements of privately held firms may be having some gaps in accounting policies and accounting estimates, that would be needed to be adjusted to determine the correct earnings estimate.

Step III: The next step is to find out the Cost of equity –This can be done using the CAPM technique.

Step IV: Now as stated earlier, the company would more sooner than later have leveraged funds on its balance sheet. In the absence of a straight comparison for the resulting capital structure, this would be more estimate driven. The rate of borrowing cost can also be taken in line with the peers. The bankers to the private company can also give a quote in this case. Thus, the WACC rate that is to be applied will be achieved from this step.

Step V: Since this is a private company, the owners will demand a return towards 'goodwill'. However, in some cases, the acquisition price may include sweeteners for the erstwhile owners to continue in the merged firm, which will then dispense off the need to perform this step.

Step VI: Finally, the future cash flows of the private company will be treated (discounted) using the WACC rate obtained above as the discount factor

Step VII: The sum of the PV of the cashflows generated by the DCF will be the value of the firm.

Illustration 1

There is a privately held company X Pvt. Ltd that is operating into the retail space, and is now scouting for angel investors. The details pertinent to valuing X Pvt. Ltd are as follows –

The company has achieved break even this year and has an EBITDA of 90. The unleveraged beta based on the industry in which it operates is 1.8, and the average debt to equity ratio is hovering at 40:60. The rate of return provided by liquid bonds is 5%. The EV is to be taken at a multiple of 5 on EBITDA. The accountant has informed that the EBITDA of 90 includes an extraordinary gain of 10 for the year, and a potential write off of preliminary sales promotion costs of 20 are still pending. The internal assessment of rate of market return for the industry is 11%. The FCFs for the next 3 years are as follows:

	Y1	Y2	Y3
Future Cash flows	100	120	150

The pre-tax cost of debt will be 12%. Assume a tax regime of 30%.

What is the potential value to be placed on X Pvt. Ltd?

Solution

The levered beta of the company will be 1.8[1+(1-0.3)*40/60)] = 2.64

The adjusted EBITDA would be 90 –10 – 20 = 60

The EV will be multiple of 5 on the 60 obtained above = 300

The Cost of equity in accordance with CAPM = r (f) + β (Rm – Rf)

= 5% + 2.64 (11% - 5%) = 20.84%

The WACC = Cost of Equity + Cost of Debt

= 20.84 (60/100) + 12.0 (1-0.3) (40/100) = 15.864

Finally, the future cash flows can be discounted at the WACC obtained above as under –

	Y1	Y2	Y3
Future Cash flows	100	120	150
Discount factor	0.863	0.745	0.643
PVs of cash flows	86.30	89.40	96.45
VALUE OF THE FIRM			**272.15**

5. RELATIVE VALUATION

The three approaches that we saw to arriving at the value of an enterprise viz. the asset based, the earnings based and the cash flow based are for arriving at the 'intrinsic value' of the same. Relative Valuation is the method to arrive at a 'relative' value using a 'comparative' analysis to its peers or similar enterprises. However, increasingly the contemporary financial analysts are using relative valuation in conjunction to the afore-stated approaches to validate the intrinsic value arrived earlier.

The Relative valuation, also referred to as 'Valuation by multiples,' uses financial ratios to derive at the desired metric (referred to as the 'multiple') and then compares the same to that of comparable firms. (Comparable firms would mean the ones having similar asset and risk dispositions, and assumed to continue to do so over the comparison period). In the process, there may be extrapolations set to the desired range to achieve the target set. To elaborate –

1. Find out the 'drivers' that will be the best representative for deriving at the multiple
2. Determine the results based on the chosen driver(s) thru financial ratios
3. Find out the comparable firms, and perform the comparative analysis, and,
4. Iterate the value of the firm obtained to smoothen out the deviations

Step 1: Finding the correct driver that goes to determine the multiple is significant for relative valuation as it sets the direction to the valuation approach. Thereby, one can have two sets of multiple based approaches depending on the tilt of the drivers –

a) Enterprise value based multiples, which would consist primarily of EV/EBITDA, EV/Invested Capital, and EV/Sales.

b) Equity value based multiples, which would comprise of P/E ratio and PEG.

We have already seen the concept and application of Enterprise Value in previous section. However, in light of relative valuation, we can definitely add that whereas EV/EBITDA is a popular ratio and does provide critical inputs, the EV/Invested Capital will be more appropriate to capital intensive enterprises, and EV/Sales will be used by companies who are cash rich, have a huge order book, and forecast organic growth thru own capital.

The P/E has a celebrated status amongst Equity based multiples, and the PEG is more suitable where we are doing relative valuation of either high growth or sunrise industries.

Step 2: Choosing the right financial ratio is a vital part of success of this model. A factor based approach may help in getting this correct – for example – a firm that generates revenue mostly by exports will be highly influenced by future foreign exchange fluctuations. A pure P/E based ratio may not be reflective of this reality, which couldn't pre-empt the impacts that Brexit triggered on currency values. Likewise, an EV/Invested Capital would be a misfit for a company which may be light on core assets, or if has significant investment properties.

Step 3: Arriving at the right mix of comparable firms: This is perhaps the most challenging of all the steps – No two entities can be same – even if they may seem to be operating within the same risk and opportunity perimeter. So, a software company 'X' that we are now comparing to a similar sized company 'Y' may have a similar capital structure, a similar operative environment, and head count size – so far the two firms are on even platform for returns forecast and beta values. On careful scrutiny, it is now realized that the revenue generators are different – X may be deriving its revenues from dedicated service contracts having FTE pricing, whereas Y earns thru UTP pricing model. This additional set of information dramatically changes the risk structure – and this is precisely what the discerning investor has to watch for. In other words, take benchmarks with a pinch of salt.

Take another example – a firm is operating in a niche market, and that obviously leads to getting comparable firms become a difficult task. In such cases, one may have to look beyond the current operating market and identify similar structured companies from other industries – like for example – a medium sized LPO may have to evaluate based on the specific divisional figures of a Big 4 firm.

The comparable firm can either be from a peer group operating within the same risks and opportunities perimeter, or alternatively can be just take closely relevant firms and then perform a regression to arrive at the comparable metrics. You would notice that in our example, the LPO is adopting the later approach. Whereas the company 'X' will have to ignore 'Y' and search for a similar revenue-risk based company. However, as a last resort, it may adopt a regression based model as above.

Step 4: Iterate / extrapolate the results obtained to arrive at the correct estimate of the value of the firm.

Let's apply the above concepts into a relative valuation illustration:

F Ltd is a small sized company that is not listed. It is however a time tested company having positive cash flows and a net profit of 9%. The company has zeroed in two value drivers going forward – a higher than industry growth rate in sales, and higher internal efficiencies. The market that it operates in has a couple of large sized listed firms, exhibiting a beta of 1.3 & 1.5 respectively. How do we approach this from a relative valuation point of view?

We are given two value drivers that essentially point out to future earnings – so let's take the EV/EBITDA approach for enterprise valuation. Assume that on applying the EV techniques, we get an EV of 50 Million. The next step is to do ring fencing for adoption of the EV approach. Or conversely, if we were to adopt the elimination way of choosing the right fit, how do we decide against, say, EV/Invested Capital? An elaborate thought process requires to be established here, and the decision to be quantified and documented.

Next, assume we do have a comparable firm. May be its demonstrating the same characteristics in a larger scale than our company F Ltd. But how do we get absolutely sure on this? As discussed earlier, we may take similar firms from dissimilar industries. Or we get the sum-total of all firms within the industry and then do appropriate regressions to remove both large-scale factors and structural differences. An important factor would be leveraged capital. Listed companies do use to a lot more of leverage, and F Ltd may have to seriously recalibrate if its balance sheet stands light.

And finally, say we have arrived at a conclusion that the comparable firm is indeed an efficient model and is the correct indicator for appraising F Ltd – taking the values of comparable firms' Beta and potential growth estimates, you can value F Ltd.

A tweak to the above case can be brought by an insistence to use a P/E based approach. In this scenario, we have a market – ready PE for the comparable firm called 'M', who's PE is, say, at 10. However, how do we find out P/E for F Ltd which is an unlisted entity? We have to necessarily use analytical approach to finding out the correct 'earnings' - adjust for accounting policy mismatches with 'M' (F Ltd being an unlisted entity may have policies that exhibit laxity), adjust for cost of capital, and then arrive at the adjusted 'earnings' to apply the above PE. Alternatively, we may work out the PEG (the ratio of the PE to the expected growth rate of the firm) and evaluate the value of F Ltd.

Thus, we can conclude that 'Relative Valuation' is a comparative driven approach that assumes that the value of similar firms can form a good indicator for the value of the tested firm. There are some assumptions that are inherent to this model –

i. The market is efficient

ii. The function between the fundamentals and the multiples are linear

iii. The firms that are comparable are similar to structure, risk and growth pattern

6. OTHER APPROACHES TO VALUE MEASUREMENT

6.1 Contemporary Approaches to Valuation

With businesses become exceedingly technology driven and managements now trying to position themselves as 'value creators' thereby venturing into a 'conglomerate' way of thinking and running business, the concept of value and valuation has also undergone a paradigm shift. The tag for 'MNC' and inorganic growth has given rise to complex structures and tiers of management styles and business houses. Of course, the more discerning of the lot would still stick to the original game-plan as has been ruminated by us in the sections of this guide till now – separate the seed from the chaff - by using the time honored 'asset' based, or 'income' based approaches or by adopting a more mature 'cash flow' based one; and even a meticulous combination of all the three; but it's not common to find the bull market referring to, and analysts liberally using terminologies like the 'PEs' and 'Exit Multiples', and to 'LBOs' and 'Brand Value'.

It is worth noting here that some of these concepts used in valuation have been borne out of the peculiarities of certain industries. An internet company would have virtually zero fixed assets – but a robust online presence and a huge brand recall value. This would give rise to a new method of valuation – price per page visited. Or an online play store can be valued now using 'price per subscriber'. However, like previously referred, the more discerning would still like to ask for the cash to sales ratio, apply a DCF model before they put the money in the pot.

Another contemporary way to value a company is to have 'goodwill' based approach – a retail giant looking to desperately acquire a traditional mom-pop store in a particular hotspot that is giving a run for its money could rightfully adopt this method – firstly take an asset based valuation, and then value for the goodwill separately by linking a multiple to its annual sales or its footfall.

The PE multiple that all pink papers are so fond of, refers to the Price Earnings Ratio (PER) – it equates the EPS (earnings per share) to the price prevailing on the stock market – the logic being that the market prices the stock based on its fundamentals, and as a corollary you don't have to look beyond the same to value the stock! So, assume the EPS of a company is INR 50, and the average share price over the last quarter is INR 40, the PER would be 50/40 which works to 1.25. But we need to understand the important fact that PER is a relative figure, and comparison across industries in the same sector can give a more median PER that may be acceptable for valuation purposes.

LBOs (Leveraged Buy Outs) – The increasing complex nature of commerce and its applications have given rise to a new category of 'strategic investors' – price equity (PE) firms who scout for enterprises in the 'rough', acquire the same using a clever mix of debt and equity (typically at 70:30 debt to equity), and then targeting to sell the same within a medium term period, say 3 to 5 years. In the process, they leverage on the debt and create value (both perceived and real), and then they either spin off the management control to another entity for a price, or go for an outright sale.

Example

X is a small software company that is providing a niche data control and testing service having 60 employees and some steady contracts, which generates an EBIDTA of INR 100 Lacs per year. A venture capitalist (VC) convinces the managing director of the company to sell off the majority stake to him – valued at a premium of 100% per share over the book value plus one time goodwill payoff of INR 50 Lacs, using an income based valuation approach. The total consideration is thus at INR 250 Lacs.

Next, the VC will rope in a banker to pump in INR 200 Lacs for the acquisition-cum-expansion as well as to do brand marketing, thereby making the company a visible player in the market. The gap of INR 50 Lacs is his contribution as promoter equity towards securities premium. Since the core operations team is not dismantled, the company easily achieves a 20% average growth in each of the next 3 years.

At the end of the third year, the VC puts the company on the 'sale block' and is able to garner interest of a leading MNC in the same. The exit multiple that the VC looks is at 7 times the EBDAT. The entity value is hypothetically worked as under –

	INR (in Lacs)			
	Y0	**Y1**	**Y2**	**Y3**
EBIDTA	100	120	144	173
Less: Interest	36	33	32	30
EBDTA	64	87	112	143
Less: Taxes @ 30%	19.2	26.1	33.6	42.8
EBDAT	**44.8**	**60.9**	**78.4**	**100.0**
Multiple				7
Capitalised Value at end of Y3				700
Less: Debt #				(200)
Equity Value				**500**
# Debt principal repayment assumed 20% over the 3 years starting Y4				

One of the prime casualties in a LBO model is that the future cannot be predicted with exactitude. Thus, if at end of Y3, the industry is caught in a cyclical slowdown, the VC will find itself saddled with a huge loan and burgeoning interest costs difficult to recycle.

6.2 Economic Value Added (EVA) and Market Value Added (MVA)

Economic Value Added (EVA) is a holistic method of evaluating a company's financial performance, which means that EVA is used not only as a mere valuation technique, but also to find the economic contribution of a company to the society at large. The core concept behind EVA is that a company generates 'value' only if there is a creation of wealth in terms of returns in

excess of its cost of capital invested. So if a company's EVA is negative, it means the company is not generating value from the funds invested into the business. Conversely, a positive EVA shows a company is producing value from the funds invested in it.

Why EVA? Up to now we have seen several financial performance metrics like ROI, ROCE, etc. and also several approaches based on asset base / earnings / FCFs to finding out the 'worth' of the entity. Then what is the need for EVA? Or in other words, what is the gap that EVA is trying to fill in, that others couldn't?

The answer to the above is the way EVA looks at performance of the 'management' of a company. To elaborate, all the approaches seen up to now were just a function of 'number-crunching'. But EVA tries to make management more accountable to their individual decisions and the impact of decisions on the path to progress of the company. Take a simple example – if there are two dissimilar but equal risk opportunities that are feasible and the management needs to take a decision, it would most probably go by the project which would break-even earlier. In choosing so it is also cutting down the risk of future losses, fair enough. However, had the management invested in both the projects, still it would have generated a positive IRR, though the second one would have had a larger pay-back period. This impact of management's strategic decision making comes out evidently in EVA computations, whereas under the techniques seen till now, this performance-driven aspect would have never been highlighted. The efficiency of the management gets highlighted in EVA, by evaluating whether returns are generated to cover the cost of capital.

EVA is a performance measure for management of the company, and this is as evident in its calculation formula as 'the excess of returns over the weighted average cost of invested capital '. The formula is as below –

EVA = NOPAT – (Invested Capital * WACC)

OR

NOPAT – Capital Charge

The concept NOPAT (net operating profit after tax) is nothing but EBIT minus tax expense. The logic is that we are trying to find out the cash returns that business operations would make after tax payments. Note that we have left depreciation untouched here – it being an operational expense for the limited purposes of EVA. From this NOPAT we need to further identify the non-cash expenses and adjust for the same to arrive at the 'actual' cash earnings. One common non-cash adjustment would 'provision for bad and doubtful debts', as this would just be a book entry.

After arriving at the correct NOPAT, the next step would be finding the capital charge. This would involve finding out

(a) Invested Capital – Which would be easy from published financials, as it would be the difference between total assets subtracted by the non-interest bearing current liabilities, like sundry creditors, billing in advance, etc. Care should be taken to do the adjustments for non-cash elements like provision for bad and doubtful debts.

(b) Applying the company's WACC on the invested capital arrived in step (a)

Finally the EVA is computed by reducing the capital charge as calculated by applying the WACC on the invested capital from the adjusted NOPAT.

Illustration 2

Compute EVA of A Ltd. with the following information:

Profit and Loss Statement		**Balance Sheet**	
Revenue	1000	PPE	1000
Direct Costs	-490	Current Assets	300
SGA	-200		**1300**
EBIT	**310**	Equity	700
Interest	-10	Reserves	100
EBT	**300**	Non Current Borrowings	100
Tax Expense	-100	Current Liabilities & Provisions	400
EAT	**200**		**1300**

Assume bad debts provision of 20 is included in the SGA, and 20 reduced from the trade receivables in current assets.

Also assume that the pre-tax Cost of Debt is 12%, Tax Rate is 33.33% and Cost of Equity (i.e. the expected shareholder's return) is 8.45%.

Solution

Step I: Computation of NOPAT

NOPAT	
EBIT	400
Less: Taxes	-100
Add: Non Cash Expenses	20
NOPAT	**320**

Step II: Finding out the Invested Capital:

Invested Capital	
Total Assets	1300
Less: Non Interest bearing liabilities	-400
	900
Add: Non Cash adjustment	20
	920

Note: It is assumed that the current liabilities also include the 100 of tax liability.

Step III: Compute the WACC

WACC = Cost of equity + Cost of debt

In this case, WACC = (800/900*8.45%) + [100/900*12% (1 - 0.3333)] = 8.40%

Step IV: Find out the Capital Charge

Capital Charge = Invested Capital * WACC = 920 * 8.40% = 77.28

Step V: EVA = NOPAT – Capital Charge = 320 – 77.28 = 242.72

The 'MVA' (Market Value Added) simply means the Current Market Value of the firm minus the Invested Capital that we obtained above. Let the current MV of the firm be 1000. Hence MVA will be –

1000 – 920 = 80.

The MVA is also an alternative way to gauge performance efficiencies of an enterprise, albeit from a market capitalization point of view, the logic being that the market will discount the efforts taken by the management fairly. Hence, the MVA of 80 arrived in example above is the true value added that is perceived by the market. In contrast, EVA is a derived value added that is for the more discerning investor.

Companies with a higher MVA will naturally become the darlings of the share market, and would eventually become 'pricey' from a pure pricing perspective. In such cases, the EVA may also sometimes have a slightly negative correlation as compared to MVA. But this will be a short term phenomenon as eventually the gap will get closed by investors themselves. A stock going ex-dividend will exhibit such propensities.

We can conclude that the main objective of EVA is thus to show management efficiency in generating returns over and above the hurdle rate of invested capital.

6.3 Shareholder Value Analysis (SVA)

Now that we have seen 'EVA' and 'MVA', let's proceed to see the concept of 'SVA'. But questions first – why SVA? And how does SVA behave?

We understand that the EVA is the residual that remains if the 'capital charge' is subtracted from the NOPAT. The 'residual' if positive simply states that the profits earned are adequate to cover the cost of capital.

However, is NOPAT the only factor that affects shareholder's wealth? The answer is not a strict 'no', but definitely it is 'inadequate', as it doesn't take future earnings and cash flows into account. In other words, NOPAT is a historical figure, albeit a good one though, but cannot fully represent for the future potencies of the entity. More importantly, it doesn't capture the future investment opportunities (or the opportunity costs, whichever way you look). SVA looks to plug in this gap by

tweaking the value analysis to take into its foray certain 'drivers' that can expand the horizon of value creation. The key drivers considered are of 'earnings potential in terms of sales, investment opportunities, and cost of incremental capital.

The following are the steps involved in SVA computation:

(a) Arrive at the Future Cash Flows (FCFs) by using a judicious mix of the 'value drivers'

(b) Discount these FCFs using the WACC

(c) Add the terminal value to the present values computed in step (b)

(d) Add the market value of non-core assets

(e) Reduce the value of debt from the result in step (d) to arrive at value of equity.

Let's take a progressive case study to run through the SVA calculations:

Step a.1: Using the appropriate value drivers, arrive at the operating cash flows:

				(in Millions)
	Y1	**Y2**	**Y3**	**Y4 onwards**
EBIT (growing at 5% yearly)	100	105	110	116
Interest Cost	5	6	7	8
EBT	95	99	103	108
Taxes @ 33%	31	33	34	36
EAT	**64**	**66**	**69**	**72**
Add back : Depreciation	5	5	6	7
Add back : One time writeoffs	1	-	-	-
Operating Cash Flow	**70**	**71**	**75**	**79**

Step a(2):

Operating Cash Flow	**70**	**71**	**75**	**79**
Less: Forecasted Capital Investments		12	6	9
Less: Forecasted Net Working Capital	5	5	6	7
Free Cash Flow (FCFs)	**65**	**54**	**63**	**63**

Step b: Applying the WACC to find out the discounted values:

Free Cash Flow (FCFs)	**65**	**54**	**63**	**63**
WACC (discount rate) @ 12%	0.89	0.80	0.71	0.64
Present Value of FCFs	**58**	**43**	**45**	**40**

Step c: Finding out the proper TV:

Present Value of FCFs	**58**	**43**	**45**	**40**
Multiplier for TV (assumed at 3)				3
Present Value of FCFs	**58**	**43**	**45**	**120**

Step d & e:

Total PVs	**266**
Add: Investment Property (at FV)	35
Less: Carrying cost of Debt	(19)
Value of Equity	**282**

Thus, we observe that SVA brings out a futuristic sense of value for shareholders. Infact, this can be a good benchmark for shareholders from a cash return on investment perspective too.

7. ARRIVING AT FAIR VALUE

The ultimate purpose of a potential acquirer of the controlling stake and / or the takeover of a company is that 'he would purchase the same at the fair price – no less no more'.

Infact, the approaches to valuation seen in this chapter along with the different methods of performing a value added analysis is to identify entities that are 'attractive' in terms of the true value to a potential investor.

An accountant's perspective to 'fair value' would automatically envisage a transaction to be measured at the arm's length. For a financial analyst, the term would be akin to the present value of an entity in cash terms, and for a speculative investor, the term would represent the arbitrage opportunities that open up among similar entities having dissimilar value numbers put to it.

However, it's an undeniable fact that in an upward boom time, the valuations defy fair value, for example, the dot com boom had companies getting valued for astronomical sums. And when the downturn arrived, some of these companies vanished and others were just able to stand up their ground.

The Concept of 'Relative Valuation': One way to look at the practical implementation of fair value within the valuation context would be to identify assets that are similar to the ones held by the acquiree company so that the values can be compared. This would be a significant departure from the 'intrinsic value' approach that we have seen until now. Trying to get a value that would be the nearest to the market price would mean that the valuation of a particular portfolio, or a divestiture in an entity, would happen at an agreeable price that fits into the normal distribution.

In one sense, we are indeed using the relative valuation in a limited approach when we speak about expected market returns, or when we are adopting an index based comparative. The more the asset pricing gets correlated to the similar assets in the market, the more inclusive it gets.

Thus, when we are comparing bonds, the closer the YTM of the bond to the government index of return, the more credible it gets when it comes to pricing.

CASE STUDIES

A couple of real life case studies would help us to understand the Concepts better –

Case Study 1

The application of 'valuation' in the context of the merger of Vodafone with Idea Cellular Ltd:

The valuation methods deployed by the appointed CA firms for the merger were as follows:

a) Market Value method: The share price observed on NSE (National Stock Exchange) for a suitable time frame has been considered to arrive at the valuation.

b) Comparable companies' market multiple method: The stock market valuations of comparable companies on the BSE and NSE were taken into account.

c) NAV method: The asset based approach was undertaken to arrive at the net asset value of the merging entities as of 31st December 2016.

Surprisingly, the DCF method was not used for valuation purposes. The reason stated was that the managements to both Vodafone and Idea had not provided the projected (future) cash flows and other parameters necessary for performing a DCF based valuation.

The final valuation done using methods a to c gave a basis to form a merger based on the 'Share Exchange' method.

Above information extracted from: 'Valuation report' filed by Idea Cellular with NSE

However, let's see how the markets have reacted to this news – the following article published in The Hindu Business Line dated 20th March 2017 will give a fair idea of the same:

"Idea Cellular slumped 9.6 per cent as traders said the implied deal price in a planned merger with Vodafone PLC's Indian operations under-valued the company shares.Although traders had initially reacted positively to the news, doubts about Idea's valuations after the merger sent shares downward.

Idea Cellular Ltd fell as much as 14.57 per cent, reversing earlier gains of 14.25 per cent, after the telecom services provider said it would merge with Vodafone Plc's Indian operations."

Hence, we can conclude that the valuation methods, though technically correct, may not elicit a positive impact amongst stockholders. That is because there is something called as 'perceived value' that's not quantifiable. It depends upon a majority of factors like analyst interpretations, majority opinion etc.

Case Study 2

Valuation model for the acquisition of 'WhatsApp' by Facebook

Facebook announced the takeover of WhatsApp for a staggering 21.8 billion USD in 2015. The key characteristics of WhatsApp that influenced the deal were –

a) It is a free text-messaging service and with a $1 per year service fee, had 450 million users worldwide close to the valuation date.

b) 70% of the above users were active users.

c) An aggressive rate of user account increase of 1 million users a day would lead to pipeline of 1 billion users just within a year's range.

The gross per-user value would thus, come to an average of USD 55, which included a 4 billion payout as a sweetener for retaining WhatsApp employees post takeover. The payback for Facebook will be eventually to monetize this huge user base with recalibrated charges on international messaging arena. Facebook believes that the future lies in international, cross-platform communications.

Above information extracted from the official website of business news agency 'CNBC'

TEST YOUR KNOWLEDGE

Theoretical Questions

1. Differentiate between EVA and MVA.

2. Relative Valuation is the method to arrive at a 'relative' value using a 'comparative' analysis to its peers or similar enterprises. Elaborate this statement.

Practical Questions

1. ABC Company is considering acquisition of XYZ Ltd. which has 1.5 crores shares outstanding and issued. The market price per share is ₹ 400 at present. ABC's average cost of capital is 12%. Available information from XYZ indicates its expected cash accruals for the next 3 years as follows:

Year	₹ Cr.
1	250
2	300
3	400

Calculate the range of valuation that ABC has to consider. (PV factors at 12% for years 1 to 3 respectively: 0.893, 0.797 and 0.712).

2. Eagle Ltd. reported a profit of ₹ 77 lakhs after 30% tax for the financial year 2011-12. An

analysis of the accounts revealed that the income included extraordinary items of ₹ 8 lakhs and an extraordinary loss of ₹10 lakhs. The existing operations, except for the extraordinary items, are expected to continue in the future. In addition, the results of the launch of a new product are expected to be as follows:

	₹ In lakhs
Sales	70
Material costs	20
Labour costs	12
Fixed costs	10

You are required to:

(i) Calculate the value of the business, given that the capitalization rate is 14%.

(ii) Determine the market price per equity share, with Eagle Ltd.'s share capital being comprised of 1,00,000 13% preference shares of ₹ 100 each and 50,00,000 equity shares of ₹ 10 each and the P/E ratio being 10 times.

3. H Ltd. agrees to buy over the business of B Ltd. effective 1st April, 2012.The summarized Balance Sheets of H Ltd. and B Ltd. as on 31st March 2012 are as follows:

Balance sheet as at 31st March, 2012 (In Crores of Rupees)

Liabilities:	**H. Ltd**	**B. Ltd.**
Paid up Share Capital		
-Equity Shares of ₹100 each	350.00	
-Equity Shares of ₹10 each		6.50
Reserve & Surplus	950.00	25.00
Total	**1,300.00**	**31.50**
Assets:		
Net Fixed Assets	220.00	0.50
Net Current Assets	1,020.00	29.00
Deferred Tax Assets	60.00	2.00
Total	**1,300.00**	**31.50**

H Ltd. proposes to buy out B Ltd. and the following information is provided to you as part of the scheme of buying:

(1) The weighted average post tax maintainable profits of H Ltd. and B Ltd. for the last 4 years are ₹ 300 crores and ₹ 10 crores respectively.

(2) Both the companies envisage a capitalization rate of 8%.

(3) H Ltd. has a contingent liability of ₹ 300 crores as on 31st March, 2012.

(4) H Ltd. to issue shares of ₹ 100 each to the shareholders of B Ltd. in terms of the exchange ratio as arrived on a Fair Value basis. (Please consider weights of 1 and 3 for the value of shares arrived on Net Asset basis and Earnings capitalization method respectively for both H Ltd. and B Ltd.)

You are required to arrive at the value of the shares of both H Ltd. and B Ltd. under:

(i) Net Asset Value Method

(ii) Earnings Capitalisation Method

(iii) Exchange ratio of shares of H Ltd. to be issued to the shareholders of B Ltd. on a Fair value basis (taking into consideration the assumption mentioned in point 4 above.)

4. The valuation of Hansel Limited has been done by an investment analyst. Based on an expected free cash flow of ₹ 54 lakhs for the following year and an expected growth rate of 9 percent, the analyst has estimated the value of Hansel Limited to be ₹ 1800 lakhs. However, he committed a mistake of using the book values of debt and equity.

The book value weights employed by the analyst are not known, but you know that Hansel Limited has a cost of equity of 20 percent and post tax cost of debt of 10 percent. The value of equity is thrice its book value, whereas the market value of its debt is nine-tenths of its book value. What is the correct value of Hansel Ltd?

ANSWERS/ SOLUTIONS

Answers to Theoretical Questions

1. Please refer paragraph 6.2

2. Please refer paragraph 5

Answers to the Practical Questions

1. VALUATION BASED ON MARKET PRICE

Market Price per share	₹ 400
Thus value of total business is (₹ 400 x 1.5 Cr.)	₹ 600 Cr.

VALUATION BASED ON DISCOUNTED CASH FLOW

Present Value of cash flows

(₹ 250 cr x 0.893) + (₹ 300 cr. X 0.797) + (₹ 400 cr. X 0.712) = ₹ 747.15 Cr.

Value of per share (₹ 747.15 Cr. / 1.5 Cr) ₹ 498.10 per share

RANGE OF VALUATION

	Per Share ₹	Total ₹ Cr.
Minimum	400.00	600.00
Maximum	498.10	747.15

2. (i) Computation of Business Value

			(₹ Lakhs)
Profit before tax $\frac{77}{1-0.30}$			110
Less: Extraordinary income			(8)
Add: Extraordinary losses			10
			112
Profit from new product		(₹ Lakhs)	
Sales		70	
Less: Material costs	20		
Labour costs	12		
Fixed costs	10	(42)	28
			140.00
Less: Taxes @30%			42.00
Future Maintainable Profit after taxes			98.00
Relevant Capitalisation Factor			0.14
Value of Business (₹98/0.14)			700

(ii) Determination of Market Price of Equity Share

Future maintainable profits (After Tax)	₹ 98,00,000
Less: Preference share dividends 1,00,000 shares of ₹ 100 @ 13%	₹ 13,00,000
Earnings available for Equity Shareholders	₹ 85,00,000
No. of Equity Shares	50,00,000
Earning per share = $\frac{₹\ 85,00,000}{50,00,000}$ =	₹ 1.70
PE ratio	10
Market price per share	₹ 17

3. (i) Net asset value

H Ltd.	$\frac{₹\ 1300\ \text{Crores} - ₹\ 300\ \text{Crores}}{3.50\ \text{Crores}} = ₹\ 285.71$

B Ltd.	$\frac{₹\ 31.50\ Crores}{0.65\ Crores} = ₹\ 48.46$

(ii) Earning capitalization value

H Ltd.	$\frac{₹\ 300\ Crores / 0.08}{3.50\ Crores} = ₹\ 1071.43$
B Ltd.	$\frac{₹\ 10\ Crores / 0.08}{0.65\ Crores} = ₹\ 192.31$

(iii) Fair value

H Ltd.	$\frac{₹\ 285.71 \times 1 + ₹\ 1071.43 \times 3}{4} = ₹\ 875$
B Ltd.	$\frac{₹\ 48.46 \times 1 + ₹\ 192.31 \times 3}{4} = ₹\ 156.3475$

Exchange ratio ₹156.3475/ ₹875 = 0.1787

H Ltd should issue its 0.1787 share for each share of B Ltd.

Note: In above solution it has been assumed that the contingent liability will materialize at its full amount.

4. Cost of capital by applying Free Cash Flow to Firm (FCFF) Model is as follows:-

$$\text{Value of Firm} = V_0 = \frac{FCFF_1}{K_c - g_n}$$

Where –

$FCFF_1$ = Expected FCFF in the year 1

K_c= Cost of capital

g_n = Growth rate forever

Thus, ₹ 1800 lakhs = ₹ 54 lakhs /(K_c-g)

Since g = 9%, then K_c = 12%

Now, let X be the weight of debt and given cost of equity = 20% and cost of debt = 10%, then 20% (1 – X) + 10% X = 12%

Hence, X = 0.80, so book value weight for debt was 80%

∴ Correct weight should be 60 of equity and 72 of debt.

∴ Cost of capital = K_c = 20% (60/132) + 10% (72/132) = 14.5455% and correct firm's value = ₹ 54 lakhs/(0.1454 – 0.09) = ₹ 974.73 lakhs.

CHAPTER 13

MERGERS, ACQUISITIONS & CORPORATE RESTRUCTURING

LEARNING OUTCOMES

After going through the chapter student shall be able to understand

- Conceptual Framework
- Rationale
- Forms
- Mergers and Acquisitions
  - Financial Framework
  - Takeover Defensive Tactics
  - Reverse Merger
- Divestitures
  - Partial Sell off
  - Demerger
  - Equity Carve outs
- Ownership Restructuring
  - Going Private
  - Management/ Leveraged Buyouts
- Cross Border Mergers

1. CONCEPTUAL FRAMEWORK

Restructuring of business is an integral part of modern business enterprises. The globalization and liberalization of Control and Restrictions has generated new waves of competition and free trade. This requires Restructuring and Re-organisation of business organization to create new synergies to face the competitive environment and changed market conditions.

Restructuring usually involves major organizational changes such as shift in corporate strategies. Restructuring can be internally in the form of new investments in plant and machinery, Research and Development of products and processes, hiving off of non-core businesses, divestment, sell-offs, de-merger etc. Restructuring can also take place externally through mergers and acquisition (M&A) and by forming joint-ventures and having strategic alliances with other firms.

The topic of Mergers and Acquisition has already been discussed in previous section. It is now proposed to focus on Corporate Restructuring.

The aspects relating to expansion or contraction of a firm's operations or changes in its assets or financial or ownership structure are known as corporate re-structuring. While there are many forms of corporate re-structuring, mergers, acquisitions and takeovers, financial restructuring and re-organisation, divestitures de-mergers and spin-offs, leveraged buyouts and management buyouts are some of the most common forms of corporate restructuring.

The most talked about subject of the day is Mergers & Acquisitions (M&A). In developed economies, corporate Mergers and Acquisition is a regular feature. In Japan, the US and Europe, hundreds of mergers and acquisition take place every year. In India, too, mergers and acquisition have become part of corporate strategy today.

Mergers, acquisitions and corporate restructuring business in India have grown by leaps and bounds in the last decade. From about $4.5 billion in 2004, the market for corporate control zoomed to $ 13 billion in 2005 and reached to record $56.2 billion in 2016. This tremendous growth was attributed to the fact that the foreign investors were looking for an alternative destination, preferably a growing economy as their own country was reeling under the pressure of recession. This was caused by the tough macro economic climate created due to Euro Zone crisis and other domestic reasons such as inflation, fiscal deficit and currency depreciation.

The terms 'mergers; 'acquisitions' and 'takeovers' are often used interchangeably in common parlance. However, there are differences. While merger means unification of two entities into one, acquisition involves one entity buying out another and absorbing the same. In India, in legal sense merger is known as 'Amalgamation'.

The amalgamations can be by merger of companies within the provisions of the Companies Act, and acquisition through takeovers. While takeovers are regulated by SEBI, Mergers and Acquisitions (M & A) deals fall under the Companies Act. In cross border transactions, international tax considerations also arise.

Halsburry's Laws of England defined amalgamation as a blending of two or more existing undertakings, the shareholders of each **amalgamating** company becoming substantially the shareholders in the **amalgamating** company. Accordingly, in a merger, two or more companies combine into a single unit.

The term "amalgamation" is used when two or more companies are amalgamated or where one is merged with another or taken over by another. In Inland steam Navigation Workers Union vs. R.S. Navigation Company Ltd., it was observed that in case of amalgamation, the rights and liabilities of a company are amalgamated into another so that the transferee company becomes vested with all rights and liabilities of the transferor company.

An **acquisition** is when both the acquiring and acquired companies are still left standing as separate entities at the end of the transaction. A **merger** results in the legal dissolution of one of the companies, and a **consolidation** dissolves both of the parties and creates a new one, into which the previous entities are merged.

Corporate takeovers were started by Swaraj Paul when he tried to takeover Escorts. The other major takeovers are that of Ashok Leyland by the Hindujas Shaw Wallace, Dunlop, and Falcon Tyres by the Chabbria Group; Ceat Tyres by the Goenkas; and Consolidated Coffee by Tata Tea. The BIFR arranged for the takeover of companies by giants like ITC, McDowells, Lakshmi Machine Works, and the Somani Group.

Many new companies are being incorporated as a result of the fast growing industrialisation of the country which is mainly dependent on agriculture. With the new trends of globalisation, not only in this country but also worldwide, there has been increasing interaction of companies and persons of one country with those of other countries. Today, corporate restructuring has gained momentum and undertakings and companies are merging, demerging, divesting and taking in or taking over companies and undertakings, both unregistered and registered, in India and outside.

Against this corporate backdrop, mergers and acquisitions have to be encouraged in the interest of the general public and for the promotion of industry and trade. At the same time the government has to safeguard the interest of the citizens, the consumers and the investors on the one hand and the shareholders, creditors and employees/workers on the other.

Chapter XV (Section 230 to 240) of Companies Act, 2013 (the Act) contains provisions on 'Compromises, Arrangements and Amalgamations', that covers compromise or arrangements, mergers and amalgamations, Corporate Debt Restructuring, demergers, fast track mergers for small companies/holding subsidiary companies, cross border mergers, takeovers, amalgamation of companies in public interest etc.,.

Special restructuring processes such as 'Reconstruction' of sick industrial companies envisaged by the Sick Industries (Special Provisions) Act, 1985 and 'Revival' of financially unviable companies envisaged by sec 72A of the Income Tax Act, 1961. However, all such mergers and acquisitions are also governed or controlled through relevant provisions of the Foreign Exchange Management Act, 1999; Income Tax Act, 1961; Industries (Development and Regulation) Act,

1951, the Competition Act 2002; the restrictions imposed by other relevant Acts including SEBI Act, 1992, as the case may be.

Amalgamation signifies the transfer of all or some part of the assets and liabilities of one or more than one existing company to another existing company or of two or more existing companies or to a new company, of which transferee company or all the members of the transferor company or companies become, or have the right of becoming, members and generally, such amalgamation is accomplished by a voluntary winding-up of the transferor company or companies.

Under an amalgamation, merger or takeover, two (or more) companies are merged either de jure by a consolidation of their undertakings or de facto by the acquisition of a controlling interest in the share capital of one by the other or of the capital of both by a new company.

Amalgamation is a state of things under which either two companies are so joined to form a third entity or one is absorbed into or blended with another."

"Generally, where only one company is involved in a scheme and the rights of the shareholders and creditors are varied, it amounts to **reconstruction or reorganisation or scheme of arrangement.** In an amalgamation, two or more companies are fused into one by merger or by one taking over the other. Amalgamation is a blending of two or more existing undertakings into one undertaking, the shareholders of each blending company become substantially the shareholders of the company which is to carry on the blended undertaking. There may be amalgamation either by the transfer of two or more undertakings to a new company, or by the transfer of one or more undertaking to an existing company. Strictly, 'amalgamation' does not cover the mere acquisition by a company of the share capital of the other company which remains in existence and continues its undertaking but the context in which the term is used may show that it is intended to include such an acquisition."

2. RATIONALE FOR MERGERS AND ACQUISITIONS

The most common reasons for Mergers and Acquisition (M&A) are:

- **Synergistic operating economics:** Synergy May be defined as follows:

  $$V(AB) > V(A) + V(B).$$

  In other words the combined value of two firms or companies shall be more than their individual value Synergy is the increase in performance of the combined firm over what the two firms are already expected or required to accomplish as independent firms (Mark L Sirower of Boston Consulting Group, in his book "The Synergy Trap"). This may be result of complimentary services economics of scale or both.

  A good example of complimentary activities can a company may have a good networking of branches and other company may have efficient production system. Thus the merged companies will be more efficient than individual companies.

On similar lines, economies of large scale is also one of the reasons for synergy benefits. The main reason is that, the large scale production results in lower average cost of production e.g. reduction in overhead costs on account of sharing of central services such as accounting and finances, office executives, top level management, legal, sales promotion and advertisement etc.

These economies can be "real" arising out of reduction in factor input per unit of output, whereas pecuniary economics are realized from paying lower prices for factor inputs for bulk transactions. Other factors for Synergies are as follows:

- **Diversification:** In case of merger between two unrelated companies would lead to reduction in business risk, which in turn will increase the market value consequent upon the reduction in discount rate/ required rate of return. Normally, greater the combination of statistically independent or negatively correlated income streams of merged companies, there will be higher reduction in the business risk in comparison to companies having income streams which are positively correlated to each other.
- **Taxation:** The provisions of set off and carry forward of losses as per Income Tax Act may be another strong season for the merger and acquisition. Thus, there will be Tax saving or reduction in tax liability of the merged firm. Similarly, in the case of acquisition the losses of the target company will be allowed to be set off against the profits of the acquiring company.
- **Growth:** Merger and acquisition mode enables the firm to grow at a rate faster than the other mode viz., organic growth. The reason being the shortening of 'Time to Market'. The acquiring company avoids delays associated with purchasing of building, site, setting up of the plant and hiring personnel etc.
- **Consolidation of Production Capacities and increasing market power:** Due to reduced competition, marketing power increases. Further, production capacity is increased by the combination of two or more plants.The following table shows the key rationale for some of the well known transactions which took place in India in the recent past.

Rationale for M & A

Instantaneous growth, Snuffing out competition, Increased market share.	• Airtel – Loop Mobile (2014) (Airtel bags top spot in Mumbai Telecom Circle)
Acquisition of a competence or a capability	• Google – Motorola (2011) (Google got access to Motorola's 17,000 issued patents and 7500 applications)
Entry into new markets/product segments	• Airtel – Zain Telecom (2010) (Airtel enters 15 nations of African Continent in one shot)

Access to funds	• Ranbaxy – Sun Pharma (2014) (Daiichi Sankyo sold Ranbaxy to generate funds)
Tax benefits	• Burger King (US) – Tim Hortons(Canada) (2014) (Burger King could save taxes in future)
Instantaneous growth, Snuffing out competition, Increased market share.	• Facebook – Whatsapp (2014) (Facebook acquired its biggest threat in chat space)
Acquisition of a competence or a capability	• Flipkart – Myntra (2014) (Flipkart poised to strengthen its competency in apparel e-commerce market)
Entry into new markets/product segments	• Cargill – Wipro (2013) (Cargill acquired Sunflower Vanaspati oil business to enter Western India Market)
Access to funds	• Jaypee – Ultratech (2014) (Jaypee sold its cement unit to raise funds for cutting off its debt)
Tax benefits	• Durga Projects Limited (DPL) – WBPDCL (2014) (DPL's loss could be carry forward and setoff)

As mentioned above amalgamation is effected basically for growth and sometimes for image. But some of the objectives for which amalgamation may be resorted to are:

— Horizontal growth to achieve optimum size, to enlarge the market share, to curb competition or to use unutilised capacity;

— Vertical combination with a view to economising costs and eliminating avoidable sales-tax and/or excise duty;

— Diversification of business;

— Mobilising financial resources by utilising the idle funds lying with another company for the expansion of business. (For example, nationalisation of banks provided this opportunity and the erstwhile banking companies merged with industrial companies);

— Merger of an export, investment or trading company with an industrial company or vice versa with a view to increasing cash flow;

— Merging subsidiary company with the holding company with a view to improving cash flow;

— Taking over a 'shell' company which may have the necessary industrial licences etc., but whose promoters do not wish to proceed with the project.

An amalgamation may also be resorted to for the purpose of nourishing a sick unit in the group and this is normally a merger for keeping up the image of the group.

3. FORMS (TYPES) OF MERGERS

A merger is generally understood to be a fusion of two companies. The term "merger" means and signifies the dissolution of one or more companies or firms or proprietorships to form or get absorbed into another company. By concept, merger increases the size of the undertakings. Following are major types of mergers:

(i) **Horizontal Merger:** The two companies which have merged are in the same industry, normally the market share of the new consolidated company would be larger and it is possible that it may move closer to being a monopoly or a near monopoly to avoid competition.

(ii) **Vertical Merger:** This merger happens when two companies that have 'buyer-seller' relationship (or potential buyer-seller relationship) come together.

(iii) **Conglomerate Mergers:** Such mergers involve firms engaged in unrelated type of business operations. In other words, the business activities of acquirer and the target are neither related to each other horizontally (i.e., producing the same or competiting products) nor vertically (having relationship of buyer and supplier).In a pure conglomerate merger, there are no important common factors between the companies in production, marketing, research and development and technology. There may however be some degree of overlapping in one or more of these common factors. Such mergers are in fact, unification of different kinds of businesses under one flagship company. The purpose of merger remains utilization of financial resources, enlarged debt capacity and also synergy of managerial functions.

(iv) **Congeneric Merger:** In these mergers, the acquirer and the target companies are related through basic technologies, production processes or markets. The acquired company represents an extension of product-line, market participants or technologies of the acquirer. These mergers represent an outward movement by the acquirer from its current business scenario to other related business activities within the overarching industry structure.

(v) **Reverse Merger:** Such mergers involve acquisition of a public (Shell Company) by a private company, as it helps private company to by-pass lengthy and complex process required to be followed in case it is interested in going public.

(vi) **Acquisition:** This refers to the purchase of controlling interest by one company in the share capital of an existing company. This may be by:

(i) an agreement with majority holder of Interest.

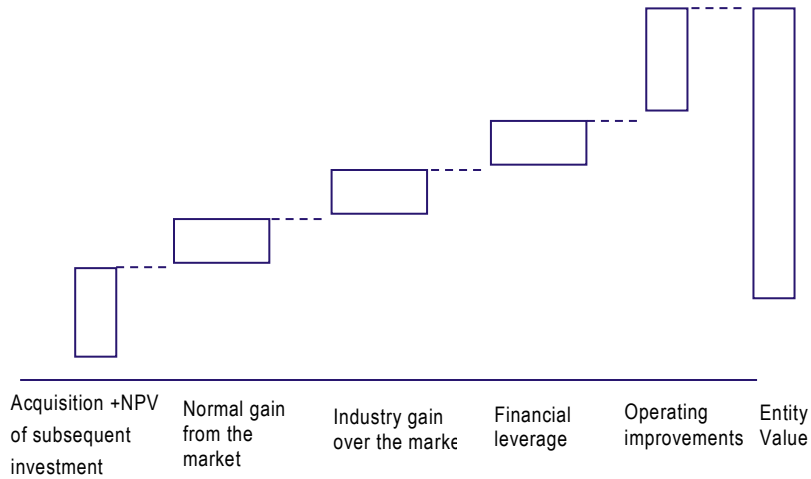
(ii) Purchase of new shares by private agreement.

(iii) Purchase of shares in open market (open offer)

(iv) Acquisition of share capital of a company by means of cash, issuance of shares.

(v) Making a buyout offer to general body of shareholders.

When a company is acquired by another company, the acquiring company has two choices, one, to merge both the companies into one and function as a single entity and, two, to operate the taken-over company as an independent entity with changed management and policies. 'Merger' is the fusion of two independent firms on co-equal terms. 'Acquisition' is buying out a company by another company and the acquired company usually loses its identity. Usually, this process is friendly.



Source: Patricial Anslinger and Thomas E Copeland, "Growth through Acquisitions : A Fresh look, Harvard Business Review Jan. – Feb -1996.

Acquisition of one of the business of a company, as a going concern by an agreement need not necessarily be routed through court, if the transfer of business is to be accomplished without allotting shares in the transferee company to the shareholders of the transferor company. This would tantamount to a simple acquisition. In this case the transferor company continues to exist and no change in shareholding is expected. If the sale takes place for a lumpsum consideration without attributing any individual values to any class of assets, such sales are called slump sales. The capital gains arising on slump sales were being exempt from income tax based on a decision of the Supreme Court of India.

4. FINANCIAL FRAMEWORK

4.1 Gains from Mergers or Synergy

The first step in merger analysis is to identify the economic gains from the merger. There are gains, if the combined entity is more than the sum of its parts.

That is, Combined value > (Value of acquirer + Stand alone value of target)

The difference between the combined value and the sum of the values of individual companies is usually attributed to **synergy.**

Value of acquirer + Stand alone value of target + Value of synergy = Combined value

There is also a cost attached to an acquisition. The cost of acquisition is the price premium paid over the market value plus other costs of integration. Therefore, the net gain is the value of synergy minus premium paid.

V_A = ₹100

V_B = ₹ 50

V_{AB} = ₹ 175

Where, VA = Value of Acquirer

VB = Standalone value of target

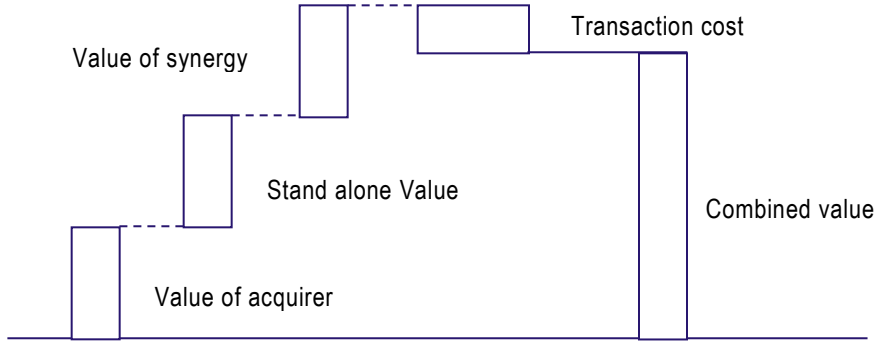
And, VAB = Combined Value

So, Synergy = $V_{AB} – (V_A + V_B)$ = 175 - (100 + 50) = 25

If premium is ₹ 10, then, Net gain = Synergy – Premium = 25 – 10 = 15

Acquisition need not be made with synergy in mind. It is possible to make money from non-synergistic acquisitions as well. As can be seen from Exhibit, operating improvements are a big source of value creation. Better post-merger integration could lead to abnormal returns even when the acquired company is in unrelated business. Obviously, managerial talent is the single most important instrument in creating value by cutting down costs, improving revenues and operating profit margin, cash flow position, etc. Many a time, executive compensation is tied to the performance in the post-merger period. Providing equity stake in the company induces executives to think and behave like shareholders.

Exhibit : Merger gains



Source : Patricia L Anslinger and Thomas E Copeland, 'Growth Through Acquisitions : A Fresh Look', Harvard Business Review, Jan–Feb., 1996.

4.2 Scheme of Amalgamation or Merger

The scheme of any arrangement or proposal for a merger is the heart of the process and has to be drafted with care.

There is no prescribed form for a scheme and it is designed to suit the terms and conditions relevant to the proposal and should take care of any special feature peculiar to the arrangement.

An essential component of a scheme is the provision for vesting all the assets and liabilities of the transferor company in its transferee company. If the transferee company does not want to take over any asset or liability, the transferor company before finalising the draft scheme should dispose it off or settle. Otherwise, the scheme would be considered defective and incomplete and the court would not sanction it.

It is equally important to define the **effective date** from which the scheme is intended to come into operation. This would save time and labour in explaining to the court the intention behind using several descriptions in the scheme. For accounting purposes, the amalgamation shall be effected with reference to the audited accounts and balance sheets as on a particular date (which precedes the date of notification) of the two companies and the transactions thereafter shall be pooled into a common account.

Another aspect relates to the **valuation of shares** to decide the exchange ratio. Objections have been raised as to the method of valuation even in cases where the scheme had been approved by a large majority of shareholders and the financial institutions as lenders. The courts have declared their unwillingness to engage in a study of the fitness of the mode of valuation. A High Court stated: "There are bound to be differences of opinion as to what the correct value of the shares of the company is. Simply because it is possible to value the share in a manner different from the one adopted in a given case, it cannot be said that the valuation agreed upon has been unfair."

Similarly, in the case of Hindustan Lever the Supreme Court held that it would not interfere with the valuation of shares when more than 99 per cent of the shareholders have approved the scheme and the valuations having been perused by the financial institutions.

The position of employees also has to be clearly set out. The employment contract is a contract of personal service which may not be transferred by an order of court and may not have an effect of making an employee of the transferor company as an employee of the transferee company. The scheme should provide for the transfer of all employees to the transferee company on the same terms and conditions of service without any break in service. In the event of the transferee company not willing to absorb any of the employees through the merger, the transferor company should settle those employees with applicable law before the scheme is put through.

4.3 Financial Evaluation

Financial evaluation addresses the following issues:

(a) What is the maximum price that should be for the target company?

(b) What are the principal areas of Risk?

(c) What are the cash flow and balance sheet implications of the acquisition? And,

(d) What is the best way of structuring the acquisition?

4.4 Arranging Finance for Acquisition

Once the Definitive Agreement is signed, the Company Secretarial aspects relating to putting through the acquisition process will be taken up by the legal and secretarial department of both the companies. Side by side, the CFO of the acquiring company will move to the next stage which is 'Financing the Acquisition'.

One of the most important decisions is how to pay for the acquisition – cash or stock or part of each and this would be part of the Definitive Agreement. If the acquisition is an 'all equity deal', the CFO's can breathe easy. However, if cash payout is significant, the acquirer has to plan for financing the deal. Sometimes acquirers do not pay all of the purchase consideration as, even though they could have sufficient funds. This is part of the acquisition strategy to keep the war chest ready for further acquisitions. Another reason to pay by shares would be when the acquirer considers that their company's shares are 'over priced' in the market.

Financing the acquisition can be quite challenging where the acquisition is a LBO. Many times strong companies plan to shore up their long term funds subsequent to the takeover. The immediate funding is accomplished with bridge financing.

5. TAKEOVER DEFENSIVE TACTICS

Normally acquisitions are made friendly, however when the process of acquisition is unfriendly (i.e., hostile) such acquisition is referred to as 'takeover'). Hostile takeover arises when the Board

of Directors of the acquiring company decide to approach the shareholders of the target company directly through a Public Announcement (Tender Offer) to buy their shares consequent to the rejection of the offer made to the Board of Directors of the target company.

5.1 Take Over Strategies

Other than Tender Offer the acquiring company can also use the following techniques:

- Street Sweep:This refers to the technique where the acquiring company accumulates larger number of shares in a target before making an open offer. The advantage is that the target company is left with no choice but to agree to the proposal of acquirer for takeover.
- Bear Hug: When the acquirer threatens the target company to make an open offer, the board of target company agrees to a settlement with the acquirer for change of control.
- Strategic Alliance: This involves disarming the acquirer by offering a partnership rather than a buyout. The acquirer should assert control from within and takeover the target company.
- Brand Power: This refers to entering into an alliance with powerful brands to displace the target's brands and as a result, buyout the weakened company.

5.2 Defensive Tactics

A target company can adopt a number of tactics to defend itself from hostile takeover through a tender offer.

- **Divestiture** - In a divestiture the target company divests or spins off some of its businesses in the form of an independent, subsidiary company. Thus, reducing the attractiveness of the existing business to the acquirer.
- **Crown jewels** - When a target company uses the tactic of divestiture it is said to sell the crown jewels. In some countries such as the UK, such tactic is not allowed once the deal becomes known and is unavoidable.
- **Poison pill** - Sometimes an acquiring company itself becomes a target when it is bidding for another company. The tactics used by the acquiring company to make itself unattractive to a potential bidder is called poison pills. For instance, the acquiring company may issue substantial amount of convertible debentures to its existing shareholders to be converted at a future date when it faces a takeover threat. The task of the bidder would become difficult since the number of shares to having voting control of the company increases substantially.
- **Poison Put** - In this case the target company issue bonds that encourage holder to cash in at higher prices. The resultant cash drainage would make the target unattractive.
- **Greenmail** - Greenmail refers to an incentive offered by management of the target company to the potential bidder for not pursuing the takeover. The management of the target company may offer the acquirer for its shares a price higher than the market price.

- **White knight** - In this a target company offers to be acquired by a friendly company to escape from a hostile takeover. The possible motive for the management of the target company to do so is not to lose the management of the company. The hostile acquirer may change the management.
- **White squire** - This strategy is essentially the same as white knight and involves sell out of shares to a company that is not interested in the takeover. As a consequence, the management of the target company retains its control over the company.
- **Golden parachutes** - When a company offers hefty compensations to its managers if they get ousted due to takeover, the company is said to offer golden parachutes. This reduces their resistance to takeover.
- **Pac-man defence** - This strategy aims at the target company making a counter bid for the acquirer company. This would force the acquirer to defend itself and consequently may call off its proposal for takeover.

It is needless to mention that hostile takeovers, as far as possible, should be avoided as they are more difficult to consummate. In other words, friendly takeover are better course of action to follow.

6. REVERSE MERGER

In ordinary case, the company taken over is the smaller company; in a 'reverse takeover', a smaller company gains control of a larger one. The concept of takeover by reverse bid, or of reverse merger, is thus not the usual case of amalgamation of a sick unit which is non-viable with a healthy or prosperous unit but is a case whereby the entire undertaking of the healthy and prosperous company is to be merged and vested in the sick company which is non-viable. A company becomes a sick industrial company when there is erosion in its net worth. This alternative is also known as taking over by reverse bid.

The three tests should be fulfilled before an arrangement can be termed as a reverse takeover is specified as follows:

(i) the assets of the transferor company are greater than the transferee company,

(ii) equity capital to be issued by the transferee company pursuant to the acquisition exceeds its original issued capital, and

(iii) the change of control in the transferee company through the introduction of a minority holder or group of holders.

This type of merger is also known as ‘back door listing’. This kind of merger has been started as an alternative to go for public issue without incurring huge expenses and passing through cumbersome process. Thus, it can be said that reverse merger leads to the following benefits for acquiring company:

- Easy access to capital market.
- Increase in visibility of the company in corporate world.
- Tax benefits on carry forward losses acquired (public) company.
- Cheaper and easier route to become a public company.

7. DIVESTITURE

It means a company selling one of the portions of its divisions or undertakings to another company or creating an altogether separate company. There are various reasons for divestment or demerger viz.,

(i) To pay attention on core areas of business;

(ii) The Division's/business may not be sufficiently contributing to the revenues;

(iii) The size of the firm may be too big to handle;

(iv) The firm may be requiring cash urgently in view of other investment opportunities.

7.1 Seller's Perspective

It is necessary to remember that for every buyer there must be a seller. Although the methods of analysis for selling are the same as for buying, the selling process is termed **divestiture.** The decision to sell a company is at least as important as buying one. But selling generally lacks the kind of planning that goes into buying. Quite often, the decision and the choice of the buyer is arbitrary, resulting in a raw deal for the selling company's shareholders. It is important to understand that selling needs the same set of skills required for buying. At some point of time the executives of a company may have to take the decision to divest a division There is nothing wrong in selling a division if it is worth more to someone else. The decision to sell may be prompted by poor growth prospects for a division or consolidation in the industry. Given the fact that the need to sell may arise any time, it makes sense for executives to be prepared. More specifically, executives need to know their company's worth. Consideration may be given to strengths and weakness in production, marketing, general management, value of synergy to potential buyers, value of brand equity, skill base of the organisation, etc.

To summarise, the following are some of the 'sell-side' imperatives

- Competitor's pressure is increasing.
- Sale of company seems to be inevitable because company is facing serious problems like:
  - No access to new technologies and developments
  - Strong market entry barriers. Geographical presence could not be enhanced
  - Badly positioned on the supply and/or demand side

- Critical mass could not be realised
- No efficient utilisation of distribution capabilities
- New strategic business units for future growth could not be developed
- Not enough capital to complete the project

- Window of opportunity: Possibility to sell the business at an attractive price
- Focus on core competencies
- In the best interest of the shareholders – where a large well known firm brings-up the proposal, the target firm may be more than willing to give-up.

7.2 Different Forms

Different ways of divestment or demerger or divestitures are as follows:

7.2.1 Sell off / Partial Sell off

A sell off is the sale of an asset, factory, division, product line or subsidiary by one entity to another for a purchase consideration payable either in cash or in the form of securities. Partial Sell off, is a form of divestiture, wherein the firm sells its business unit or a subsidiary to another because it deemed to be unfit with the company's core business strategy.

Normally, sell-offs are done because the subsidiary doesn't fit into the parent company's core strategy. The market may be undervaluing the combined businesses due to a lack of synergy between the parent and the subsidiary. So the management and the board decide that the subsidiary is better off under a different ownership. Besides getting rid of an unwanted subsidiary, sell-offs also raise cash, which can be used to pay off debts. In the late 1980s and early 1990s, corporate raiders would use debt to finance acquisitions. Then, after making a purchase they would sell-off its subsidiaries to raise cash to service the debt. The raiders' method certainly makes sense if the sum of the parts is greater than the whole. When it isn't, deals are unsuccessful.

7.2.2 Spin-off

In this case, a part of the business is separated and created as a separate firm. The existing shareholders of the firm get proportionate ownership. So there is no change in ownership and the same shareholders continue to own the newly created entity in the same proportion as previously in the original firm. The management of spun-off division is however, parted with. Spin-off does not bring fresh cash. The reasons for spin off may be:

(i) Separate identity to a part/division.

(ii) To avoid the takeover attempt by a predator by making the firm unattractive to him since a valuable division is spun-off.

(iii) To create separate Regulated and unregulated lines of business.

Example: Kishore Biyani led Future Group spin off its consumer durables business, Ezone, into a separate entity in order to maximise value from it.

7.2.3 Split-up

This involves breaking up of the entire firm into a series of spin off (by creating separate legal entities).The parent firm no longer legally exists and only the newly created entities survive. For instance a corporate firm has 4 divisions namely A, B, C, D. All these 4 division shall be split-up to create 4 new corporate firms with full autonomy and legal status. The original corporate firm is to be wound up. Since de-merged units are relatively smaller in size, they are logistically more convenient and manageable. Therefore, it is understood that spin-off and split-up are likely to enhance shareholders value and bring efficiency and effectiveness.

Example: Philips, the Dutch conglomerate that started life making light bulbs 123 years ago, is splitting off its lighting business in a bold step to expand its higher-margin healthcare and consumer divisions. The new structure should save 100 million euros ($128.5 million) next year and 200 million euros in 2016. It expects restructuring charges of 50 million euros from 2014 to 2016.

7.2.4 Equity Carve outs

This is like spin off, however, some shares of the new company are sold in the market by making a public offer, so this brings cash. More and more companies are using equity carve-outs to boost shareholder value. A parent firm makes a subsidiary public through an initial public offering (IPO) of shares, amounting to a partial sell-off. A new publicly-listed company is created, but the parent keeps a controlling stake in the newly traded subsidiary.

A carve-out is a strategic avenue a parent firm may take when one of its subsidiaries is growing faster and carrying higher valuations than other businesses owned by the parent. A carve-out generates cash because shares in the subsidiary are sold to the public, but the issue also unlocks the value of the subsidiary unit and enhances the parent's shareholder value.

The new legal entity of a carve-out has a separate board, but in most carve-outs, the parent retains some control over it. In these cases, some portion of the parent firm's board of directors may be shared. Since the parent has a controlling stake, meaning that both firms have common shareholders, the connection between the two is likely to be strong. That said, sometimes companies carve-out a subsidiary not because it is doing well, but because it is a burden. Such an intention won't lead to a successful result, especially if a carved-out subsidiary is too loaded with debt or trouble, even when it was a part of the parent and lacks an established track record for growing revenues and profits.

7.2.5 Sale of a Division

In the case of sale of a division, the seller company is demerging its business whereas the buyer company is acquiring a business. For the first time the tax laws in India propose to recognise demergers.

7.2.6 Demerger or Division of Family-Managed Business

Around 80 per cent of private sector companies in India are family-managed companies. The family-owned companies are, under extraordinary pressure to yield control to professional managements, as, in the emerging scenario of a liberalised economy the capital markets are broadening, with attendant incentives for growth. So, many of these companies are arranging to hive off their unprofitable businesses or divisions with a view to meeting a variety of succession problems.

Even otherwise, a group of such family-managed companies may undertake restructuring of its operations with a view also to consolidating its core businesses. For this, the first step that may need to be taken is to identify core and non-core operations within the group. The second step may involve reducing interest burden through debt restructuring along with sale of surplus assets. The proceeds from the sale of assets may be employed for expanding by acquisitions and rejuvenation of its existing operations. The bottom line is that an acquisition must improve economies of scale, lower the cost of production, and generate and promote synergies. Besides acquisitions, therefore, the group may necessarily have to take steps to improve productivity of its existing operations.

8. FINANCIAL RESTRUCTURING

Financial restructuring refers to a kind of internal changes made by the management in Assets and Liabilities of a company with the consent of its various stakeholders. This is a suitable mode of restructuring for corporate entities who have suffered from sizeable losses over a period of time. Consequent upon losses the share capital or net worth of such companies get substantially eroded. In fact, in some cases, the accumulated losses are even more than the share capital and thus leading to negative net worth, putting the firm on the verge of liquidation. In order to revive such firms, financial restructuring is one of the technique to bring into health such firms which are having potential and promise for better financial performance in the years to come. To achieve this desired objective, such firms need to re-start with a fresh balance sheet free from losses and fictitious assets and show share capital at its true worth.

To nurse back such firms a plan of restructuring need to be formulated involving a number of legal formalities (which includes consent of court, and other stake-holders viz., creditors, lenders and shareholders etc.). An attempt is made to do refinancing and rescue financing while Restructuring. Normally equity shareholders make maximum sacrifice by foregoing certain accrued benefits, followed by preference shareholders and debenture holders, lenders and creditors etc. The sacrifice may be in the form of waving a part of the sum payable to various liability holders. The foregone benefits may be in the form of new securities with lower coupon rates so as to reduce future liabilities. The sacrifice may also lead to the conversion of debt into equity. Sometime, creditors, apart from reducing their claim, may also agree to convert their dues into securities to avert pressure of payment. These measures will lead to better financial liquidity. The financial restructuring leads to significant changes in the financial obligations and capital structure of

corporate firm, leading to a change in the financing pattern, ownership and control and payment of various financial charges.

In nutshell it may be said that financial restructuring (also known as internal re-construction) is aimed at reducing the debt/payment burden of the corporate firm. This results into

(i) Reduction/Waiver in the claims from various stakeholders;

(ii) Real worth of various properties/assets by revaluing them timely;

(iii) Utilizing profit accruing on account of appreciation of assets to write off accumulated losses and fictitious assets (such as preliminary expenses and cost of issue of shares and debentures) and creating provision for bad and doubtful debts. In practice, the financial re-structuring scheme is drawn in such a way so that all the above requirements of write off are duly met. The following illustration is a good example of financial restructuring.

Illustration 1

The following is the Balance-sheet of XYZ Company Ltd as on March 31st, 2013.

(₹ in lakh)

Liabilities	Amount	Assets	Amount
6 lakh equity shares of ₹100/- each	600	Land & Building	200
2 lakh 14% Preference shares of ₹100/- each	200	Plant & Machinery	300
		Furniture & Fixtures	50
13% Debentures	200	Inventory	150
Debenture Interest accrued and Payable	26	Sundry debtors	70
Loan from Bank	74	Cash at Bank	130
Trade Creditors	300	Preliminary Expenses	10
		Cost of Issue of debentures	5
		Profit & Loss A/c	485
	1,400		1,400

The XYZ Company did not perform well and has suffered sizable losses during the last few years. However, it is now felt that the company can be nursed back to health by proper financial restructuring and consequently the following scheme of reconstruction has been devised:

(i) Equity shares are to be reduced to ₹ 25/- per share, fully paid up;

(ii) Preference shares are to be reduced (with coupon rate of 10%) to equal number of shares of ₹50 each, fully paid up.

(iii) Debenture holders have agreed to forego interest accrued to them. Beside this, they have

agreed to accept new debentures carrying a coupon rate of 9%.

(iv) Trade creditors have agreed to forgo 25 per cent of their existing claim; for the balance sum they have agreed to convert their claims into equity shares of ₹ 25/- each.

(v) In order to make payment for bank loan and augment the working capital, the company issues 6 lakh equity shares at ₹ 25/- each; the entire sum is required to be paid on application. The existing shareholders have agreed to subscribe to the new issue.

(vi) While Land and Building is to be revalued at ₹ 250 lakh, Plant & Machinery is to be written down to ₹ 104 lakh. A provision amounting to ₹ 5 lakh is to be made for bad and doubtful debts.

You are required to show the impact of financial restructuring/re-construction. Also, prepare the new balance sheet assuming the scheme of re-construction is implemented in letter and spirit.

Solution

Impact of Financial Restructuring

(i) Benefits to XYZ Ltd.

		₹ in lakhs
(a)	Reduction of liabilities payable	
	Reduction in equity share capital (6 lakh shares x ₹75 per share)	450
	Reduction in preference share capital (2 lakh shares x ₹50 per share)	100
	Waiver of outstanding debenture Interest	26
	Waiver from trade creditors (₹300 lakhs x 0.25)	75
		651
(b)	Revaluation of Assets	
	Appreciation of Land and Building (₹250 lakhs - ₹200 lakhs)	50
		701

(ii) Amount of ₹701 lakhs utilized to write off losses, fictious assets and over- valued assets.

	₹ in lakhs
Writing off profit and loss account	485
Cost of issue of debentures	5
Preliminary expenses	10
Provision for bad and doubtful debts	5
Revaluation of Plant and Machinery (₹300 lakhs – ₹104 lakhs)	196
	701

Balance sheet of XYZ Ltd as at_____ (after re-construction)

(₹ in lakhs)

Liabilities	Amount	Assets		Amount
21 lakhs equity shares of ₹25/- each	525	Land & Building		250
2 lakhs 10% Preference shares of ₹50/- each	100	Plant & Machinery		104
9% Debentures	200	Furnitures& Fixtures		50
		Inventory		150
		Sundry debtors	70	
			-5	65
		Cash-at-Bank (Balancing figure)*		206
	825			825

*Opening Balance of ₹130/- lakhs + Sale proceeds from issue of new equity shares ₹150/- lakhs – Payment of bank loan of ₹74/- lakhs = ₹206 lakhs.

It is worth mentioning that financial restructuring is unique in nature and is company specific. It is carried out, in practice when all shareholders sacrifice and understand that the restructured firm (reflecting its true value of assets, capital and other significant financial para meters) can now be nursed back to health. This type of corporate restructuring helps in the revival of firms that otherwise would have faced closure/liquidation.

9. OWNERSHIP RESTRUCTURING

9.1 Going Private

This refers to the situation wherein a listed company is converted into a private company by buying back all the outstanding shares from the markets.

Example: The Essar group successfully completed Essar Energy Plc delisting process from London Stock Exchange in 2014.

Going private is a transaction or a series of transactions that convert a publicly traded company into a private entity. Once a company goes private, its shareholders are no longer able to trade their stocks in the open market.

A company typically goes private when its stakeholders decide that there are no longer significant benefits to be garnered as a public company. Privatization will usually arise either when a company's management wants to buy out the public shareholders and take the company private (a

management buyout), or when a company or individual makes a tender offer to buy most or all of the company's stock. Going private transactions generally involve a significant amount of debt.

9.2 Management Buy Outs

Buyouts initiated by the management team of a company are known as a management buyout. In this type of acquisition, the company is bought by its own management team.

MBOs are considered as a useful strategy for exiting those divisions that does not form part of the core business of the entity.

9.3 Leveraged Buyout (LBO)

An acquisition of a company or a division of another company which is financed entirely or partially (50% or more) using borrowed funds is termed as a leveraged buyout. The target company no longer remains public after the leveraged buyout; hence the transaction is also known as going private. The deal is usually secured by the acquired firm's physical assets.

The intention behind an LBO transaction is to improve the operational efficiency of a firm and increase the volume of its sales, thereby increasing the cash flow of the firm. This extra cash flow generated will be used to pay back the debt in LBO transaction. After an, LBO the target entity is managed by private investors, which makes it easier to have a close control of its operational activities. The LBOs do not stay permanent. Once the LBO is successful in increasing its profit margin and improving its operational efficiency and the debt is paid back, it will go public again. Companies that are in a leading market position with proven demand for product, have a strong management team, strong relationships with key customers and suppliers and steady growth are likely to become the target for LBOs. In India the first LBO took place in the year 2000 when Tata Tea acquired Tetley in the United Kingdom. The deal value was Rs 2135 crores out of which almost 77% was financed by the company using debt. The intention behind this deal was to get direct access to Tetley's international market. The largest LBO deal in terms of deal value (7.6 Billion) by an Indian company is the buyout of Corus by Tata Steel.

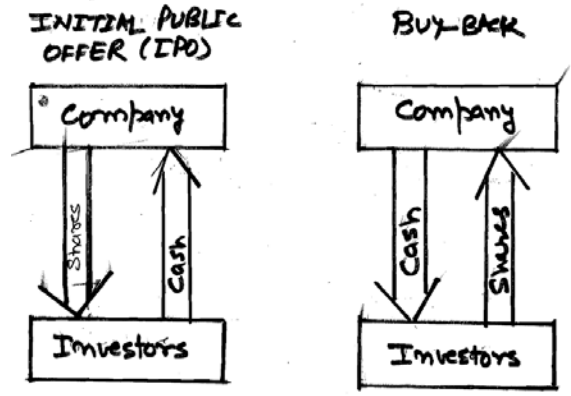
9.4 Equity buyback

This refers to the situation wherein a company buys back its own shares back from the market. This results in reduction in the equity capital of the company. This strengthen the promoter's position by increasing his stake in the equity of the company.

The buyback is a process in which a company uses its surplus cash to buy shares from the public. It is almost the opposite of initial public offer in which shares are issued to the public for the first time. In buyback, shares which have already been issued are bought back from the public. And, once the shares are bought back, they get absorbed and cease to exist.

For example, a company has one crore outstanding shares and owing a huge cash pile of ₹ 5 crores. Since, the company has very limited investment options it decides to buyback some of its outstanding shares from the shareholders, by utilizing some portion of its surplus cash.

Accordingly, it purchases 10 lakh shares from the existing shareholders by paying ₹ 20 per share. total cash of say, ₹ 2 crore. The process of buyback can be shown with the help of following diagram:



Example Cairn India bought back 3.67 crores shares and spent nearly ₹ 1230 crores by May 2014.

Effects of Buyback

There are several effects or consequences of buyback some of which are as follows:

(i) It increases the proportion of shares owned by controlling shareholders as the number of outstanding shares decreases after the buyback.

(ii) Earning Per Share (EPS) escalates as the number of shares reduces leading the market price of shares to step up.

(iii) A share repurchase also effects a company's financial statements as follows:

(a) In balance sheet, a share buyback will reduce the company's total assets position as cash holdings will be reduced and consequently as shareholders' equity reduced it results in reduction on the liabilities side by the same amount.

(b) Amount spent on share buybacks shall be shown in Statement of Cash Flows in the "Financing Activities" section, as well as from the Statement of Changes in Equity or Statement of Retained Earnings.

(iv) Ratios based on performance indicators such as Return on Assets (ROA) and Return on Equity (ROE) typically improve after a share buyback. This can be understood with the help of following Statement showing Buyback Effect of a hypothetical company using ₹ 1.50 crore of cash out of total cash of ₹ 2.00 for buyback.

	Before Buyback	After Buyback (₹)
Cash (₹)	2,00,00,000	50,00,000

Assets (₹)	5,00,00,000	3,50,00,000
Earnings (₹)	20,00,000	20,00,000
No. of Shares outstanding (Nos.)	10,00,000	9,00,000
Return on Assets (%)	4.00%	5.71%
Earnings Per Share (EPS) (₹)	0.20	0.22

As visible from the above figure, the company's cash pile has been reduced from ₹ 2 crore to ₹ 50 lakh after the buyback. Because cash is an asset, this will lower the total assets of the company from ₹ 5 crore to ₹ 3.5 crore. Now, this leads to an increase in the company's ROA, even though earnings have not changed. Prior to the buyback, its ROA was 4% but after the repurchase, ROA increases to 5.71%. A similar effect can be seen in the EPS number, which increases from 0.20 to 0.22.

10. PREMIUM AND DISCOUNT

Premiums and discounts are typically attached to a business valuation, based on the situation. These could be market share premium, controlling stake premium, brand value premium, small player discount or unlisted company discount. In addition, it may be required to work out various potential scenarios in each methodology and arrive at the likely probabilities of each while deriving the values.

Timing is very critical while divesting a business since valuation depends on the timing. Timing of sale is crucial keeping in mind economic cycles (deal valuation takes into consideration GDP growth rates), stock market situations (which would decide market multiples), global situations (like a war or terrorist attacks).

In times like the above, the price expectations between the buyer and the seller would widely vary. For example, during a stock market lull, there could be a situation where there are more buyers but not sellers due to the low valuation.

The basis for M&A is the expectation of several future benefits arising out of **synergies** between businesses. There is a risk involved in realizing this synergy value. This could be due to corporate, market, economic reasons or wrong estimation of the benefits/synergies. A key case in point here is the high valuations at which internet companies were acquired in the year 2000 (such as Satyam Infoway acquisition of India World).

It is also important to try and work out valuations from as many of the above methods as possible and then try and see which methodology is to be taken in and which are to be rejected and derive a range of values for the transaction in different situations in case one is called upon to assist in advising the transaction valuation. Some methods like Net Asset Value or past earnings based methods may prove inadequate in case of growing businesses or those with intangible assets.

11. CASE STUDIES

Some case studies are listed below based on actual Indian situations and an analysis based on published data is given below.

11.1 Case Study – Rationale for M & A and Valuation – Largest Customer Base

Bharti Airtel to buy Loop Mobile for ₹ 700 crores

In February 2014, Bharti Airtel ("Airtel"), a leading global telecommunications services provider with operations in 20 countries across Asia and Africa has announced to buy Mumbai based Loop Mobile. Although the price was not stated it is understood to be in the region of around ₹ 700 crores. The proposed association will undergo seamless integration once definitive agreements are signed and is subject to regulatory and statutory approvals. Under the agreement, Loop Mobile's 3 million subscribers in Mumbai will join Airtel's over 4 million subscribers, creating an unmatched mobile network in Mumbai. The merged network will be thw largest by customer base in the Mumbai circle. The proposed transaction will bring together Loop Mobile's 2G/EDGE enabled network supported by 2,500 plus cell sites, and Airtel's 2G and 3G network supported by over 4000 cell sites across Mumbai. It will also offer subscribers the widest exclusive retail reach with 220 outlets that will enable best in class customer service. The agreement will ensure continuity of quality services to Loop Mobile's subscribers, while offering them the added benefits of Airtel's innovative product portfolio and access to superior services, innovative products like 3G, 4G, Airtel Money, VAS and domestic/international roaming facilities. Loop Mobile subscribers will become part of Airtel's global network that serves over 289 million customers in 20 countries. Globally, Airtel is ranked as the fourth largest mobile services provider in terms of subscribers.

(Based on Press release hosted on Bharti Airtel's website)

11.2 Case Study – Valuation Analysis

Listed software company X to merge with unlisted company Y

Company X and company Y were in the software services business. X was a listed company and Y was an unlisted entity. X and Y decided to merge in order to benefit from marketing. Operational synergies and economies of scale. With both companies being mid-sized, the merger would make them a larger player, open new market avenues, bring in expertise in more verticals and wider management expertise. For company X, the benefit lies in merging with a newer company with high growth potential and for company Y, the advantage was in merging with a business with track record, that too a listed entity.

The stock swap ratio considered after valuation of the two businesses was 1:1.

Several key factors were considered to arrive at this valuation. Some of them were very unique to the businesses and the deal:

- Valuation based on book value net asset value would not be appropriate for X and Y since they are in the knowledge business, unless other intangibles assets like human capital, customer relationships etc. could be identified and valued.
- X and Y were valued on the basis of

a) expected earnings b) market multiple.

- While arriving at a valuation based on expected earnings, a higher growth rate was considered for Y, it being on the growth stage of the business life cycle while a lower rate was considered for X, it being in the mature stage and considering past growth.
- Different discount factors were considered for X and Y, based on their cost of capital, fund raising capabilities and debt-equity ratios.
- While arriving at a market based valuation, the market capitalization was used as the starting point for X which was a listed company. Since X had a significant stake in Z, another listed company, the market capitalization of X reflected the value of Z as well. Hence the market capitalization of Z had to be removed to the extent of X's stake from X's value as on the valuation date.
- Since Y was unlisted, several comparable companies had to be identified, based on size, nature of business etc. and a composite of their market multiples had to be estimated as a surrogate measure to arrive at Y's likely market capitalization, as if it were listed. This value had to be discounted to remove the listing or liquidity premium since the surrogate measure was estimated from listed companies.
- After arriving at two sets of values for X and Y, a weighted average value was calculated after allotting a higher weight for market based method for X (being a listed company) and a higher weight for earnings based method for Y (being an unlisted but growing company).The final values for X and Y were almost equal and hence the 1:1 ratio was decided.

11.3 Case Study – Rationale for M&A and Valuation – Acquisition at Premium

(1) Ranbaxy to Bring In Daiichi Sankyo Company Limited as Majority Partner – June 2008

Ranbaxy Laboratories Limited, among the top 10 generic companies in the world and India's largest pharmaceutical company, and Daiichi Sankyo Company Limited, one of the largest pharmaceutical companies in Japan, announced that a binding Share Purchase and Share Subscription Agreement was entered into between Daiichi Sankyo, Ranbaxy and the Singh family, the largest and controlling shareholders of Ranbaxy (the "Sellers"), pursuant to which Daiichi Sankyo will acquire the entire shareholding of the Sellers in Ranbaxy and further seek to acquire the majority of the voting capital of Ranbaxy at a price of Rs737 per share with the total

transaction value expected to be between US$3.4 to US$4.6 billion (currency exchange rate: US$1=Rs43). On the post closing basis, the transaction would value Ranbaxy at US$8.5 billion.

The Share Purchase and Share Subscription Agreement has been unanimously approved by the Boards of Directors of both companies. Daiichi Sankyo is expected to acquire the majority equity stake in Ranbaxy by a combination of (i) purchase of shares held by the Sellers, (ii) preferential allotment of equity shares, (iii) an open offer to the public shareholders for 20% of Ranbaxy's shares, as per Indian regulations, and (iv) Daiichi Sankyo's exercise of a portion or all of the share warrants to be issued on a preferential basis. All the shares/warrants will be acquired at a price of Rs737 per share. This purchase price represents a premium of 53.5% to Ranbaxy's average daily closing price on the National Stock Exchange for the three months ending on June 10, 2008 and 31.4% to such closing price on June 10, 2008.

The deal will be financed through a mix of bank debt facilities and existing cash resources of Daiichi Sankyo. It is anticipated that the transaction will be accretive to Daiichi Sankyo's EPS and Operating income before amortization of goodwill in the fiscal year ending March 31, 2010 (FY2009). EPS and Operating income after amortization of goodwill are expected to see an accretive effect in FY2010 and FY2009, respectively.

Why would Daiichi Sankyo wanted to aquire majority stake in Ranbaxy, that too at a premium?

Ranbaxy's drive to become a research-based drug developer and major manufacturer has led it straight into the welcoming arms of Japan's Daiichi Sankyo, that's why it announced to buy a majority stake in the Indian pharma company. After Sankyo completes a buyout of the founding Singh family's stake in the company, Ranbaxy will become a subsidiary operation. The deal is valued at $4.6 billion and will create a combined company worth about $30 billion. That move positions Daiichi Sankyo to become a major supplier of low-priced generics to Japan's aging population and accelerates a trend by Japanese pharma companies to enter emerging Asian markets, where they see much of their future growth. The acquisition stunned investors and analysts alike, who were caught off guard by a bold move from a conservative player in the industry. (Source: Fiercebiotech.com)

Also, from a financial and business perspective Ranbaxy's revenues and bottom lines were continiously on the rise since 2001; the R&D expenses were stable around 6%. In FY 2007 the company had revenues of 69,822 million INR ($1.5billion) excluding other income. The earnings of the company were well diversified across the globe; however the emerging world contributed heavily to the revnues (Emerging 54%, Developed 40%, others 6%). However the Japan market, with low generics penetration contributed just $25 million to the top line. The company had just begun to re-orient its strategy in favour of the emerging markets. The product, patent and API portfolio of the company was strong. The company made 526 product filings and received 457 approvals globally. The Company than served customers in over 125 countries and had an expanding international portfolio of affiliates, joint ventures and alliances, operations in 56 countries. (Source: ukessays.com)

(2) Sun Pharma to acquire Ranbaxy in US$4 billion – April 2014

Sun Pharmaceutical Industries Ltd. and Ranbaxy Laboratories Ltd today announced that they have entered into definitive agreements pursuant to which Sun Pharma will acquire 100% of Ranbaxy in an all-stock transaction. Under these agreements, Ranbaxy shareholders will receive 0.8 share of Sun Pharma for each share of Ranbaxy. This exchange ratio represents an implied value of ₹457 for each Ranbaxy share, a premium of 18% to Ranbaxy's 30-day volume-weighted average share price and a premium of 24.3% to Ranbaxy's 60-day volume-weighted average share price, in each case, as of the close of business on April 4, 2014. The transaction is expected to represent a tax-free exchange to Ranbaxy shareholders,who are expected to own approximately 14% of the combined company on a pro forma basis. Upon closing, Daiichi Sankyo will become a significant shareholder of Sun Pharma and will have the right to nominate one director to Sun Pharma's Board of Directors.

What prompted Daiichi Sankyo to decide on divestiture of the Indian Pharma company which it had barely acquired just about six years ago?

It has been a rocky path for Japanese pharma major Daiichi Sankyo ever since it acquired a 63.5 per cent stake in Indian drug maker Ranbaxy in June 2008. The Japanese drug-maker was expected to improve manufacturing process at Ranbaxy, which has a long history of run-ins with drug regulators in the US, its largest market, going back to 2002. Instead, serious issues persisted, resulting in a ban by the US Food & Drug Administration on most drugs and pharmaceutical ingredients made in Ranbaxy's four Indian manufacturing plants. Soon after the deal was inked, in September 2008, the US drug regulator - Food and Drug Administration - accused Ranbaxy of misrepresenting data and manufacturing deficiencies. It issued an import ban on Ranbaxy, prohibiting the export of 30 drugs to the US, within three months after Daiichi announced the acquisition. Following this, Ranbaxy's sales in the US shrank almost by a fourth, and its stock price slumped to over a fifth of the acquisition price. It has since taken Ranbaxy four years to reach a settlement with the US regulatory authorities. In 2013, The Company agreed to pay a fine of $500 million after admitting to false representation of data and quality issues at its three Indian plants supplying to the US market. The company's problems in the US are far from done with. It continues to face challenges in securing timely approval for its exclusive products in the US markets. (Source: thehindubusinessline.com)

Why Sun Pharma take interest in acquiring Ranbaxy?

The combination of Sun Pharma and Ranbaxy creates the fifth-largest specialty generics company in the world and the largest pharmaceutical company in India. The combined entity will have 47 manufacturing facilities across 5 continents. The transaction will combine Sun Pharma's proven complex product capabilities with Ranbaxy's strong global footprint, leading to significant value creation opportunities. Additionally, the combined entity will have increased exposure to emerging economies while also bolstering Sun Pharma's commercial and manufacturing presence in the United States and India. It will have an established presence in key high-growth emerging markets. In India, it will be ranked No. 1 by prescriptions amongst 13 different classes of specialist doctors.

Also, from a financial and business perspective on a pro forma basis, the combined entity's revenues are estimated at US$ 4.2 billion with EBITDA of US$ 1.2billion for the twelve month period ended December 31, 2013.The transaction value implies a revenue multiple of 2.2 based on12 months ended December 31, 2013. Sun Pharma expects to realize revenue and operating synergies of US$ 250 millionby third yearpost closing of the transaction. These synergies are expected to result primarily from topline growth, efficient procurement and supply chain efficiencies.

(Major contents are derived from press releases hosted on website of Ranbaxy)

In summary, the challenge to valuing for M&As is to obtain a thorough understanding of the business dynamics of both the parties, the rationale for the merger, the industry dynamics, the resulting synergies as well as the likely risks of the transaction are required in order to ensure that the valuation is such that it is a 'win-win' for both the parties and is financially viable. It is also important to understand that there are no hard and fast rules since one is projecting the future which is 'unknown' based on current understanding. Therefore, experience, good judgment and diligence are important in working out values.

11.4 Case Study – Rationale for M&A and Valuation – Turnaround

JLR acquisition by Tata motors and How JLR was turned around by Tata's

Tata's growth strategy was to consolidate position in domestic market & expand international footprint through development of new products by:

- Leveraging in house capabilities
- Acquisitions & collaborations to gain complementary capabilities

Why Tata Motors want to acquire Jaguar Land Rover (JLR)?

There are several reasons why Tata Motors want to acquire Jaguar Land Rover (JLR)

i) Long term strategic commitment to Automotive sector.

ii) Build comprehensive product portfolio with a global footprint immediately.

iii) Diversify across markets & products segments.

iv) Unique opportunity to move into premium segment.

v) Sharing the best practices between Jaguar, Land rover and Tata Motors in the future.

Introduction of JLR

(i) Global sales of around 300,000 units, across 169 countries

(ii) Global revenue of $15 Billion

(iii) Nine Car lines, designed, engineered and manufactured in the UK.

(iv) 16000 employees

TATA Motor's position after acquiring JLR

Tata Motors' market value plunged to 6,503.2 crore, with the stock hitting rock bottom 126.45 on 20 November 2008 (after the acquisition of JLR in 2008)

How Tata Motors turned JLR around

(i) Favorable Currency Movements

- Significant export in dollars- North America
- Net importers of Euros in terms of material

(ii) Improved market sentiments.

- Retail volumes in America, Europe and China improved

(iii) Introduction of newer, more fuel-efficient and stylish models

- Launch of XK & New XZ Jaguar models

(iv) Refreshing the existing ones

(v) Revival of demand in the firm's key markets such as the UK, the US and Europe

(vi) Costs reductions at various levels and the formation of 10-11 cross-functional teams

(vii) A number of management changes, including new heads at JLR, were made

(viii) Workforce being trimmed since July 2008 by around 11,000

There were five key issues that persuaded Tata Motors to go ahead

Firstly, Ford had pumped in a great deal of cash to improve quality and it was just a matter of time before this made a difference.

Secondly, JLR had very good automobile plants.

Thirdly, the steadfastness of the dealers despite losses over the past four-five years.

Fourthly, Jaguar cars had already started moving up the ranks of the annual JD Power customer satisfaction rankings.

And, lastly, besides that, there was a crop of great new models in the pipeline, among them the Jaguar XJ and XF and the upcoming Land Rover, which convinced Tata Motors that JLR was on the verge of change.

11.5 Case Study on Demerger – Rationale - Dabur India Ltd.

Dabur India Ltd. ("Dabur") initiated its demerger exercise in January 2003, after the agreement of the Board of Directors to hive off the Pharma business into a new company named Dabur Pharma Ltd. ("DPL"). After the demerger, Dabur concentrated on its core competencies in personal care, healthcare, and Ayurvedic specialties, while DPL focused on its expertise in oncology formulations and bulk drugs. The demerger would allow investors to benchmark performance of these two entities with their respective industry standards.

Results of Demerger Analysis.

	Dabur FMCG	Dabur Pharma	Composite
Beta Equity	0.50	0.53	0.56
R_e	11.52%	11.74%	11.95%
$R_d(1 – t)$	5.20%	5.20%	5.20%
D/E	0.22	0.07	0.4
E/V	0.82	0.93	0.71
D/V	0.18	0.07	0.29
WACC	10.38%	11.31%	10.02%
ROCE	27.70%	8.35%	19.40%
EVA	51.16	-8.49	47.08

The results of the analysis

The Dabur FMCG business unlocked value for shareholders, since the EVA of the FMCG business was more than that of the composite business. Dabur Pharma had a negative EVA, clearly indicating that its capital was not properly used in the composite company.

The total EVA of the FMCG and Pharma division was lesser than that of the composite business indicating a negative synergy between the two divisions. The EVA disparity between the demerged units is expected as FMCG and Pharma are two distinctly different businesses, where FMCG is a low capital intensity business, the pharmaceutical business requires higher capital due to R&D activities.

11.6 Case Study on Demerger – Rationale - Bajaj Auto Ltd.

The Board of Directors of Bajaj Auto Ltd agreed to a demerger on 17th May 2007. Under the scheme, BAL, the parent company, would be renamed Bajaj Holdings and Investment Ltd ("BHIL") and the business was to be demerged into two new incorporated subsidiaries – Bajaj Auto Ltd ("BAL") and Bajaj Finserv Ltd ("BFL"). The auto and manufacturing businesses of the company would be held by BHIL while the wind power project, investments in insurance companies and consumer finance would go to BFL. All the shareholders of the parent company became shareholders in the new companies and were issued shares of the two new companies in the ratio 1:1.

Results of Demerger Analysis

	Composite	Bajaj Auto	Bajaj Fin. Services	BHIL
Beta Equity	0.67	0.72	0.77	0.53
R_e	12.67%	13.04%	13.39%	11.71%
$R_d(1 – t)$	5.20%	5.20%	5.20%	5.20%
D/E	0.30	0.84	0.26	0.19
E/V	0.77	0.54	0.79	0.84
D/V	0.23	0.46	0.21	0.16
WACC	10.95%	9.46%	11.70%	10.67%
ROCE	18.84%	39.13%	4.35%	6.79%
EVA	138.17	474.91	-139.40	-156.46

The results of the analysis

The Auto division unlocked value for shareholders (its EVA more than that of composite business).

BFL and BHIL showed negative EVA, clearly indicating that capital was not properly used by them.

The sum total EVA of the three divisions after the demerger is greater than the composite business EVA, indicating a successful value unlocking for the shareholders. Both these cases highlight that demergers can unlock significant shareholder value. The markets also reacted positively, with both scrips appreciating when the news of the demerger broke out.

12. MERGERS AND ACQUISITIONS FAILURES

There are five principal steps in a successful M & A programme.

1. Manage the pre-acquisition phase.
2. Screen candidates.
3. Eliminate those who do not meet the criteria and value the rest.
4. Negotiate.
5. Post-merger integration.

During the pre-acquisition phase, the acquirer should maintain secrecy about its intentions. Otherwise, the resulting price increase due to rumours may kill the deal.

Academic studies indicate that success in creating value through acquisitions in a competitive market is extremely difficult. Jensen and Ruback (1983) highlighted this point by summarising results from mergers and acquisitions over a period of 11 years. They found that in case of a merger, the average return, around the date of announcement, to shareholders of the acquired company is 20 per cent, whereas the average return to the acquiring company is 0 per cent. Another study by McKinsey indicates that 61 per cent of the 116 acquisitions studied were failures, 23 per cent were successes. Despite such statistics why do companies acquire? Why do mergers fail? The reasons for merger failures can be numerous. Some of the key reasons are :

- Acquirers generally overpay;
- The value of synergy is over-estimated;
- Poor post-merger integration; and
- Psychological barriers.

Companies often merge in the fear that the bigger competitors have economies of scale and may destroy them by exercising a stranglehold on raw material supply, distribution etc. What they do not realise is the drawbacks of being big. The acquiring company's executives would have drawn up elaborate plans for the target without consulting its executives which leads to resentment and managerial attrition. This can be avoided by honest discussions with the target company's executives.

Most companies merge with the hope that the benefits of synergy will be realised. Synergy will be there only if the merged entity is managed better after the acquisition than it was managed before.

It is the quality of the top management that determines the success of the merger. Quite often the executives of the acquiring company lose interest in the target company due to its smallness. The small company executives get bogged down repairing vision and mission statements, budgets, forecasts, profit plans which were hitherto unheard of. The elaborateness of the control system depends on the size and culture of the company. To make a merger successful,

- Decide what tasks need to be accomplished in the post-merger period;
- Choose managers from both the companies (and from outside);
- Establish performance yardstick and evaluate the managers on that yardstick; and
- Motivate them.

13. ACQUISITION THROUGH SHARES

The acquirer can pay the target company in cash or exchange shares in consideration. The analysis of acquisition for shares is slightly different. The steps involved in the analysis are:

- Estimate the value of acquirer's (self) equity;
- Estimate the value of target company's equity;
- Calculate the maximum number of shares that can be exchanged with the target company's shares; and
- Conduct the analysis for pessimistic and optimistic scenarios.

Exchange ratio is the number of acquiring firm's shares exchanged for each share of the selling firm's stock. Suppose company A is trying to acquire company B's 100,000 shares at ₹ 230. So the cost of acquisition is ₹ 230,00,000. Company A has estimated its value at ₹ 200 per share. To get one share of company B, A has to exchange (230/200) 1.15 share, or 115,000 shares for 100,000 shares of B. The relative merits of acquisition for cash or shares should be analysed after giving due consideration to the impact on EPS, capital structure, etc.

Normally when shares are issued in payment to the selling company's shareholders, stockholders will find the merger desirable only if the value of their shares is higher with the merger than without the merger. The number of shares that the buying company will issue in acquiring the selling company is determined as follows:

(1) The acquiring company will compare its value per share with and without the merger.

(2) The selling company will compare its value with the value of shares that they would receive from acquiring company under the merger.

(3) The managements of acquiring company and selling company will negotiate the final terms of the merger in the light of (1) and (2); the ultimate terms of the merger will reflect the relative bargaining position of the two companies.

The fewer of acquiring company's shares that acquiring company must pay to selling company, the better off are the shareholders of acquiring company and worse off are the shareholders of selling company. However, for the merger to be effected, the shareholders of both the buying and selling company will have to anticipate some benefits from the merger even though their share swap deal is subject to synergy risk for both of them.

Impact of Price Earning Ratio: The reciprocal of cost of equity is price-earning (P/E) ratio. The cost of equity, and consequently the P/E ratio reflects risk as perceived by the shareholders. The risk of merging entities and the combined business can be different. In other words, the combined P/E ratio can very well be different from those of the merging entities. Since market value of a business can be expressed as product of earning and P/E ratio (P/E x E = P), the value of combined business is a function of combined earning and combined P/E ratio. A lower combined P/E ratio can offset the gains of synergy or a higher P/E ratio can lead to higher value of business, even if there is no synergy. In ascertaining the exchange ratio of shares due care should be exercised to take the possible combined P/E ratio into account.

Illustration 2

Company X is contemplating the purchase of Company Y, Company X has 3,00,000 shares having a market price of ₹ 30 per share, while Company Y has 2,00,000 shares selling at ₹ 20 per share. The EPS are ₹ 4.00 and ₹ 2.25 for Company X and Y respectively. Managements of both companies are discussing two alternative proposals for exchange of shares as indicated below:

(i) in proportion to the relative earnings per share of two companies.

(ii) 0.5 share of Company X for one share of Company Y (0.5:1).

You are required:

(i) to calculate the Earnings Per share (EPS) after merger under two alternatives; and

(ii) to show the impact of EPS for the shareholders of two companies under both the alternatives.

Solution

Working Notes: Calculation of total earnings after merger

Particulars	Company X	Company Y	Total
Outstanding shares	3,00,000	2,00,000	
EPS (₹)	4	2.25	
Total earnings (₹)	12,00,000	4,50,000	16,50,000

(i) (a) Calculation of EPS when exchange ratio is in proportion to relative EPS of two companies

Company X		3,00,000
Company Y	2,00,000 x 2.25/4	1,12,500
Total number of shares after merger		4,12,500

Company X

EPS before merger	=	₹ 4
EPS after merger = ₹ 16,50,000/4,12,500 shares	=	₹ 4

Company Y

EPS before merger	=	₹ 2.25
EPS after merger = EPS of Merged Entity after merger x Share Exchange ratio on EPS basis $= ₹ 4 \times \frac{2.25}{4}$	=	₹ 2.25

(b) Calculation of EPS when share exchange ratio is 0.5 : 1

Total earnings after merger = ₹ 16,50,000

Total number of shares after merger = 3,00,000 + (2,00,000 x 0.5) = 4,00,000 shares

EPS after merger = ₹ 16,50,000/4,00,000 = ₹ 4.125

(ii) Impact of merger on EPS for shareholders of Company X and Company Y

(a) Impact on Shareholders of Company X

	(₹)
EPS before merger	4.000
EPS after merger	4.125
Increase in EPS	0.125

(b) Impact on Shareholders of Company Y

	(₹)
Equivalent EPS before merger	2.2500
Equivalent EPS after merger	2.0625
Decrease in EPS	0.1875

Illustration 3

A Ltd. is studying the possible acquisition of B Ltd. by way of merger. The following data are available:

Firm	After-tax earnings	No. of equity shares	Market price per share
A Ltd.	₹ 10,00,000	2,00,000	₹ 75
B Ltd.	₹ 3,00,000	50,000	₹ 60

(i) If the merger goes through by exchange of equity shares and the exchange ratio is set according to the current market prices, what is the new earnings per share for A Ltd..

(ii) B Ltd. wants to be sure that its earning per share is not diminished by the merger. What exchange ratio is relevant to achieve the objective?

Solution

(i) The current market price is the basis of exchange of equity shares, in the proposed merger, shareholders of B Ltd. will get only 40,000 shares in all or 4 shares of A Ltd. for every 5 shares held by them, i.e.,

$$\frac{50,000 \times 60}{75} = 40,000$$

The total number of shares in A Ltd. will then be 2,40,000 and, ignoring any synergistic effect, the profit will be ₹ 13,00,000.The new earning per share (EPS) of A Ltd. will be ₹ 5.42, i.e., ₹ 13,00,000/2,40,000.

(ii) The present earnings per share of B Ltd. is ₹6/- (₹ 3,00,000 ÷ 50,000) and that of A Ltd. is ₹5/-, i.e., ₹ 10,00,000 ÷ 2,00,000.If B Ltd. wants to ensure that, even after merger, the earning per share of its shareholders should remain unaffected, then the exchange ratio will be 6 shares for every 5 shares.

The total number of shares of A Ltd. that will produce ₹ 3,00,000 profit is 60,000, (3,00,000 ÷ 5), to be distributed among, shareholders of B Ltd., giving a ratio of 6 shares in A for 5 shares in B.

Proof:

The shareholders of B Ltd. will get in all 60,000 share for 50,000 shares. It means after merger, their earning per share will be ₹ 5/-, i.e. $\frac{₹13,00,000}{2,60,000}$.

In all they will get ₹3,00,000, i.e., 60,000 x 5, as before.

Illustration 4

Simpson Ltd. is considering a merger with Wilson Ltd. The data below are in the hands of both Board of Directors. The issue at hand is how many shares of Simpson should be exchanged for Wilson Ltd. Both boards are considering three possibilities 20,000, 25,000 and 30,000 shares. You are required to construct a table demonstrating the potential impact of each scheme on each set of shareholders:

		Simpson Ltd.	Wilson Ltd.	Combined Post merger Firm 'A'
1.	Current earnings per year	2,00,000	1,00,000	3,50,000
2.	Shares outstanding	50,000	10,000	?
3.	Earnings per share (₹) (1÷ 2)	4	10	?
4.	Price per share (₹)	40	100	?
5.	Price-earning ratio [4 ÷ 3]	10	10	10
6.	Value of firm (₹)	20,00,000	10,00,000	35,00,000
7.	Expected Annual growth rate in earnings in foreseeable future	0	0	0

Solution

The following table demonstrates the potential impact of the three possible schemes, on each set of shareholders:-

Number of Simpson Ltd.'s shares issued to shareholders of Wilson Ltd.	Exchange ratio [(1)/10,000 shares of Wilson Ltd.]	Number of Simpson Ltd.'s shares outstanding after merger [50,000+(1)]	Fraction of Simpson Ltd. (Post merger) owned by Wilson Ltd.'s shareholders [(1)/(3)]	Value of shares owned by Wilson Ltd.'s shareholders [(4)x 35,00,000]	Fraction of Simpson Ltd. (combined Post-merger owned by Simpson Ltd.'s share-holders [50,000/(3)]	Value of shares owned by Simpson Ltd.'s shareholders [(6) x 35,00,000]
(1)	(2)	(3)	(4)	(5)	(6)	(7)
20,000	2	70,000	2/7	10,00,000	5/7	25,00,000
25,000	2.5	75,000	1/3	11,66,667	2/3	23,33,333
30,000	3	80,000	3/8	13,12,500	5/8	21,87,500

14. CROSS-BORDER M&A

Cross-border M&A is a popular route for global growth and overseas expansion. Cross-border M&A is also playing an important role in global M&A. This is especially true for developing

countries such as India. Kaushik Chatterjee, CFO, of Tata Steel in an interview with McKenzie Quarterly in September 2009 articulates this point very clearly. To the following question

The Quarterly: Last year was the first in which Asian and Indian companies acquired more businesses outside of Asia than European or US multinationals acquired within it. What's behind the Tata Group's move to go global?

His respons is as follows:-

"India is clearly a very large country with a significant population and a big market, and the Tata Group's companies in a number of sectors have a pretty significant market share. India remains the main base for future growth for Tata Steel Group, and we have substantial investment plans in India, which are currently being pursued. But meeting our growth goals through organic means in India, unfortunately, is not the fastest approach, especially for large capital projects, due to significant delays on various fronts. Nor are there many opportunities for growth through acquisitions in India, particularly in sectors like steel, where the value to be captured is limited—for example, in terms of technology, product profiles, the product mix, and good management."

Other major factors that motivate multinational companies to engage in cross-border M&A in Asia include the following:

- Globalization of production and distribution of products and services.
- Integration of global economies.
- Expansion of trade and investment relationships on International level.
- Many countries are reforming their economic and legal systems, and providing generous investment and tax incentives to attract foreign investment.
- Privatisation of state-owned enterprises and consolidation of the banking industry.

TEST YOUR KNOWLEDGE

Theoretical Questions

1. Explain synergy in the context of Mergers and Acquisitions.
2. What is take over by reverse bid or Reverse Merger.
3. What is an equity curve out? How does it differ from a spin off.
4. Write a short note on Horizontal Merger and Vertical Merger.

Practical Questions

1. B Ltd. is a highly successful company and wishes to expand by acquiring other firms. Its expected high growth in earnings and dividends is reflected in its PE ratio of 17. The Board of Directors of B Ltd. has been advised that if it were to take over firms with a lower PE ratio than it own, using a share-for-share exchange, then it could increase its reported earnings

per share. C Ltd. has been suggested as a possible target for a takeover, which has a PE ratio of 10 and 1,00,000 shares in issue with a share price of ₹ 15. B Ltd. has 5,00,000 shares in issue with a share price of ₹ 12.

Calculate the change in earnings per share of B Ltd. if it acquires the whole of C Ltd. by issuing shares at its market price of ₹12. Assume the price of B Ltd. shares remains constant.

2. **Elrond Limited plans to acquire Doom Limited. The relevant financial details of the two firms prior to the merger announcement are:**

	Elrond Limited	Doom Limited
Market price per share	₹ 50	₹ 25
Number of outstanding shares	20 lakhs	10 Lakhs

The merger is expected to generate gains, which have a present value of ₹200 lakhs. The exchange ratio agreed to is 0.5.

What is the true cost of the merger from the point of view of Elrond Limited?

3. A Ltd. wants to acquire T Ltd. and has offered a swap ratio of 1:2 (0.5 shares for every one share of T Ltd.). Following information is provided:

	A Ltd.	T. Ltd.
Profit after tax	₹18,00,000	₹3,60,000
Equity shares outstanding (Nos.)	6,00,000	1,80,000
EPS	₹3	₹2
PE Ratio	10 times	7 times
Market price per share	₹30	₹14

Required:

(i) The number of equity shares to be issued by A Ltd. for acquisition of T Ltd.

(ii) What is the EPS of A Ltd. after the acquisition?

(iii) Determine the equivalent earnings per share of T Ltd.

(iv) What is the expected market price per share of A Ltd. after the acquisition, assuming its PE multiple remains unchanged?

(v) Determine the market value of the merged firm.

4. XYZ Ltd., is considering merger with ABC Ltd. XYZ Ltd.'s shares are currently traded at ₹ 20. It has 2,50,000 shares outstanding and its earnings after taxes (EAT) amount to ₹ 5,00,000. ABC Ltd., has 1,25,000 shares outstanding; its current market price is ₹ 10 and

its EAT are ₹ 1,25,000. The merger will be effected by means of a stock swap (exchange). ABC Ltd., has agreed to a plan under which XYZ Ltd., will offer the current market value of ABC Ltd.'s shares:

(i) What is the pre-merger earnings per share (EPS) and P/E ratios of both the companies?

(ii) If ABC Ltd.'s P/E ratio is 6.4, what is its current market price? What is the exchange ratio? What will XYZ Ltd.'s post-merger EPS be?

(iii) What should be the exchange ratio; if XYZ Ltd.'s pre-merger and post-merger EPS are to be the same?

5. Company X is contemplating the purchase of Company Y. Company X has 3,00,000 shares having a market price of ₹ 30 per share, while Company Y has 2,00,000 shares selling at ₹ 20 per share. The EPS are ₹ 4.00 and ₹ 2.25 for Company X and Y respectively. Managements of both companies are discussing two alternative proposals for exchange of shares as indicated below:

(i) In proportion to the relative earnings per share of two companies.

(ii) 0.5 share of Company X for one share of Company Y (0.5 : 1).

You are required:

(i) To calculate the Earnings Per Share (EPS) after merger under two alternatives; and

(ii) To show the impact on EPS for the shareholders of two companies under both the alternatives.

6. M Co. Ltd. is studying the possible acquisition of N Co. Ltd., by way of merger. The following data are available in respect of the companies:

Particulars	M Co. Ltd.	N Co. Ltd.
Earnings after tax (₹)	80,00,000	24,00,000
No. of equity shares	16,00,000	4,00,000
Market value per share (₹)	200	160

(i) If the merger goes through by exchange of equity and the exchange ratio is based on the current market price, what is the new earning per share for M Co. Ltd.?

(ii) N Co. Ltd. wants to be sure that the earnings available to its shareholders will not be diminished by the merger. What should be the exchange ratio in that case?

7. Simple Ltd. and Dimple Ltd. are planning to merge. The total value of the companies are dependent on the fluctuating business conditions. The following information is given for the total value (debt + equity) structure of each of the two companies.

Business Condition	Probability	Simple Ltd. ₹ Lacs	Dimple Ltd. ₹ Lacs
High Growth	0.20	820	1050
Medium Growth	0.60	550	825
Slow Growth	0.20	410	590

The current debt of Dimple Ltd. is ₹ 65 lacs and of Simple Ltd. is ₹ 460 lacs.

Calculate the expected value of debt and equity separately for the merged entity.

8. Yes Ltd. wants to acquire No Ltd. and the cash flows of Yes Ltd. and the merged entity are given below:

(₹ In lakhs)

Year	1	2	3	4	5
Yes Ltd.	175	200	320	340	350
Merged Entity	400	450	525	590	620

Earnings would have witnessed 5% constant growth rate without merger and 6% with merger on account of economies of operations after 5 years in each case. The cost of capital is 15%.

The number of shares outstanding in both the companies before the merger is the same and the companies agree to an exchange ratio of 0.5 shares of Yes Ltd. for each share of No Ltd.

PV factor at 15% for years 1-5 are 0.870, 0.756; 0.658, 0.572, 0.497 respectively.

You are required to:

(i) Compute the Value of Yes Ltd. before and after merger.

(ii) Value of Acquisition and

(iii) Gain to shareholders of Yes Ltd.

9. The following information is provided relating to the acquiring company Efficient Ltd. and the target Company Healthy Ltd.

	Efficient Ltd.	Healthy Ltd.
No. of shares (F.V. ₹ 10 each)	10.00 lakhs	7.5 lakhs
Market capitalization	500.00 lakhs	750.00 lakhs
P/E ratio (times)	10.00	5.00
Reserves and Surplus	300.00 lakhs	165.00 lakhs
Promoter's Holding (No. of shares)	4.75 lakhs	5.00 lakhs

Board of Directors of both the Companies have decided to give a fair deal to the shareholders and accordingly for swap ratio the weights are decided as 40%, 25% and 35% respectively for Earning, Book Value and Market Price of share of each company:

(i) Calculate the swap ratio and also calculate Promoter's holding % after acquisition.

(ii) What is the EPS of Efficient Ltd. after acquisition of Healthy Ltd.?

(iii) What is the expected market price per share and market capitalization of Efficient Ltd. after acquisition, assuming P/E ratio of Firm Efficient Ltd. remains unchanged.

(iv) Calculate free float market capitalization of the merged firm.

10. T Ltd. and E Ltd. are in the same industry. The former is in negotiation for acquisition of the latter. Important information about the two companies as per their latest financial statements is given below:

	T Ltd.	E Ltd.
₹ 10 Equity shares outstanding	12 Lakhs	6 Lakhs
Debt:		
10% Debentures (₹ Lakhs)	580	--
12.5% Institutional Loan (₹ Lakhs)	--	240
Earning before interest, depreciation and tax (EBIDAT) (₹ Lakhs)	400.86	115.71
Market Price/share (₹)	220.00	110.00

T Ltd. plans to offer a price for E Ltd., business as a whole which will be 7 times EBIDAT reduced by outstanding debt, to be discharged by own shares at market price.

E Ltd. is planning to seek one share in T Ltd. for every 2 shares in E Ltd. based on the market price. Tax rate for the two companies may be assumed as 30%.

Calculate and show the following under both alternatives - T Ltd.'s offer and E Ltd.'s plan:

(i) Net consideration payable.

(ii) No. of shares to be issued by T Ltd.

(iii) EPS of T Ltd. after acquisition.

(iv) Expected market price per share of T Ltd. after acquisition.

(v) State briefly the advantages to T Ltd. from the acquisition.

Calculations (except EPS) may be rounded off to 2 decimals in lakhs.

ANSWERS/ SOLUTIONS

Answers to Theoretical Questions

1. Please refer paragraph 2
2. Please refer paragraph 6
3. Please refer paragraph 7.2
4. Please refer paragraph 3

Answers to the Practical Questions

1. Total market value of C Ltd is = 1,00,000 x ₹ 15 = ₹ 15,00,000

PE ratio (given) = 10

Therefore, earnings = ₹ 15,00,000 /10

= ₹ 1,50,000

Total market value of B Ltd. is = 5,00,000 x ₹ 12 = ₹ 60,00,000

PE ratio (given) = 17

Therefore, earnings = ₹ 60,00,000/17

= ₹ 3,52,941

The number of shares to be issued by B Ltd.

₹ 15,00,000 ÷ 12 = 1,25,000

Total number of shares of B Ltd = 5,00,000 + 1,25,000 = 6,25,000

The EPS of the new firm is = (₹ 3,52,941+₹1,50,000)/6,25,000

= ₹ 0.80

The present EPS of B Ltd is = ₹ 3,52,941 /5,00,000

= ₹ 0.71

So the EPS affirm B will increase from Re. 0.71 to ₹ 0.80 as a result of merger

2. **Shareholders of Doom Ltd. will get 5 lakh share of Elrond Limited, so they will get:**

$$= \frac{5 \text{ lakh}}{20 \text{ lakh} + 5 \text{ lakh}} = 20\% \text{ of shares Elrond Limited}$$

The value of Elrond Ltd. after merger will be:

= ₹ 50 x 20 lakh + ₹ 25 x 10 lakh + ₹ 200 lakh

= ₹ 1000 lakh + ₹ 250 lakh + ₹ 200 lakh = ₹ 1450 lakh

True Cost of Merger will be:

(₹ 1450 x 20%) ₹ 290 lakhs – ₹ 250 lakhs = ₹ 40 lakhs

3. (i) The number of shares to be issued by A Ltd.:

The Exchange ratio is 0.5

So, new Shares = 1,80,000 x 0.5 = 90,000 shares.

(ii) **EPS of A Ltd. After a acquisition:**

Total Earnings	(₹ 18,00,000 + ₹ 3,60,000)	₹21,60,000
No. of Shares	(6,00,000 + 90,000)	6,90,000
EPS	(₹ 21,60,000)/6,90,000)	₹3.13

(iii) **Equivalent EPS of T Ltd.:**

No. of new Shares	0.5
EPS	₹3.13
Equivalent EPS (₹ 3.13 x 0.5)	₹1.57

(iv) **New Market Price of A Ltd. (P/E remaining unchanged):**

Present P/E Ratio of A Ltd.	10 times
Expected EPS after merger	₹3.13
Expected Market Price (₹3.13 x 10)	₹31.30

(v) **Market Value of merged firm:**

Total number of Shares	6,90,000
Expected Market Price	₹31.30
Total value (6,90,000 x 31.30)	₹2,15,97,000

4. (i) Pre-merger EPS and P/E ratios of XYZ Ltd. and ABC Ltd.

Particulars	XYZ Ltd.	ABC Ltd.
Earnings after taxes	5,00,000	1,25,000
Number of shares outstanding	2,50,000	1,25,000
EPS	2	1
Market Price per share	20	10
P/E Ratio (times)	10	10

(ii) Current Market Price of ABC Ltd. if P/E ratio is 6.4 = ₹ 1 × 6.4 = ₹ 6.40

$$\text{Exchange ratio} = \frac{₹\ 20}{₹\ 6.40} = 3.125 \text{ or } \frac{₹\ 6.40}{₹\ 20} = 0.32$$

Post merger EPS of XYZ Ltd.

$$= \frac{₹\ 5,00,000 + ₹\ 1,25,000}{2,50,000 + (1,25,000/3.125)}$$

$$= \frac{₹\ 6,25,000}{2,90,000} = 2.16$$

(iii) Desired Exchange Ratio

Total number of shares in post-merged company

$$= \frac{\text{Post - merger earnings}}{\text{Pre - merger EPS of XYZ Ltd}} = \frac{₹\ 6,25,000}{2} = 3,12,500$$

Number of shares required to be issued

= 3,12,500 – 2,50,000 = 62,500

Therefore, the exchange ratio is

62,500 : 1,25,000

$$= \frac{62,500}{1,25,000} = 0.50$$

5. (i) Exchange ratio in proportion to relative EPS **(in ₹)**

Company	Existing No. of shares	EPS	Total earnings
X	3,00,000	4.00	12,00,000
Y	2,00,000	2.25	4,50,000
		Total earnings	16,50,000

No. of shares after merger 3,00,000 + 1,12,500 = 4,12,500

Note: 1,12,500 may be calculated as $= \left(2,00,000 \times \frac{2.25}{4.00}\right)$

EPS for Co. X after merger $= \frac{16,50,000}{4,12,500}$ = ₹ 4.00

Impact on EPS

Equivalent EPS of Co. Y

Before merger ₹ 2.25

After merger (EPS before merger X Share exchange ratio on EPS basis)

₹ 4.00 X 0.5625 = ₹ 2.25

(ii) Merger effect on EPS with share exchange ratio of 0.5 : 1

Total earnings after merger	₹ 16,50,000
No. of shares post merger (3,00,000 + 1,00,000 (0.5 × 2,00,000)	4,00,000
EPS 16,50,000 ÷ 4,00,000	4.125

Impact on EPS

Co. X' shareholders	₹
EPS before merger	4.00
EPS after merger i.e. (16,50,000 ÷ 4,00,000)	4.125
Increase in EPS	0.125
Co. Y' Shareholders	
EPS before merger	2.2500
Equivalent EPS after the merger 4.125 x 0.5	2.0625
Decrease in EPS	0.1875

6. (i) Calculation of new EPS of M Co. Ltd.

No. of equity shares to be issued by M Co. Ltd. to N Co. Ltd.

= 4,00,000 shares × ₹ 160/₹ 200 = 3,20,000 shares

Total no. of shares in M Co. Ltd. after acquisition of N Co. Ltd.

= 16,00,000 + 3,20,000 = 19,20,000

Total earnings after tax [after acquisition]

= 80,00,000 + 24,00,000 = 1,04,00,000

$$\text{EPS} = \frac{₹\ 1{,}04{,}00{,}000}{19{,}20{,}000 \text{ equity shares}} = ₹\ 5.42$$

(ii) Calculation of exchange ratio which would not diminish the EPS of N Co. Ltd. after its merger with M Co. Ltd.

Current EPS:

$$\text{M Co. Ltd.} = \frac{₹\ 80{,}00{,}000}{16{,}00{,}000 \text{ equity shares}} = ₹\ 5$$

$$\text{N Co. Ltd.} = \frac{₹\ 24{,}00{,}000}{4{,}00{,}000 \text{ equity shares}} = ₹\ 6$$

Exchange ratio = 6/5 = 1.20

No. of new shares to be issued by M Co. Ltd. to N Co. Ltd.

= 4,00,000 × 1.20 = 4,80,000 shares

Total number of shares of M Co. Ltd. after acquisition

= 16,00,000 + 4,80,000 = 20,80,000 shares

$$\text{EPS [after merger]} = \frac{₹\ 1{,}04{,}00{,}000}{20{,}80{,}000 \text{ shares}} = ₹\ 5$$

Total earnings in M Co. Ltd. available to new shareholders of N Co. Ltd.

= 4,80,000 × ₹ 5 = ₹ 24,00,000

Recommendation: The exchange ratio (6 for 5) based on market shares is beneficial to shareholders of 'N' Co. Ltd.

7. Compute Value of Equity

Simple Ltd.

₹ in Lacs

	High Growth	Medium Growth	Slow Growth
Debit + Equity	820	550	410
Less: Debt	460	460	460
Equity	360	90	-50

Since the Company has limited liability the value of equity cannot be negative therefore the value of equity under slow growth will be taken as zero because of insolvency risk and the value of debt is taken at 410 lacs. The expected value of debt and equity can then be calculated as:

Simple Ltd.

₹ in Lacs

	High Growth		Medium Growth		Slow Growth		Expected Value
	Prob.	Value	Prob.	Value	Prob.	Value	
Debt	0.20	460	0.60	460	0.20	410	450
Equity	0.20	360	0.60	90	0.20	0	126
		820		550		410	576

Dimple Ltd.

₹ in Lacs

	High Growth		Medium Growth		Slow Growth		Expected Value
	Prob.	Value	Prob.	Value	Prob.	Value	

Equity	0.20	985	0.60	760	0.20	525	758
Debt	0.20	65	0.60	65	0.20	65	65
		1050		825		590	823

Expected Values

₹ in Lacs

Equity		**Debt**	
Simple Ltd.	126	Simple Ltd.	450
Dimple Ltd.	758	Dimple Ltd.	65
	884		515

8. (i) Working Notes:

Present Value of Cash Flows (CF) upto 5 years

Year End	CF of Yes Ltd. (₹ lakhs)	PVF @15%	PV of CF (₹ lakhs)	CF of Merged Entity (₹ lakhs)	PV of CF of Merged Entity (₹ lakhs)
1	175	0.870	152.25	400	348.00
2	200	0.756	151.20	450	340.20
3	320	0.658	210.56	525	345.45
4	340	0.572	194.48	590	337.48
5	350	0.497	173.95	620	308.14
			882.44		1679.27

PV of Cash Flows of Yes Ltd. after the forecast period

$$TV_5 = \frac{CF_5(1+g)}{K_e - g} = \frac{350(1+0.05)}{0.15-0.05} = \frac{367.50}{0.10} = ₹3675 \text{ lakhs}$$

PV of TV_5 = ₹3675 lakhs x 0.497 = ₹1826.475 lakhs

PV of Cash Flows of Merged Entity after the forecast period

$$TV_5 = \frac{CF_5(1+g)}{K_e - g} = \frac{620(1+0.06)}{0.15-0.06} = \frac{657.20}{0.09} = ₹7302.22 \text{ lakhs}$$

PV of TV_5 = ₹7302.22 lakhs x 0.497 = ₹3629.20 lakhs

Value of Yes Ltd.

	Before merger (₹lakhs)	After merger (₹lakhs)
PV of CF (1-5 years)	882.440	1679.27
Add: PV of TV_5	1826.475	3629.20
	2708.915	5308.47

(ii) Value of Acquisition

= Value of Merged Entity – Value of Yes Ltd.

= ₹5308.47 lakhs – ₹2708.915 lakhs = ₹2599.555 lakhs

(iii) Gain to Shareholders of Yes Ltd.

Share of Yes Ltd. in merged entity = ₹5308.47 lakhs x $\frac{1}{1.5}$ = ₹3538.98 lakhs

Gain to shareholder = Share of Yes Ltd. in merged entity – Value of Yes Ltd. before merger

= ₹3538.98 lakhs - ₹2708.915 = ₹830.065 lakhs

9. Swap Ratio

	Efficient Ltd.	Healthy Ltd.
Market capitalization	500 lakhs	750 lakhs
No. of shares	10 lakhs	7.5 lakhs
Market Price per share	₹ 50	₹ 100
P/E ratio	10	5
EPS	₹ 5	₹ 20
Profit	₹ 50 lakh	₹ 150 lakh
Share capital	₹ 100 lakh	₹ 75 lakh
Reserves and surplus	₹ 300 lakh	₹ 165 lakh
Total	₹ 400 lakh	₹ 240 lakh
Book Value per share	₹ 40	₹ 32

(i) Calculation of Swap Ratio

EPS	1 : 4 i.e.	4.0 × 40%	1.6
Book value	1 : 0.8 i.e.	0.8 × 25%	0.2
Market price	1 : 2 i.e.	2.0 × 35%	0.7
		Total	2.5

Swap ratio is for every one share of Healthy Ltd., to issue 2.5 shares of Efficient Ltd. Hence, total no. of shares to be issued 7.5 lakh × 2.5 = 18.75 lakh shares.

Promoter's holding = 4.75 lakh shares + (5 × 2.5 = 12.5 lakh shares) = 17.25 lakh i.e. Promoter's holding % is (17.25 lakh/28.75 lakh) × 100 = 60%.

Calculation of EPS, Market price, Market capitalization and free float market capitalization.

(ii) Total No. of shares 10 lakh + 18.75 lakh = 28.75 lakh

Total capital 100 lakh + 187.5 lakh = ₹ 287.5 lakh

EPS $\frac{\text{Total profit}}{\text{No. of shares}} = \frac{50\,\text{lakh} + 150\,\text{lakh}}{28.75\,\text{lakh}} = \frac{200}{28.75}$ = ₹ 6.956

(iii) Expected market price EPS 6.956 × P/E 10 = ₹ 69.56

Market capitalization = ₹ 69.56 per share × 28.75 lakh shares

= ₹ 1,999.85 lakh

(iv) Free float of market capitalization = ₹ 69.56 per share × (28.75 lakh × 40%)

= ₹ 799.94 lakh

10. As per T Ltd.'s Offer

		₹ in lakhs
(i)	**Net Consideration Payable**	
	7 times EBIDAT, i.e. 7 x ₹ 115.71 lakh	809.97
	Less: Debt	240.00
		569.97
(ii)	**No. of shares to be issued by T Ltd**	
	₹ 569.97 lakh/₹ 220 (rounded off) (Nos.)	2,59,000
(iii)	**EPS of T Ltd after acquisition**	
	Total EBIDT (₹ 400.86 lakh + ₹ 115.71 lakh)	516.57
	Less: Interest (₹ 58 lakh + ₹ 30 lakh)	88.00
		428.57
	Less: 30% Tax	128.57
	Total earnings (NPAT)	300.00
	Total no. of shares outstanding (12 lakh + 2.59 lakh)	14.59 lakh

	EPS (₹ 300 lakh/ 14.59 lakh)	₹ 20.56
(iv)	**Expected Market Price:**	

	₹ in lakhs
Pre-acquisition P/E multiple:	
EBIDAT	400.86
Less: Interest $(580 X \frac{10}{100})$	58.00
	342.86
Less: 30% Tax	102.86
	240.00
No. of shares (lakhs)	12.00
EPS	₹ 20.00
Hence, PE multiple $\frac{220}{20}$	11
Expected market price after acquisition (₹ 20.56 x 11)	₹ 226.16

As per E Ltd's Plan

		₹ in lakhs
(i)	**Net consideration payable**	
	6 lakhs shares x ₹ 110	660
(ii)	**No. of shares to be issued by T Ltd**	
	₹ 660 lakhs ÷ ₹ 220	3 lakh
(iii)	**EPS of T Ltd after Acquisition**	
	NPAT (as per earlier calculations)	300.00
	Total no. of shares outstanding (12 lakhs + 3 lakhs)	15 lakh
	Earning Per Share (EPS) ₹ 300 lakh/15 lakh	₹ 20.00
(iv)	**Expected Market Price** (₹ 20 x 11)	220.00

(v) Advantages of Acquisition to T Ltd

Since the two companies are in the same industry, the following advantages could accrue:

- Synergy, cost reduction and operating efficiency.
- Better market share.
- Avoidance of competition

CHAPTER 14

STARTUP FINANCE

LEARNING OUTCOMES

After going through the chapter student shall be able to understand:

- Introduction of Startup finance
- Pitch Presentation
- Sources of Funding
- Startup financing through Venture Capital Financing

1. THE BASICS OF STARTUP FINANCING

Startup financing means some initial infusion of money needed to turn an idea (by starting a business) into reality. While starting out, big lenders like banks etc. are not interested in a startup business. The reason is that when you are just starting out, you're not at the point yet where a traditional lender or investor would be interested in you. So that leaves one with the option of selling some assets, borrowing against one's home, asking loved ones i.e. family and friends for loans etc. But, that involves a lot of risk, including the risk of bankruptcy and strained relationships with friends and family.

So, the pertinent question is how to keep loans from family and friends strictly businesslike. This is the hard part behind starting a business -- putting so much at risk. But doing so is essential. It's what sets entrepreneurs apart from people who collect regular salaries as employees.

A good way to get success in the field of entrepreneurship is to speed up initial operations as quickly as possible to get to the point where outside investors can see and feel the business venture, as well as understand that a person has taken some risk reaching it to that level.

Some businesses can also be bootstrapped (attempting to found and build a company from personal finances or from the operating revenues of the new company).They can be built up quickly enough to make money without any help from investors who might otherwise come in and start dictating the terms.

In order to successfully launch a business and get it to a level where large investors are interested in putting their money, requires a strong business plan. It also requires seeking advice from experienced entrepreneurs and experts -- people who might invest in the business sometime in the future.

2. SOME OF THE INNOVATIVE WAYS TO FINANCE A STARTUP

Every startup needs access to capital, whether for funding product development, acquiring machinery and inventory, or paying salaries to its employee. Most entrepreneurs think first of bank loans as the primary source of money, only to find out that banks are really the least likely benefactors for startups. So, innovative measures include maximizing non-bank financing.

Here are some of the sources for funding a startup:

(i) **Personal financing.** It may not seem to be innovative but you may be surprised to note that most budding entrepreneurs never thought of saving any money to start a business. This is important because most of the investors will not put money into a deal if they see that you have not contributed any money from your personal sources.

(ii) **Personal credit lines.** One qualifies for personal credit line based on one's personal credit efforts. Credit cards are a good example of this. However, banks are very cautious while granting personal credit lines. They provide this facility only when the business has enough cash flow to repay the line of credit.

(iii) **Family and friends.** These are the people who generally believe in you, without even thinking that your idea works or not. However, the loan obligations to friends and relatives should always be in writing as a promissory note or otherwise.

(iv) **Peer-to-peer lending.** In this process group of people come together and lend money to each other. Peer to peer to lending has been there for many years. Many small and ethnic business groups having similar faith or interest generally support each other in their start up endeavors.

(v) **Crowdfunding**. Crowdfunding is the use of small amounts of capital from a large number of individuals to finance a new business initiative. Crowdfunding makes use of the easy accessibility of vast networks of people through social media and crowdfunding websites to bring investors and entrepreneurs together.

(vi) **Microloans.** Microloans are small loans that are given by individuals at a lower interest to a new business ventures. These loans can be issued by a single individual or aggregated across a number of individuals who each contribute a portion of the total amount.

(vii) **Vendor financing.** Vendor financing is the form of financing in which a company lends money to one of its customers so that he can buy products from the company itself. Vendor financing also takes place when many manufacturers and distributors are convinced to defer payment until the goods are sold. This means extending the payment terms to a longer period for e.g. 30 days payment period can be extended to 45 days or 60 days. However, this depends on one's credit worthiness and payment of more money.

(viii) **Purchase order financing.** The most common scaling problem faced by startups is the inability to find a large new order. The reason is that they don't have the necessary cash to produce and deliver the product. Purchase order financing companies often advance the required funds directly to the supplier. This allows the transaction to complete and profit to flow up to the new business.

(ix) **Factoring accounts receivables.** In this method, a facility is given to the seller who has sold the good on credit to fund his receivables till the amount is fully received. So, when the goods are sold on credit, and the credit period (i.e. the date upto which payment shall be made) is for example 6 months, factor will pay most of the sold amount up front and rest of the amount later. Therefore, in this way, a startup can meet his day to day expenses.

3. PITCH PRESENTATION

Pitch deck presentation is a short and brief presentation (not more than 20 minutes) to investors explaining about the prospects of the company and why they should invest into the startup business. So, pitch deck presentation is a brief presentation basically using Power Point to provide a quick overview of business plan and convincing the investors to put some money into the business. Pitch presentation can be made either during face to face meetings or online meetings with potential investors, customers, partners, and co-founders. Here, some of the methods have been highlighted below as how to approach a pitch presentation:

(i) Introduction

To start with, first step is to give a brief account of yourself i.e. who are you? What are you doing? But care should be taken to make it short and sweet. Also, use this opportunity to get your investors interested in your company. One can also talk up the most interesting facts about one's business, as well as any huge milestones one may have achieved.

(ii) Team

The next step is to introduce the audience the people behind the scenes. The reason is that the investors will want to know the people who are going to make the product or service successful. Moreover, the investors are not only putting money towards the idea but they are also investing in

the team. Also, an attempt should be made to include the background of the promoter, and how it relates to the new company. Moreover, if possible, it can also be highlighted that the team has worked together in the past and achieved significant results.

(iii) Problem

Further, the promoter should be able to explain the problem he is going to solve and solutions emerging from it. Further the investors should be convinced that the newly introduced product or service will solve the problem convincingly.

For instance, when Facebook was launched in 2004, it added some new features which give it a more professional and lively look in comparison to Orkut which was there for some time. It enabled Facebook to become an instant hit among the people. Further, customers have no privacy while using Orkut. However, in Facebook, you can view a person's profile only if he adds you to his list. These simple yet effective advantages that Facebook has over Orkut make it an extremely popular social networking site.

(iv) Solution

It is very important to describe in the pitch presentation as to how the company is planning to solve the problem. For instance, when Flipkart first started its business in 2007, it brought the concept of e-commerce in India. But when they started, payment through credit card was rare. So, they introduced the system of payment on the basis of cash on delivery which was later followed by other e-commerce companies in India. The second problem was the entire supply chain system. Delivering goods on time is one of the most important factors that determine the success of an ecommerce company. Flipkart addressed this issue by launching their own supply chain management system to deliver orders in a timely manner. These innovative techniques used by Flipkart enabled them to raise large amount of capital from the investors.

(v) Marketing/Sales

This is a very important part where investors will be deeply interested. The market size of the product must be communicated to the investors. This can include profiles of target customers, but one should be prepared to answer questions about how the promoter is planning to attract the customers. If a business is already selling goods, the promoter can also brief the investors about the growth and forecast future revenue.

(vi) Projections or Milestones

It is true that it is difficult to make financial projections for a startup concern. If an organization doesn't have a long financial history, an educated guess can be made. Projected financial statements can be prepared which gives an organization a brief idea about where is the business heading? It tells us that whether the business will be making profit or loss?

Financial projections include three basic documents that make up a business's financial statements.

- **Income statement:** This projects how much money the business will generate by projecting income and expenses, such as sales, cost of goods sold, expenses and capital. For your first year in business, you'll want to create a monthly income statement. For the second year, quarterly statements will suffice. For the following years, you'll just need an annual income statement.
- **Cash flow statement:** A projected cash flow statement will depict how much cash will be coming into the business and out of that cash how much cash will be utilized into the business. At the end of each period (e.g. monthly, quarterly, annually), one can tally it all up to show either a profit or loss.
- **Balance sheet:** The balance sheet shows the business's overall finances including assets, liabilities and equity. Typically, one will create an annual balance sheet for one's financial projections.

(vii) Competition

Every business organization has competition even if the product or service offered is new and unique. It is necessary to highlight in the pitch presentation as to how the products or services are different from their competitors. If any of the competitors have been acquired, there complete details like name of the organization, acquisition prices etc. should be also be highlighted.

(viii) Business Model

The term business model is a wide term denoting core aspects of a business including purpose, business process, target customers, offerings, strategies, infrastructure, organizational structures, sourcing, trading practices, and operational processes and policies including culture.

Further, as per Investopedia, a business model is the way in which a company generates revenue and makes a profit from company operations. Analysts use the term gross profit as a way to compare the efficiency and effectiveness of a firm's business model. Gross profit is calculated by subtracting the cost of goods sold from revenues. A business model can be illustrated with the help of an example. There are two companies – company A and company B. Both the companies are engaged in the business of renting movies. Prior to the advent of internet both the companies rent movies physically. Both the companies made ₹ 5 crore as revenues. Cost of goods sold was ₹ 400000. So, the companies made ₹ 100000 as gross profit. After the introduction of internet, company A started to offer movies online instead of renting or selling it physically. This change affected the business model of company A positively. Revenue is still ₹ 500000. But the significant part is that cost of goods sold is now ₹ 200000 only. This is because online sales lead to significant reduction of storage and distribution costs. So, the gross profit increases from 20% to 60%.

Therefore, Company A isn't making more in sales, but it figured out a way to revolutionize its business model, which greatly reduces costs. Managers at company A have an additional 40%

more in margin to play with than managers at company A. Managers at company A have little room for error and they have to tread carefully.

Hence, every investor wants to get his money back, so it's important to tell them in a pitch presentation as to how they should plan on generating revenue. It is better to show the investors a list of the various revenue streams for a business model and the timeline for each of them. Further, how to price the product and what does the competitor charge for the same or similar product shall also be highlighted. It is also beneficial to discuss the lifetime value of the customer and what should be the strategy to keep him glued to their product.

(ix) Financing

If a startup business firm has raised money, it is preferable to talk about how much money has already been raised, who invested money into the business and what they did about it. If no money has been raised till date, an explanation can be made regarding how much work has been accomplished with the help of minimum funding that the company is managed to raise.

It is true that investors like to see entrepreneurs who have invested their own money. If a promoter is pitching to raise capital he should list how much he is looking to raise and how he intend to use the funds.

4. MODES OF FINANCING FOR STARTUPS

(i) Bootstrapping

An individual is said to be boot strapping when he or she attempts to found and build a company from personal finances or from the operating revenues of the new company.

A common mistake made by most founders is that they make unnecessary expenses towards marketing, offices and equipment they cannot really afford. So, it is true that more money at the inception of a business leads to complacency and wasteful expenditure. On the other hand, investment by startups from their own savings leads to cautious approach. It curbs wasteful expenditures and enable the promoter to be on their toes all the time.

Here are some of the methods in which a startup firm can bootstrap:

(a) Trade Credit

When a person is starting his business, suppliers are reluctant to give trade credit. They will insist on payment of their goods supplied either by cash or by credit card. However, a way out in this situation is to prepare a well-crafted financial plan. The next step is to pay a visit to the supplier's office. If the business organization is small, the owner can be directly contacted. On the other hand, if it is a big firm, the Chief Financial Officer can be contacted and convinced about the financial plan.

Communication skills are important here. The financial plan has to be shown. The owner or the financial officer has to be explained about the business and the need to get the first order on credit in order to launch the venture. The owner or financial officer may give half the order on credit and balance on delivery. The trick here is to get the goods shipped and sell them before paying to them. One can also borrow to pay for the good sold. But there is interest cost also. So trade credit is one of the most important ways to reduce the amount of working capital one needs. This is especially true in retail operations.

When you visit your supplier to set up your order during your startup period, ask to speak directly to the owner of the business if it's a small company. If it's a larger business, ask to speak to the chief financial officer or any other person who approves credit. Introduce yourself. Show the officer the financial plan that you have prepared. Tell the owner or financial officer about your business, and explain that you need to get your first orders on credit in order to launch your venture.

The owner or financial officer may give half the order on credit, with the balance due upon delivery. Of course, the trick here is to get the goods shipped, and sell them before one has to pay for them. One could borrow money to pay for the inventory, but you have to pay interest on that money. So trade credit is one of the most important ways to reduce the amount of working capital one needs. This is especially true in retail operations.

(b) Factoring

This is a financing method where accounts receivable of a business organization is sold to a commercial finance company to raise capital. The factor then got hold of the accounts receivable of a business organization and assumes the task of collecting the receivables as well as doing what would've been the paperwork. Factoring can be performed on a non-notification basis. It means customers may not be told that their accounts have been sold.

However, there are merits and demerits to factoring. The process of factoring may actually reduce costs for a business organization. It can actually reduce costs associated with maintaining accounts receivable such as bookkeeping, collections and credit verifications. If comparison can be made between these costs and fee payable to the factor, in many cases it has been observed that it even proved fruitful to utilize this financing method.

In addition to reducing internal costs of a business, factoring also frees up money that would otherwise be tied to receivables. This is especially true for businesses that sell to other businesses or to government; there are often long delays in payment that this would offset. This money can be used to generate profit through other avenues of the company. Factoring can be a very useful tool for raising money and keeping cash flowing.

(c) Leasing

Another popular method of bootstrapping is to take the equipment on lease rather than purchasing it. It will reduce the capital cost and also help lessee (person who take the asset on lease) to claim

tax exemption. So, it is better to a take a photocopy machine, an automobile or a van on lease to avoid paying out lump sum money which is not at all feasible for a startup organization.

Further, if you are able to shop around and get the best kind of leasing arrangement when you're starting up a new business, it's much better to lease. It's better, for example, to lease a photocopier, rather than pay $3,000 for it; or lease your automobile or van to avoid paying out $8,000 or more.

There are advantages for both the startup businessman using the property or equipment (i.e. the *lessee*) and the owner of that property or equipment (i.e. the *lessor*.) The lessor enjoys tax benefits in the form of depreciation on the fixed asset leased and may gain from capital appreciation on the property, as well as making a profit from the lease. The lessee benefits by making smaller payments retain the ability to walk away from the equipment at the end of the lease term. The lessee may also claim tax benefit in the form of lease rentals paid by him.

(ii) Angel Investors

Despite being a country of many cultures and communities traditionally inclined to business and entrepreneurship, India still ranks low on comparative ratings across entrepreneurship, innovation and ease of doing business. The reasons are obvious. These include our old and outdated draconian rules and regulations which provides a hindrance to our business environment for a long time. Other reasons are red tapism, our time consuming procedures, and lack of general support for entrepreneurship. Off course, things are changing in recent times.

As per Investopedia, Angel investors invest in small startups or entrepreneurs. Often, angel investors are among an entrepreneur's family and friends. The capital angel investors provide may be a one-time investment to help the business propel or an ongoing injection of money to support and carry the company through its difficult early stages.

Angel investors provide more favorable terms compared to other lenders, since they usually invest in the entrepreneur starting the business rather than the viability of the business. Angel investors are focused on helping startups take their first steps, rather than the possible profit they may get from the business. Essentially, angel investors are the opposite of venture capitalists.

Angel investors are also called informal investors, angel funders, private investors, seed investors or business angels. These are affluent individuals who inject capital for startups in exchange for ownership equity or convertible debt. Some angel investors invest through crowdfunding platforms online or build angel investor networks to pool in capital.

Angel investors typically use their own money, unlike venture capitalists who take care of pooled money from many other investors and place them in a strategically managed fund.

Though angel investors usually represent individuals, the entity that actually provides the fund may be a limited liability company, a business, a trust or an investment fund, among many other kinds of vehicles.

Angel investors who seed startups that fail during their early stages lose their investments completely. This is why professional angel investors look for opportunities for a defined exit strategy, acquisitions or initial public offerings (IPOs).

(iii) Venture Capital Funds

Evolution

Venture Capital in India stated in the decade of 1970, when the Government of India appointed a committee to tackle the issue of inadequate funding to entrepreneurs and start-ups. However, it is only after ten years that the first all India venture capital funding was started by IDBI, ICICI and IFCI.

With the institutionalization of the industry in November 1988, the government announced its guidelines in the "CCI" (Controller of Capital Issues). These focused on a very narrow description of Venture Capital and proved to be extremely restrictive and encumbering, requiring investment in innovative technologies started by first generation entrepreneur. This made investment in VC highly risky and unattractive.

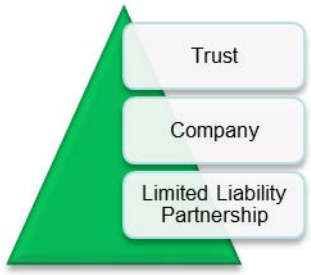
At about the same time, the World Bank organized a VC awareness seminar, giving birth to players like: TDICICI, GVFL, Canbank and Pathfinder. Along with the other reforms the government decided to liberalize the VC Industry and abolish the "CCI", while in 1995 Foreign Finance companies were allowed to invest in the country.

Nevertheless, the liberalization was short-spanned, with new calls for regulation being made in 1996. The new guidelines' loopholes created an unequal playing ground that favoured the foreign players and gave no incentives to domestic high net worth individuals to invest in this industry.

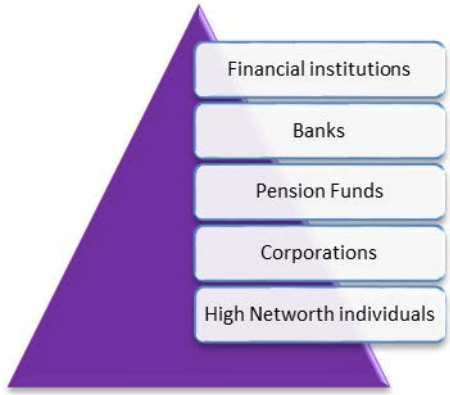
VC investing got considerably boosted by the IT revolution in 1997, as the venture capitalists became prominent founders of the growing IT and telecom industry.

Many of these investors later floundered during the dotcom bust and most of the surviving ones shifted their attention to later stage financing, leaving the risky seed and start-up financing to a few daring funds.

Formation of venture capital has been depicted in the diagram below:



Investors in venture capital funds are shown in the following diagram:



Structure of Venture Capital Fund in India

Three main types of fund structure exist: one for domestic funds and two for offshore ones:

(a) **Domestic Funds**: Domestic Funds (i.e. one which raises funds domestically) are usually structured as: i) a domestic vehicle for the pooling of funds from the investor, and ii) a separate investment adviser that carries those duties of asset manager. The choice of entity for the pooling vehicle falls between a trust and a company, (India, unlike most developed countries does not recognize a limited partnership), with the trust form prevailing due to its operational flexibility.

(b) **Offshore Funds**: Two common alternatives available to offshore investors are: the "offshore structure" and the "unified structure".

Offshore structure: Under this structure, an investment vehicle (an LLC or an LP organized in a jurisdiction outside India) makes investments directly into Indian portfolio companies. Typically, the assets are managed by an offshore manager, while the investment advisor in India carries out the due diligence and identifies deals.

Unified Structure: When domestic investors are expected to participate in the fund, a unified structure is used. Overseas investors pool their assets in an offshore vehicle that invests in a locally managed trust, whereas domestic investors directly contribute to the trust. This is later device used to make the local portfolio investments.

Concept of Venture Capital Fund

Venture capital means funds made available for startup firms and small businesses with exceptional growth potential. Venture capital is money provided by professionals who alongside management invest in young, rapidly growing companies that have the potential to develop into significant economic contributors.

Venture Capitalists generally:

- Finance new and rapidly growing companies
- Purchase equity securities

- Assist in the development of new products or services
- Add value to the company through active participation.

Characteristics of Venture Capital Financing:

(i) **Long time horizon**: The fund would invest with a long time horizon in mind. Minimum period of investment would be 3 years and maximum period can be 10 years.

(ii) **Lack of liquidity**: When VC invests, it takes into account the liquidity factor. It assumes that there would be less liquidity on the equity it gets and accordingly it would be investing in that format. They adjust this liquidity premium against the price and required return.

(iii) **High Risk**: VC would not hesitate to take risk. It works on principle of high risk and high return. So, high risk would not eliminate the investment choice for a venture capital.

(iv) **Equity Participation**: Most of the time, VC would be investing in the form of equity of a company. This would help the VC participate in the management and help the company grow. Besides, a lot of board decisions can be supervised by the VC if they participate in the equity of a company.

Advantages of bringing VC in the company:

- It injects long- term equity finance which provides a solid capital base for future growth.
- The venture capitalist is a business partner, sharing both the risks and rewards. Venture capitalists are rewarded with business success and capital gain.
- The venture capitalist is able to provide practical advice and assistance to the company based on past experience with other companies which were in similar situations.
- The venture capitalist also has a network of contacts in many areas that can add value to the company.
- The venture capitalist may be capable of providing additional rounds of funding should it be required to finance growth.
- Venture capitalists are experienced in the process of preparing a company for an initial public offering (IPO) of its shares onto the stock exchanges or overseas stock exchange such as NASDAQ.
- They can also facilitate a trade sale.

Stages of funding for VC:

1. **Seed Money**: Low level financing needed to prove a new idea.
2. **Start-up**: Early stage firms that need funding for expenses associated with marketing and product development.
3. **First-Round**: Early sales and manufacturing funds.

4. **Second-Round**: Working capital for early stage companies that are selling product, but not yet turning in a profit.

5. **Third Round**: Also called Mezzanine financing, this is expansion money for a newly profitable company.

6. **Fourth-Round**: Also called bridge financing, it is intended to finance the "going public" process.

Risk in each stage is different. An indicative Risk matrix is given below:

Financial Stage	Period (Funds locked in years)	Risk Perception	Activity to be financed
Seed Money	7-10	Extreme	For supporting a concept or idea or R&D for product development
Start Up	5-9	Very High	Initializing prototypes operations or developing
First Stage	3-7	High	Start commercials marketing production and
Second Stage	3-5	Sufficiently high	Expand market and growing working capital need
Third Stage	1-3	Medium	Market expansion, acquisition & product development for profit making company
Fourth Stage	1-3	Low	Facilitating public issue

VC Investment Process

The entire VC Investment process can be segregated into the following steps:

1. **Deal Origination**: VC operates directly or through intermediaries. Mainly many practicing Chartered Accountants would work as intermediary and through them VC gets the deal.

Before sourcing the deal, the VC would inform the intermediary or its employees about the following so that the sourcing entity does not waste time :

- Sector focus
- Stages of business focus
- Promoter focus
- Turn over focus

Here the company would give a detailed business plan which consists of business model, financial plan and exit plan. All these aspects are covered in a document which is called Investment Memorandum (IM). A tentative valuation is also carried out in the IM.

2. **Screening**: Once the deal is sourced the same would be sent for screening by the VC. The screening is generally carried out by a committee consisting of senior level people of the VC. Once the screening happens, it would select the company for further processing.

3. **Due Diligence**: The screening decision would take place based on the information provided by the company. Once the decision is taken to proceed further, the VC would now carry out due diligence. This is mainly the process by which the VC would try to verify the veracity of the documents taken. This is generally handled by external bodies, mainly renowned consultants. The fees of due diligence are generally paid by the VC. However, in many cases, this can be shared between the investor (VC) and Investee (the company) depending on the veracity of the document agreement.

4. **Deal Structuring**: Once the case passes through the due diligence it would now go through the deal structuring. The deal is structured in such a way that both parties win. In many cases, the convertible structure is brought in to ensure that the promoter retains the right to buy back the share. Besides, in many structures to facilitate the exit, the VC may put a condition that promoter has also to sell part of its stake along with the VC. Such a clause is called tag- along clause.

5. **Post Investment Activity**: In this section, the VC nominates its nominee in the board of the company. The company has to adhere to certain guidelines like strong MIS, strong budgeting system, strong corporate governance and other covenants of the VC and periodically keep the VC updated about certain mile-stones. If milestone has not been met the company has to give explanation to the VC. Besides, VC would also ensure that professional management is set up in the company.

6. **Exit plan**: At the time of investing, the VC would ask the promoter or company to spell out in detail the exit plan. Mainly, exit happens in two ways: one way is 'sell to third party(ies)'. This sale can be in the form of IPO or Private Placement to other VCs. The second way to exit is that promoter would give a buy back commitment at a pre agreed rate (generally between IRR of 18% to 25%). In case the exit is not happening in the form of IPO or third party sell, the promoter would buy back. In many deals, the promoter buyback is the first refusal method adopted i.e. the promoter would get the first right of buyback.

5. STARTUP INDIA INITIATIVE

Startup India scheme was initiated by the Government of India on 16th of January, 2016. The definition of startup was provided which is applicable only in case of Government Schemes.

Startup means an entity, incorporated or registered in India:

- Not prior to five years,
- With annual turnover not exceeding ₹ 25 crore in any preceding financial year, and

- Working towards innovation, development, deployment or commercialization of new products, processes or services driven by technology or intellectual property.

Provided that such entity is not formed by splitting up, or reconstruction, of a business already in existence. Provided also that an entity shall cease to be a Startup if its turnover for the previous financial years has exceeded ₹ 25 crore or it has completed 5 years from the date of incorporation/ registration. Provided further that a Startup shall be eligible for tax benefits only after it has obtained certification from the Inter-Ministerial Board, setup for such purpose.

What is a Startup to avail government schemes?

Up to 5 years from its date of incorporation / registration

Incorporated as either a Private Limited Company or a Registered Partnership Firm or a Limited Liability Partnership

Turnover for any fiscal year has not exceeded INR 25 crore

Entity should not have been formed by splitting up or reconstruction a business already in existence

Working towards innovation, development, deployment or commercialization of new product, processes or services driven by technology or intellectual property

Source: http://www.startupindia.gov.in/

TEST YOUR KNOWLEDGE

Theoretical Questions

1. Explain some of the sources for funding a start-up.

2. What do you mean by Pitch Presentation in context of Start-up Business?

ANSWERS/ SOLUTIONS

Answers to Theoretical Questions

1. Please refer paragraph 2

2. Please refer paragraph 3