DK24: SECURITY ANALYSIS AND PORTFOLIO MANAGEMENT

Unit I

Investment setting – securities, securities market – sources of investment information – security contract Regulation Act.

Unit II

Valuation of Securities – Equity – Preference Shares – Debt Instruments – Hybrid Securities – derivatives – Asset pricing theories – CAPM – APT – Portfolio theory – Option Pricing Theory.

Unit III

Economic Analysing – Economic Forecasting and stock investment decisions – Industry Analysis – Industry Life cycle – External industry information sources.

Unit IV

Company analysis – Measuring Earnings – Forecasting earnings – Applied valuation techniques – Technical Analysis – Charting methods – market indicators Trend – Trend reversals – Patterns.

Unit V

Portfolio – Construction – Diagnostic Management – Portfolio revision. Efficient market theory – comparison with fundamental and Technical School of Thought – Portfolio analysis – Techniques of revision and performance measurement.

References:

1. Preethi Singh – Investment Management, Himalaya Pub.House.
2. Donald E.Fisher and J.Jorden – Security Analysis and Portfolio Management, Prentice Hall.
3. Steven E.Bolten - Security Analysis and Portfolio Management, Holk, Rinehart and Winstan.
4. Fuller and Farvel – Modern Security Analysis of Portfolio Management.

UNIT I

INTRODUCTION

The income that a person receives may be used for purchasing goods and services that he currently requires or it may be saved for purchasing goods and services that he may require in the future. In other words, income can be what is spent for current consumption or saved for the future consumption. Savings are generated when a person or an organization abstains from present consumption for future use. The person saving a part of his income tries to find a temporary repository for his savings until they are required to finance his future expenditure. This results in investment.

WHAT IS INVESTMENT?

Investment is parting with one's fund, to be used by another party, user of fund, for productive activity. It can mean giving an advance or loan or contributing to the equity (ownership capital) or debt capital of a corporate or non corporate business unit. Generalised, investment means conversion of cash or money into a monetary asset or a claim of future money for a return. This return is for saving (as abstaining from present consumption), parting with saving or liquidity (to be rewarded for waiting for a future consumption) and lastly for taking a risk involving the uncertainty about the actual return, time of waiting and cost of getting back funds, safety of funds, and risk of the variability of the return.

MEANING OF INVESTMENT

Investment is an activity that is engaged in by people who have savings, i.e. investments are made from savings, or in other words, people invest their savings. But all savers are not investors. Investment is an activity which is different from savings. Let us see what is meant by investment.

It may mean many things to many persons. If one person has advanced some money to another, he may consider his loan as an investment. He expects to get back the money along with interest at a future date. Another person may have purchased one kilogram of gold for the purpose of price appreciation and may consider it as an investment. Yet another person may purchase an insurance plan for the various benefits it promises in future. That is his investment.

In all these cases it can be seen that investment involves employment of funds with the aim of achieving additional income or growth in values. The essential quality of an investment is that it involves waiting for a reward. Investment involves the commitment of resources which have been saved in the hope that some benefits will accrue in future.

Thus, investment may be defined as "a commitment of funds made in the expectation of some positive rate of return". Expectation of return is an essential element of investment. Since the return is expected to be realized in future, there is a possibility that the return actually realised is lower than the return expected to be realised. This possibility of variation in the actual return is known as investment risk. Thus, every investment involves return and risk.

F. Amling defines investment as "purchase of financial assets that produces a yield that is proportionate to the risk assumed over some future investment period."

According to sharpe, "investment is sacrifice of certain present value for some uncertain future values".

SPECULATION

Speculation means taking up the business risk in the hope of getting short term gain. Speculation essentially involves buying and selling activities with the expectation of getting profit from the price fluctuations. This can be explained with an example. If spouse buys a stock for its dividend, she may be termed as an investor. If she buys with the anticipation of price rise in the near future and the hope of selling it at a gain price she would be termed as a speculator. The dividing line between speculation and investment is very thin because people buy stock for dividends and capital appreciation.

The time factor involved in the speculation and investment is different. The investor is interested in consistent good rate of return for a longer period. He is primarily concerned with the direct benefits provided by the securities in the long run. The speculator is interested in getting abnormal return i.e. extremely high rate of return than the normal return in the short run. Speculator's investments are made for short term.

The speculator is more interested in the market action and its price movement. The investor constantly evaluates the worth of security whereas the speculator evaluates the price movement. He is not worried about the fundamental factors like his counterpart, the investor.

The investor would try to match the risk and return. The speculator would like to assume greater risk than the investor. Risk refers to the possibility of incurring loss in a financial transaction. The negative short term fluctuations affect the speculators in a worse manner than the investors. The risk factor involved in the investment is also limited. After studying the factors related with the concerned company's stock, the investors buys it and hence the risk exposure is limited. The investor likes to invest in securities where his principal would be safe.

DIFFERENCE BETWEEN INVESTMENT AND SPECULATION

1. Investment is all about value creation (e.g. manufacturing products and providing services) while speculation is concerned about price movement. In the latter, you profit purely from price differences. The price movement is mostly influenced by the psychology of the market.

2. Investment is has lower risk but need more capital to generate more value while speculation is challenging, has higher risk but requires less capital. This explains why most people are speculating because its entry requirement (capital) is lower.

3. Investment is about getting what market offers you while speculation is about trying to get more by doing more in believing that you can beat the market.

4. Investment is about doing least since you let the companies or industries work for you by owning a piece of their businesses while speculation is about doing the most (unconsciously) and it is more involving because you keep chasing the price movement. You need to keep buying and selling to generate profit.

5. Investment is over long term while speculation is of shorter term. For the former, the success rate is highest by maximizing the holding period of a position while for the latter; the success rate will peak if the position is kept open for the shortest time possible. This also explains why people like to speculate because it provides "shortcuts" to wealth.

6. Investment is about simplicity while speculation is about complexity (timing market, predicting market direction, stock picking…). That's why most people fail when speculating. It gives a false sense of simplicity.

7. Investment = growing system (like a living organic creature) while speculation = zerosum game (one person's gain is another person's loss). The former will grow over time while the latter remains constant or shrinking over time.

GAMBLING AND INVESTMENT

A gamble is usually a very short term investment in a game or chance. Gambling is different from speculation and investment. The time horizon involved in gambling is shorter than speculation and investment. The results are determined by the roll of dice or the turn of a card. Secondly, people gamble as a way to entertain themselves, earning incomes would be the secondary factor. Thirdly, the risk in gambling is different from the risk of the investment. Gambling employs artificial risks whereas commercial risks are present in the investment activity. There is no risk and return trade off in the gambling and the negative outcomes are expected. But in the investment there is an analysis of risk and return. Positive returns are

expected by the investors. Finally, the financial analysis does not reduce the risk proportion involved in the gambling.

FINANCIAL AND ECONOMIC MEANING OF INVESTMENT

In the financial sense, investment is the commitment of a person's funds to derive future income in the form of interest, dividend, premiums, pension benefits or appreciation in the value of their capital. Purchasing of shares, debentures, post office savings certificates, insurance policies are all investments in the financial sense. Such investments generate financial asset.

In the economic sense, investment means the net additions to the economy's capital stock which consists of goods and services that are used in the production of other goods and services. Investment in this sense implies the formation of new and productive capital in the form of new constructions, plant and machinery, inventories, etc. Such investments generate physical assets.

The two types of investments are, however, related and dependent. The money invested in financial investments are ultimately converted into physical asset. Thus, all investments result in the acquisition of some asset either financial or physical.

CHARACTERISTICS OF INVESTMENT

All investments are characterised by certain features. Let us analyse these characteristic features of investments.

1. Return

All investments are characterised by the expectation of a return. In fact, investments are made with the primary objective of deriving a return. The return may be received in the form of yield plus capital appreciation. The difference between the sale price and the purchase price is capital appreciation. The dividend or interest received from the investment is the yield. Different types of investment promise different rates of return. The return from an investment depends upon the nature of the investment, the maturity period and a host of other factor.

2. Risk

Risk is inherent in any investment. This risk may relate to loos of capital, delay in repayment of capital, non – payment of interest, or variability of return. While some investments like government securities and bank deposits are almost riskless, others are more risky. The risk of an investment depends on the following factors.

a) The longer the maturity period, the larger is the risk.

b) The lower the credit worthiness of the borrower, the higher is the risk.

c) The risk varies with the nature of investment. Investments in ownership securities like equity shares carry higher risk compared to investments in debt instruments like debentures and bonds.

Risk and return of an investment are related. Normally, the higher risk, the higher is the return.

3. Safety

The safety of an investment implies the certainty of return of capital without loss of money or time. Safety is another feature which an investor desires for his investments. Every investor expects to get back his capital on maturity without loss and without delay.

4. Liquidity

An investment which is easily saleable or marketable without loss of money and without loss of time is said to possess liquidity. Some investments like company deposits, bank deposits, P.O. Deposits, NSC, NSS, etc. are not marketable. Some investment instruments like preference shares and debentures are marketable, but there are no buyers in many cases and hence their liquidity is negligible. Equity shares of companies listed on stock exchanges are easily marketable through the stock exchanges.

An investor generally prefers liquidity for his investments, safety of his funds, a good return with minimum risk or minimisation of risk and maximisation of return.

OBJECTIVES OF INVESTMENT

An investor has various alternative avenues of investment for his savings to flow to. Savings kept as cash are barren and do not earn anything. Hence, savings are invested in assets depending on their risk and return characteristics. The objective of the investor is to minimize the risk involved in investment and maximise the return from the investment.

Our savings kept as cash are not only barren because they do not earn anything, but also loses its value to the extent of rise in prices. Thus, rise in prices or inflation erodes the value of money. Savings are invested to provide a hedge or protection against inflation. If the investment cannot earn as much as the rise in prices, the real rate of return would be negative. Thus, if inflation is at an average annual rate of ten per cent, then the return from an investment should be above ten percent to induce savings to flow into investment.

Thus, the objectives of an investor can be stated as:

1. Maximisation of return
2. Minimisation of risk
3. Hedge against inflation.

NEED AND IMPORTANCE OF INVESTMENTS

An investment is an important and useful factor in the context of present day conditions. Some factors are important. They are as outlined below:

1. Longer life expectancy or planning for retirement
2. Increasing rates of taxation
3. High interest rates
4. High rate of inflation
5. Larger incomes
6. Availability of a complex number of investment outlets.

1. Longer Life Expectancy

Investment decisions have become more significant as most people in India retire between the ages of 56 to 60. So that, they are planned to save their money. Saving by themselves do not increase wealth, saving must be invested in such a way that the principal and income will be adequate for a greater number of retirement years. Longer life expectancy is one reason for effective saving and further investment activity that help for investment decisions.

2. Increasing Rates of Taxation

When tax rate is increased, it will focus for generating saving by tax payer. When the tax payer invest their income into provident fund, pension fund, Unit Trust of India, Life Insurance, Unit Linked Insurance Plan, National Saving Certificates, Development Bonds, Post Office Cumulative Deposit Schemes etc. It affects the taxable income.

3. Interest Rates

Interest rate is one of the most important aspects of a sound investment plan. The interest rate differs from one investment to another. There may be changes between degree of risk and safe investments. They may also differ due to different benefit schemes offered by the institutions. A high rate of interest may not be the only factor favouring the outlet for investment. Stability of interest is an important aspect of receiving a high rate of interest.

4. Inflation

Inflation has become a continuous problem. It affects in terms of rising prices. Several problems are associated and coupled with a falling standard of living. Therefore, investor careful scrutiny of the inflation will make further investment process delayed. Investor ensures to check up safety of the principal amount, security of the investment. Both are crucial from the point of view of the interest gained from the investments.

5. Income

      Income is another important element of the investment. When government provides jobs to the unemployed persons in the country, the ultimate result is ensuring of income than saving the extra income. More incomes and more avenues of investment have led to the ability and willingness of working people to save and invest their funds.

6. Investment Channels

      The growth and development of the country leading to greater economic prosperity has led to the introduction of vast areas of investment outlets. Investment channels means an investor is willing to invest in several instruments like corporate stock, provident fund, life insurance, fixed deposits in the corporate sector and unit trust schemes.

THE INVESTMENT PROCESS/STAGES

      Investment process refers to investment policy, investment analysis, valuation of securities and proper portfolio construction in this way achieve to investment process.
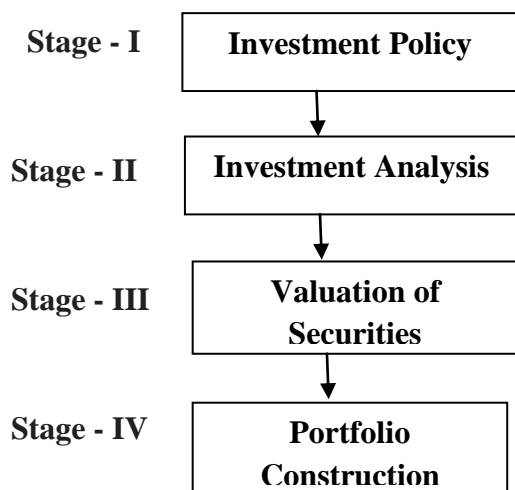
Stage - I	**Investment Policy**
Stage - II	**Investment Analysis**
Stage - III	**Valuation of Securities**
Stage - IV	**Portfolio Construction**

Fig. 1.1 The Investment Process/Stages

1. Investment Policy

      Investment policy is the first stage of the investment process. It determines the following aspects of the investor:

      a) Determination of Investable Wealth.

      b) Determination of Portfolio Objectives.

      c) Identification of Potential Investment Assets.

      d) Consideration of Attributes of Investment Assets.

      e) Allocation of Wealth to Asset Categories.

2. Investment Analysis

Investment analysis is the second stage of the investment process. Investor analysis of the investment is made on the following grounds:

a) Equity Stock Analysis.

b) Screening of Industries.

c) Analysis of Industries.

d) Quantitative Analysis of Stocks.

e) Analysis of the Economy.

f) Debentures and Bond Analysis.

g) Analysis of Yield Structure.

h) Consideration of Debentures.

i) Quantitative Analysis of Debentures.

j) Other Asset Analysis.

k) Qualitative Analysis.

l) Quantitative Analysis.

3. Valuation of Securities

Valuation of the securities is the third stages of the investment process. This stage involves:

a) Valuation of Stocks.

b) Valuation of Debentures and Bonds.

c) Valuation of Other Assets.

4. Portfolio Construction

Portfolio construction is the last stage of the investment process. It involves the following areas as outlined below that:

a) Determination of Diversification Level.

b) Consideration of Investment Timing.

c) Selection of Investment Assets.

d) Allocation of Investable Wealth to Investment Assets.

e) Evaluation of Portfolio for Feedback.

TYPES OF INVESTORS

Investors may be individuals and institutions. Individual investors operate alongside institutional investors in the investment arena. However, their characteristics are different.

Individual investors are large in number but their investable resources are comparatively smaller. They generally lack the skill to carry out extensive evaluation and

analysis before investing. Moreover, they do not have the time and resources to engage in such analysis.

Institutional investors, on the other hand, are the organizations with surplus funds who engage in investment activities. Mutual funds, investment companies, banking and non – banking companies, insurance corporations etc. are the organizations with large amounts of surplus funds to be invested in various profitable avenues. These institutional investors are fewer in number compared to individual investors, but their investable resources are much larger. The institutional investors engage professional fund managers to carry out extensive analysis and evaluation of different investment opportunities. As result their investment activity tends to be more rational and scientific. They have a better chance of maximising returns and minimising risk.

The professional investors and the unskilled individual investors combine to make the investment arena dynamic.

INVESTMENT AVENUES

Today's investor has a wide array of investment avenues and he can choose the one that suits his preferences. Following are the various asset classes that the investor can choose from,

1. Equity
2. Debentures
3. Bonds or Fixed Income Securities
   a) Government Securities
   b) Savings bonds
   c) Private Sector debentures
   d) PSU bonds
   e) Infrastructure Bonds
4. Money Market Instruments
   a) Treasury Bills
   b) Certificate of Deposits
   c) Commercial Papers
   d) Repos
   e) LIQUID BEES
5. Non-marketable Financial Assets
   a) Bank deposits
   b) Flexi Deposits

c) Post office deposits (POTD)

d) Monthly income scheme of the post office (MISPO)

e) National Savings Certificate (NSC)

f) Company Deposits

g) Employees Provident Fund Scheme (EPF)

h) Public Provident Fund (PPF)

6. Real Estate

a) Residential House

b) Commercial Property

c) Agricultural Land

d) Suburban Land

e) Time Share in Holiday Resort

f) Real Estate Investment Trust (REIT)

7. Precious Objects

a) Gold & Silver

b) Gold ETFs

8. Insurance Policies

a) Endowment Assurance

b) Money Back Plans

c) Whole Life Assurance

d) ULIP

e) Term Assurance

f) Immediate Annuity

g) Deferred Annuity

9. Pension Funds

a) NPS

b) Private Pension Funds

10. Mutual Funds

1. EQUITY

Equity is the investment media that represent an ownership position, that is, in which the investor in stocks or certain options is an owner of the firm and is thus entitled to a residual share of profits. The equity ownership can be broadly divided into direct equity investment through capital markets and indirect equity investment through institutions.

Equity stock or equity shares represent an ownership position and the equity shareholders are the owners of the firm having the voting power. The equity shares enables the investors the right to the earnings of the firm and also run the risk of receiving nothing if earnings are insufficient to cover the obligations of the firm.

Equity shares earn a return based on two sources – dividends and capital gains. Dividends are received only if the company earns sufficient money and the board of directors deems it proper to declare a dividend. Capital Gains arise from an increase in the market price of the equity, which is generally associated with a growth in earnings per share. The share prices have been quite volatile due to various factors that are external and internal. Hence there is a need for careful analysis in the selection of securities for purchase and sale, and also in the timing of these investment decisions, since equity shares do not have maturity date at which a fixed value will be realized.

2. DEBENTURES

Investors look forward for secured returns on a regular basis and such instruments are in great demand. One such option is the Non-Convertible Debentures. There has been a series of NCD issues recently and many more are in pipeline. A NCD is a fixed income debt paper issued by a Company. The issuer agrees to pay a fixed interest on the investment.

The NCDs are for a long term generally ranging from 5 to 15 years. These instruments have to be normally rated by the credit rating agencies. A good rating indicates reasonable assurance of safety and return of principal as well as interest. The risk element shall be high if the rating is not so good.

These NCDs may be either secured or unsecured. The secured debentures are backed by assets; in case the issuer is not able to fulfill his obligations, the assets are liquidated in order to repay the investors holding the debentures. The secured NCDs offer lower interests as compared to that of unsecured ones, due to risk differential. The interest earned on these instruments are taxable and is also liable for tax-deducted at source. It is also to be noted that there is a very poor secondary market for NCDs in India, thereby making these instruments illiquid.

3. BONDS OR FIXED INCOME SECURITIES

Bonds refer to a long-term investment avenue which has a specified amount or rate of interest and specified maturity date. It is a marketable legal contract that promises to pay its investors a stated rate of interest and to repay the principal at the maturity date. Bonds differ according to their provisions for repayment, security pledged, and other technical aspects.

a) Government Bonds

Government bonds are the tradable instrument issued either by Central Government or State Government to finance their activities. The State Government issues these bonds as State Development Loans (SDLs). Bonds issued by municipalities and public institutions are also deemed as Government bonds. Investors can choose this as an investment avenue, which provides returns in terms of coupons. These can be held in dematerialized form and has a very secondary market, thereby providing high liquidity. These instruments are fully free of default risk. However, the returns earned thereof is relatively low.

b) Savings Bonds

Savings bonds are the bonds issued by RBI, which are available for investment at various banks, designated by RBI. These bonds have the feature of both cumulative and noncumulative interest payments. Generally these bonds earn a coupon rate of interest at 8% per annum. The minimum investment is Rs.1,000 and in multiples of Rs. 1,000 thereof. Generally these bonds have a maturity period of 6 years. These bonds are taxable, that is, the interests earned from these are liable to income tax. However, these investments are not subject to wealth tax. These bonds are not transferable, although, nomination facility is available for individual investors.

c) Private Sector bonds

Private sector bonds or corporate bonds are the means by which the private firms borrow money directly from the public. The investors can invest in these bonds and they generally pay semi-annual coupons over the entire term of the bond and also return the face value to the investor upon maturity. These bonds carry a higher rate of interest over the Government bonds, since the inherent default risk is higher. The private sector bonds include all listed debt securities issued by institutions such as banks, bodies corporate and companies. In order to issue these bonds, they have to be credit rated. The credit rating helps the investor to assess the credit worthiness of the issuer and to decide accordingly.

The corporate bonds are either,

      a. interest-bearing or

      b. issued at a discount and redeemed at face value

The investor of these bonds does not have a claim on the ownership to the company, but they have only creditorship claim.

d) PSU bonds

PSU bonds are the bonds issued by Public Sector Undertakings in which the government shareholding is generally more than 51%, wherein these agencies tend to

channelize the credit to finance their needs. These bonds provide an investment opportunity, wherein the interest payments are made at pre-determined intervals and the principal is repaid upon maturity. The returns on these bonds are relatively higher that Government bonds and lesser than corporate bonds.

Mostly, these PSU bonds are issued by the way of private placements, and hence there is a little room for individual investors. However, it does not completely deprive the individual or retail participation. There is also a secondary market, through which these instruments can be purchased.

PSU bonds are of two types, namely, taxable bonds and tax-free bonds. Tax-free bonds are bonds where the interest earned thereon is exempted from tax. These bonds are issued with prior approval from the Government through the Central Board for Direct Taxes (CBDT).

e) Infrastructure Bonds

Infrastructure bonds are long-term bonds notified by the Central Government which are eligible for a deduction under section 80CCF. Only the bonds issued by IFCI, LIC, IDFC, NBFCs which are classified as 'Infrastructure Finance Companies' by the RBI are eligible for the aforesaid deduction. The investor may invest in these bonds, but have a minimum tenure of 10 years and a lock-in period of 5 years. After the lock-in period of 5 years, the investor may, exit in the secondary market. The investment in these bonds up to Rs. 20,000 is eligible for deduction u/s 80 CCF. However, the deduction u/s 80 CCF is disallowed with effect from FY 2012-13. Yet, this remains as one of the investment avenue for a long-term horizon.

4. MONEY MARKET INSTRUMENTS

Money market instruments are the investment avenues which have high liquidity and short term maturity, generally less than a year. These instruments provide an opportunity for the investor to park his/her money for a short-term varying from few days to few weeks to few months.

a) Treasury Bills

Treasury bills are another investment vehicle available for the investors who can invest for a period of less than a year. These are issued by Government of India and currently three variants of treasury bills are issued, namely, 91-day treasury bills, 182-day treasury bills and 364-day treasury bills. The subscriptions can be made for a minimum of Rs.10, 000 and in multiples of Rs.10, 000. Treasury bills are issued based on auction and these auctions are held on Negotiated Dealing System (NDS). The bidders can submit their bids electronically.

The successful bidders need to pay the bid amount on the next working day of the auction date.

b) Certificate of Deposits

Commercial deposits are short-term instruments issued by schedule banks, having a maturity ranging from 7 days to a year. These are similar to promissory notes and are issued in demat form. CDs are issued in denomination of Rs. 1, 00,000 and in multiples of Rs. 1,00,000, thereon. The interest rate on these are market driven. Commercial deposits are like bank term deposits, except for the fact that they are freely negotiable and transferable. Commercial deposits normally earn relatively higher return as compared to bank term deposits. There can be traded in secondary market and there is no lock-in-period. These instruments can be purchased by individuals, corporate, trusts and even NRIs. They have to be compulsorily credit rated by credit rating agencies. SBI DFHI is the most active player in secondary market of CDs.

c) Commercial Papers

Commercial papers are another investment vehicle in money-market asset class. Indian money market reforms were responsible for introduction of commercial papers. These are short-term monetary funds, issued in the form of promissory notes by large corporations. They are not backed by any form of collaterals and hence are unsecured. The corporations issuing these papers must be compulsorily credit rated.

The issuers of commercial paper create supply while the subscribers or investors create demand for these papers. The main issuers of commercial papers are large corporations and subscribers are majorly the banking companies. The other subscribers are individuals, NRIs and FIIs.

Commercial papers are generally issued at a discount to face value and redeemed at par value. The face value of these papers are in denominations of Rs.5,00,000 and in multiples thereof. The maturity period of these papers, range between 7 days and a year.

d) Liquid Bees

Liquid Bees is a peculiar investment vehicle which are listed and traded on a recognized stock exchange, wherein the investment is made in a basket of money-market instruments like call-money, short-term government securities or treasury bills, commercial paper, certificate of deposits and other money-market instruments of short maturities. Safety and liquidity are the two most important factors considered in Liquid Bees. The unique feature of Liquid Bees is that the price risk would be minimized. These need to be credit rated and can be traded only in electronic mode (Demat). Liquid Bees is the alternate mode for

managing cash-in-hand for the short-term, instead of it lying idle in the bank. The income received from these investments is exempt from tax.

5. NON-MARKETABLE FINANCIAL ASSETS

A significant portion of the investment in financial assets by an individual or a household is parked in non-marketable financial assets such as, bank deposits, post-office deposits, PPF, NSC, etc. The unique feature of these assets is that there is a prevalence of personal relationship between the investor and the issuer. This personal transaction touch makes the investor comfortable and moreover these investments are quite safe. Though these investments cannot be traded, it ensures high degree of safety and reasonable liquidity. The purpose of these assets is to provide a good savings plan to individuals for future purposes or a regular stream of income. The risks in these investments result from two major economic factors, namely, inflation and interest rates. A relatively high inflation shall reduce the real returns and a higher interest rates shall increase the opportunity cost thereby reduce the flair for these investments.

a) Bank deposits

Bank deposits are most popular and the simplest investment avenue for an individual investors, where he opens an account with a bank and parks his money. There are basically four types of bank deposits, namely,

i.   Savings deposits
ii. Fixed deposits
iii. Current deposits
iv. Recurring deposits

The current a/c deposits do not earn any interest, while the other three deposits earn interest on the deposited amount that is payable by the bank to the depositor.

Fixed deposits are the popular scheme for investment purpose available for households and individual investors, where safety is assured. The deposit of a certain amount is made for a fixed period at the pre-determined market rate of interest. The interest is payable on a periodic basis and also reinvestment of interest type of fixed deposits are available. At the end of fixed period, the amount with accrued interest is paid back to the depositor.

Recurring deposits are also quite popular means of investment by the households, where the depositor makes periodical investment for a fixed duration. This enables the individual investor to build a corpus amount with small deposits on a regular basis. Recurring deposits are very popular among salaried class, especially for those who can save few hundreds to few thousands per month. This scheme is quite useful to people who cannot

afford to have a large amount of savings and thus cannot use fixed deposit scheme of the bank. The depositor deposits the amount periodically, generally every month, and the banks promise to pay the interest at the pre-determined rates on these deposits. Upon maturity, the investor is paid the maturity value, which denotes principal coupled with interest accrued.

b) Flexi Deposits

Flexi deposits are unique type of savings deposit account, which is a blend the characteristics of both savings account and the fixed deposit account. In this deposit scheme, the balance in excess of a stipulated amount is automatically converted to fixed deposit for a default term of one year. This is a savings-cum-fixed deposit account, where the cash limit of the savings deposit is fixed and the balance of the idle cash in the savings account is converted into earning mode of fixed deposits. These flexi deposits provide the liquidity associated with the savings deposit as well as the higher returns by investing the surplus cash into fixed deposits.

c) Post office term deposits (POTD)

Post office deposits are very popular means of investment by individuals and households in India, since it is one of the safest and easiest modes of investments. The investment in post office term deposit is quite similar to that of fixed deposits offered by the bank, but with additional features. POTD has the maturity periods ranging from 1 year, 2 years, 3 years and 5 years. The POTD can be opened with a very small amount of 200 and in its multiples; however, there is no upper limit. The rates offered by POTD are slightly higher than the bank deposits and very safe mode of investment, since government backing is available.

d) Monthly income scheme of the post office (MISPO)

POMIS is one of the most popular investment avenue among rural investors and not that well-known amongst urban population. It is the scheme where there is a defined return on the investment. The interest is calculated on a yearly basis, but payable every month. The interest is payable from the date of making the investment and not from the start of the month. The maturity period is five years. The unique feature of this scheme is that the investor is also eligible for a 5% bonus if he retains the scheme for entire tenure, in addition to the regular interest. However, w.e.f. 1st January 2011, this bonus is not applicable. The minimum amount eligible for investment is Rs.1,500 and the maximum amount is Rs.4,50,000 in case of individuals and Rs.9,00,000 in case of joint account holders. The drawback of this scheme is that this investment is not eligible for deduction u/s 80C, which explain the fact that it is not popular amongst urban investors.

e) National Savings Certificate (NSC)

National Savings Certificate is another opportunity for investors, wherein, they can keep their money invested for a slightly long period and want this amount to compound. The investment in NSC is eligible for deduction u/s 80C. However, the interest earned thereon is taxable. This is an excellent avenue for those who want to stay invested and allow the investment to grow over a period of time. NSCs are available in the denominations of Rs.100, Rs.500, Rs.1000, Rs.5,000 and Rs.10,000. NSCs can be also purchased in demat form. The NSC VIII issue have a maturity period of 5 years and NSC IX issue has a maturity of 10 years. This scheme is best suitable to government employees, businessmen and other salaried class, who are income tax assesses.

f) Company Deposits

Company deposits are very similar to bank fixed deposits that are made by the investors with Financial Institutions and NBFCs for a fixed period at a pre-determined fixed rate of interest. The interest paid on these deposits is relatively higher than the bank deposits, since there is a higher degree of risk associated. The risks associated with these company deposits are credit risk and interest rate risk. Although, there is a higher risk involved, the investors are motivated to invest in these instruments due to higher returns earned thereof.

g) Employees Provident Fund Scheme (EPF)

Employee Provident Fund is a prominent platform of savings in India amongst the organized workforce. Employee Provident Fund Scheme is an investment avenue, wherein, the employees from both the private sectors and public sectors can invest a portion of their salary every month and build a corpus for future. Generally, the contribution is made by both the employee and the employer. The contribution made by the employee is eligible for deduction u/s 80C of Indian Income Tax Act of 1961. Interest is paid on amount deposited and it is accumulated with the fund. The fund gets built and the investor can use it for his retirement of future plans. Employee Provident Fund Organization, a statutory body of the Government of India, established under the Ministry of Labour and Employment oversees the functioning of EPF.

h) Public Provident Fund (PPF)

Public Provident Fund is a long-term debt scheme of Government of India, wherein, any individual in India can invest in this scheme and can earn a decent tax-free return on the same. The interest rate on PPF is generally slightly higher than that of interest rates offered by Bank Fixed Deposits. PPF account can be opened in any post office or designated bank branches. The PPF investors prefer to maintain their PPF account with banks rather than Post

office, since banks facilitate online transfer of funds and online deposits. The minimum amount to be deposited in a PPF account is Rs.500 and the maximum is Rs.1,00,000 per annum. PPF account can be closed after a period of fifteen years from the date of opening the account. However, the investor can extend for a further period of five years. There is also a lock-in-period of initial five years. Another unique feature of PPF account is that the account holder can avail loan from the third year onwards. He can get a loan up to 25% of the amount outstanding at the end of immediately preceding the year in which the loan is applied for. Investment in PPF is eligible for deduction u/s 80C of Income Tax Act of 1961 and also, the tax earned thereon is tax-free.

6. REAL ESTATE

Real estate is one of the most sought after investments, which the investors are excited about. The rapid rise in real estate prices is very attractive and the investor looks forward this as both an investment avenue and a basic shelter to live in. The real estate investors think it is wise decision to invest in a real estate, since there are numerous advantages of investing in real estate. There is an ever growing capital appreciation, rental income, real and tangible asset, safety, etc. The real estate has emerged as an asset class and increasingly becoming a global asset class. India's large market, favourable demographics, higher disposable income and rising domestic demand are key ingredients for the growth in real estate sector in India.The investment in real estate may take any of the following form, namely,

a. Residential House
b. Commercial Property
c. Agricultural Land
d. Suburban Land
e. Time Share in Holiday Resort

7. PRECIOUS OBJECTS

Precious objects are those items that are generally small in size, but highly valuable in monetary terms. These are normal physical product or metals that are used as traditional store of wealth. The most important precious objects are gold, silver, precious stones and art objects. There is an increased use of precious objects as an investment vehicle, since the returns from these are quite outstanding, where as the risks are comparatively lower. Investment in these precious objects can be made directly in the product or through derivative instruments like futures or through mutual funds with a directive of investing in the specified commodities.

a) Gold & Silver

Gold has been an important part of diversified investment portfolio. It is being respected throughout the word for its value and rich history. It is also considered as a way to pass on and preserve wealth from one generation to the next. There has been a paradigm shift in the gold's preference, as consumers are turning into investors. Gold, as an investment option is gaining momentum and popularity as compared to ornamental value. Around 40% of the gold buying in India is for investment purpose. (Source: Business Standard, 15th December 2002). Gold, despite the surge in price has lead to spurt in demand. Gold has been used as a hedge against other investment options. Gold ensures that there is the most enduring benefit and has the ability to stabilize a portfolio and protect it against market fluctuations. Silver, in the recent times, has gained sheen as an investment avenue. It has been viewed as safe haven and regarded as a form of money and store of value. Besides investing in physical silver, investors have shown keen interest in exchange traded funds. Analysts have predicted silver to rise faster than gold in the next decade. Silver is relatively volatile than gold and silver is positively correlated to industrial demand.

b) Gold ETFs

Gold exchange traded funds refer to buying gold in electronic form. Gold ETFs are units representing physical gold in demat form. Gold ETF is much easier form of investing in gold. The Gold ETF shall ensure to provide the returns that closely correspond with the real price of gold. The investor can buy a gram at a time and hence has the avenue to build a good gold portfolio, by accumulating gold over a period of time. The Gold ETFs are open-ended funds that can be traded on the stock exchange, thereby providing high liquidity. The Gold ETFs aims to provide the investors to participate in the gold market and to offer the investors a simple and cost-efficient way to access the gold market by providing a return equivalent to movement in the gold spot prices. Gold ETFs have quite a lot of benefits than actual gold, like there are not premium charges, making charges, wastage charges, delivery charges, no worries of theft and quite easy to sell. The best part of Gold ETF is that there is no need to pay sales tax, securities transaction tax,VAT or wealth tax.

8. INSURANCE POLICIES

Insurance is a contract, wherein the individual or an entity gets the protection against the losses resulting from some unexpected or uncertain event. The concept of insurance is that a group of people exposed to similar risk come together and make contributions towards formation of a pool of funds. A person, suffering an actual loss on account of such risk, is compensated out of the same pool of funds. The interesting aspect of insurance is that it

serves the twin-objective of protection as well as investment. The investor has to primarily separate the insurance portion from the investment portion of the premium that he pays, so that he knows, the quantum of each portion. The total premium paid minus the amount evaluated as the cost of insurance must be considered as the amount invested. The yield must be calculated based on this amount to evaluate the investment. Though insurance is not the best available investment avenue, there are sufficient reasons for the investor to believe that it can be highly lucrative avenue to facilitate savings. The very essence of insurance is to enable protection to the family coupled with returns on the investment.

a) Endowment Assurance

Endowment assurance is a policy which not only provides protection to the family of the life assured in case of early death, but also assures a lumpsum at a desired age. The premiums are generally paid for a fixed term or until death whichever is earlier. The lumpsum received at the end of the term can be reinvested to provide an annuity during the remainder of the life. The salient features of endowment assurance are,

a. Moderate premium
b. High bonus
c. High liquidity
d. Savings oriented

LIC's Jeevan Saral and Jeevan Anand are the two popular endowment policies in India.

b) Money Back Plans

In case of money back policy, the insured gets periodic receipt of partial survival benefits during the term of the policy. Money back policy protects the family's financial interests from unforeseen situation like death or critical illness of the policy holder. In this case, the periodic payouts ensure wealth creation for meeting financial commitments at important phases in life. A good money back policy has lower risk, assured returns and also gives tax benefits. At the time of maturity, the policyholder gets the remaining amount of the survival benefits plus the accrued bonus. In case of death of the life assured within the term, the total sum insured is paid to the nominee, irrespective of earlier survival benefits. Money back policy can be availed for either 20 years or 25 years. Generally, periodic payments are made every 5 years. At the end of the period, the remaining amount plus bonus is paid to the insured. The amount invested in the money back policy is eligible for deduction u/s 80C of Income Tax Act of 1961.

c) Whole Life Assurance

A whole life assurance is a policy where premium is for a term and this premium has two components. The first component is the insurance component and the second component is the investment component. The insurance component pays an assured amount upon death of the insured and the investment component the wealth that the policyholder can withdraw or borrow against. The whole life insurance is different form term assurance. In case of term assurance, the amount is paid only in case of death during the term of the policy, but the whole life assurance always pays out eventually. Hence, whole life assurance is comparatively expensive than term assurance. This policy is mainly devised to create a wealth for legal heirs of the policyholders. The premium under this policy are payable up to the age of 80 years of the policyholder or for a term of 35 years whichever is later.

d) ULIP

ULIP is a unique investment avenue which blends the benefits of both insurance and investment under a single integrated plan. ULIP is an avenue that focuses on safety on insurance as well as wealth creation opportunities. In case of ULIPs, a portion of investment is apportioned towards providing life cover and the residual portion is invested in a fund to be invested in equity or bonds. The investment value is market driven. ULIPs are gaining popularity since they offer dual role of protection for life and investment plan simultaneously. The amount invested in ULIP is eligible for deduction u/s 80 C of Income Tax Act of 1961. There is however a lock-in-period of 5 years for these ULIPs. ULIP returns are directly linked to market performance and investment risk in investment portfolio is entirely borne by the policyholders. The invested portions of the premium after deducting for all the charges and premium for risk cover under all policies in a particular fund. The value of the fund units with accrued bonus is payable on maturity of the policy.

e) Term Assurance

Term assurance is the purest and the simplest form of the life insurance providing coverage for a defined period of time, at a fixed rate of payment. In case of death of the insured during the relevant term, the benefit is payable to the nominee. There is no survival benefit payable to the insured. Further, if the coverage has to be extended beyond the term, he has to pay generally a higher premium for the continual. Term assurance is the least expensive mode of substantial life cover over a particular period of time. The term assurance just provides a specific amount of coverage for a specified period of time, but does not involve any investment component. However, the premium paid for term assurance is eligible for deduction u/s 80C of Income Tax Act of 1961.

f) Immediate Annuity

Immediate annuity is an investment avenue, wherein a single lumpsum premium is paid and in return a guaranteed income starts flowing almost immediately to the insured. In this case, the insured receives a guaranteed gross income throughout his life time or over a fixed period. In addition to the regular income upon the death of the insured, the family shall receive the death benefits. However, there is also an option, wherein the nominee shall receive regular income upon death of the insured. The immediate annuity plan is best suited for retired personnel, who anticipate a regular and a guaranteed amount in place of pension. The regular stream of income can be chosen at the option of the insured either monthly, quarterly, half-yearly or annually.

g) Deferred Annuity

Deferred annuity is an investment vehicle, wherein the investor starts savings his money by paying regular premium and builds a corpus. Later, the insured can elect to receive income from the corpus that has been built over a period of time. Typically, this plan has two phases, namely, savings phase and income phase. In the savings phase, the investor invests money into the account on a periodical basis. The income phase is a period, where the investor converts the amount invested into an annuity and receives periodical income. The deferred annuity also consists of death benefit to the nominee upon death of the insured. Deferred annuities are designed primarily as retirement savings accounts. The amount invested into this account is eligible for deduction u/s 80C of the Income Tax Act of 1961.

9. PENSION FUNDS

Pension fund is a qualified retirement plan set up by an entity – a corporation, labour union, government or other organization. Pension fund is a retirement plan, in which an investor makes a contribution into an account periodically. In other words, pension funds are type of retirement plan, wherein an investor pays part of his current income towards retirement income. These contributions are invested on behalf of the investor, who may withdraw after retirement. There are two types of pension plans, namely, defined-benefit plan and defined-contribution plan. In case of defined-benefit plan, the investor is guaranteed to receive a fixed amount upon retirement, irrespective of the performance of the underlying investment. On the contrary, in case of defined-contribution plan, the investor makes pre-defined contribution, but the benefit is market-driven or underlying investment's performance driven.

a) NPS

Government of India has constantly been searching for a solution to the problem of providing adequate retirement income and in the effort of doing so, NPS has been designed. Government had a huge responsibility of single-handedly contributing towards the pension fund for its employees till 2003. The huge pension obligations for the government prompted a rethink of this scheme. Thus, the shift was being made from defined benefit system to defined contribution system by introducing NPS. Government of India, Ministry of Finance, Department of Economic Affairs Notification, and dated 22nd December 2003 has notified NPS. The NPS came into operation with effect from 1st January 2004 and was made applicable to all new employees to Central Government service, except to Armed Forces, joining Government service on or after 1st January 2004. The State Governments and Union Territories have also notified the NPS for their new employees. During 2004 to 2009, NPS was open only to Government employees and from 1st April, 2009 it was made available to every citizen of India between the age group of 18 and 55 on a voluntary basis. The New Pension System has been designed to enable the subscribers to make optimum decisions regarding their future and provide for their old-age through systemic savings from the day they start their employment. Under the scheme of NPS, the government employees are required to make a contribution at par with the employer i.e. 10 per cent of basic pay plus DA to the pension fund. Another major change that took place in 2008 was to allow the private pension fund managers to manage the NPS.

b) Private Pension Funds

Apart from NPS, there are several private pension funds offering pension income to the retired personnel. The private pension schemes provided by insurance companies are gaining importance with an improvement in cost and quality of the living of the people. These private pension schemes offer competitive benefits, returns and better services. People consider this option to be a part of this investment needs wherein it allows them to participate and purchase units. The investors are mostly benefitted through tax exemptions that are possible through these plans. It is an avenue to plan the retirement and lead a secured life.

10. MUTUAL FUNDS

Mutual Fund refers to the trust that pools the savings of investors and forms a common fund. The fund thus created is then invested in financial market instruments like shares, debentures and other securities which also include government securities. The income earned through these investments and the capital appreciation realized are shared among the unit holders in proportion of the units held by them. Investments in securities are spread over

a wide cross-section of industries and sectors, thus allowing risk reduction to take place. Diversification reduces the risk because all stocks and instruments may not move in the same direction and in the same proportion and at the same time.

a) Open ended scheme

When a fund is accepted and liquidated on a continuous basis by a mutual fund manager, it is called 'open ended scheme'. These schemes do not have a fixed maturity and entry to fund is always open to investors who can subscribe it at any time. Similarly, the investors have an option to get their holdings redeemed at any time. Under this scheme the capitalization of the fund will constantly change, since it is always open for the investors to sell or buy the units. The scheme provides an excellent liquidity facility to investors. The value of the unit is based upon the net asset value of the unit.

b) Close ended scheme

A close ended scheme means any scheme of mutual fund in which the period of maturity of the scheme is specified. Unlike open ended funds, the corpus of the close ended scheme is fixed and an investor can subscribe directly to the scheme only at the time of initial issue. After the initial issue is closed, a person can buy or sell the units of the scheme in the secondary market i.e. the stock exchanges where they are listed. The price in the secondary market is determined on the basis of demand and supply and hence could be different from the net asset value.

c) Interval schemes

It is a kind of close ended scheme with a peculiar feature that it remains open during a particular part of a year for the benefit of the investors, either to offload their holdings or to undertake purchase of units at their NAV. An interval scheme is a scheme of mutual fund which is kept open for a specific interval and after that it operates as a closed scheme. Thus, it combines the features of both open ended as well as close ended schemes. Interval schemes have been permitted by the SEBI in recent years only. The scheme is open for sale or repurchase at a fixed pre-determined intervals which are disclosed in the offer document. The units of this scheme are also traded in the stock exchanges.

d) Income Fund Scheme

The scheme that is tailored to suit the needs of investors who are particular about regular returns is known as income fund scheme. The scheme offers maximum current income, whereby the income earned by the units is distributed periodically. Such funds are offered in two forms. The first scheme earns a target constant income at a relatively low risk.

While the second scheme offers the maximum possible income. This obviously implies that the higher expected returns come with the higher potential risks of the investment.

e) Growth Fund Scheme

It is a mutual fund scheme that offers the advantage of capital appreciation of the underlying investment. For such funds investment is made in growth oriented securities that are capable of appreciating in the long run. In proportion to such capital appreciation the amount of risk to be assumed would be far greater.

f) Conservative Fund Scheme

A scheme that aims at providing a reasonable rate of return, protecting the value of the investment and achieving capital appreciation may be designated as conservative fund scheme. These are also known as middle of the road funds, since such funds offer a blend of all these features. Further such funds divide their portfolio in common stocks and bonds in such a way as to achieve the desired objectives.

g) Equity Fund Scheme

A kind of mutual whose strength is derived from equity-based investment is called 'equity fund scheme'. They carry a very high degree of risk. Such funds do well in periods of favourable capital market trends. A variation of the equity fund scheme is the 'index fund scheme', which is involved in transacting only on those scrips which are included in any specific index.

h) Bond Scheme Fund

It is a type of mutual fund whose strength is derived from bond based investments. The portfolio of such funds comprises bonds, debentures, etc. This type of fund carries advantage of secure and steady income. However, such shares have very little or no capital appreciation, but carry low risk. A variant of this scheme is 'Liquid funds', which specializes in investing in short term money market instruments. The focus is mainly on low risk and low, but steady income.

i) Balanced Fund Scheme

A scheme of mutual fund that has a mix of debt and equity in the portfolio of investments of may be referred to as a 'balanced fund scheme'. The portfolio of such scheme will be often shifted between debt and equity, depending upon the prevailing market trends.

j) Sectoral Fund Schemes

When the managers of the mutual funds invest the amount collected from a wide variety of small investors directly in various specific sectors of the economy, such funds are

called as Sectoral Mutual Funds. The specialized sectors may include gold and silver, real estate, specific industry, etc.

k) Fund of Fund Schemes

There can be Fund of Funds, where funds of one mutual fund are invested in the units of the other mutual funds. There are a number of other mutual funds that direct investment into a specified sector of the economy. This makes diversified and yet intensive investment of funds possible.

l) Leverage Funds Schemes

The funds that are created out of investments, with not only the amount mobilized from small savers but also the fund managers who borrow money from the capital market, are known as 'leveraged-fund scheme'. This way, fund managers pass on the benefit of leverage to the mutual fund investors. In order to operate such schemes, there must be provisions available.

m) Gilt Funds

These funds seek to generate returns through investment in gilts. Under this scheme, funds are invested only in Central and State Government securities and repos/reverse repos. A portion of the corpus may be invested in the call money market or RBI to meet liquidity requirements. Government securities carry zero credit risk or default risks. Their prices are influenced only by movement of interest rates in the financial system.

n) Index Funds

These funds are also known as growth funds, but they are linked to a specific index of share prices. It means that the funds mobilized under such scheme are invested principally in the securities of companies whose securities are included in the index concerned and in the same weightage. Thus, the funds progress is linked to the growth in the concerned index.

o) Tax Savings Scheme

Certain mutual fund schemes offer tax benefits on investment made in mutual funds. This helps the Assessee to save tax. He can plan his investment in such a way that the tax payment is minimized, but within the legal framework.

p) Money Market Mutual Funds

Money Market Mutual Fund refers to a scheme of mutual fund which has been set up with the objective of investing exclusively in money market instruments. These instruments include treasury bills, call and notice money, commercial papers, commercial bills, certificate of deposits etc.

SECURITIES

Various types of securities are traded in the market. Broadly securities represent evidence to property right. Security provides a claim on an asset and any future cash flows the asset may generate. Commonly we think of securities as shares and bonds. According to the Securities Contracts Regulation Act 1956, securities include shares, scrips, stocks, bonds, debentures or other marketable like securities of any incorporated company or other body corporate, or government. Securities are classified on the basis of return and the sources of issue. On the basis of income they may be classified as fixed or variable income securities. In the case of fixed income security, the income is fixed at the time of issue itself. Bonds, debentures and preference shares fall into this category. Sources of issue may be government, semei government and corporate. The incomes of the variable securities vary from year to year. Dividends of the equity shares of companies' can be cited as an example for this. Corporate generally raises funds through fixed and variable income securities like equity shares, preference shares and debentures.

WHAT IS SECURITIES MARKET?

According to Dr. V A Avadhani, Securities markets are markets in financial assets or instruments and these are represented as I.O.Us (I owe you) in financial form. These are issued by business organizations, corporate units and the Governments, Central or State. Public sector undertakings also issue these securities. These securities are used to finance their investment and current expenditure. These are thus sources of funds to the issuers. There are different types of business organizations in India, namely, partnership firms, cooperative societies, private and public limited companies and joint and public sector, organizations etc. the more frequently organized method is the company, registered under the Indian Companies Act 1956. Under this Act, there are three types of companies: (a) companies limited by guarantee; (b) companies which are private limited companies – limited by shares paid up; and (c) companies private limited companies can have 50 members and their shares are not transferable freely. These companies reserve the right to refuse any transfer of shares and as such trading in them is restricted. Due to these inhibitive features, private limited companies do not have easy access to the securities markets. Only public limited companies are largely popular as they can raise funds from the public through the issue of shares. The methods of raising funds used by the corporate sector are to issue securities, either ownership instruments or debt instruments.

DEFINITION OF CAPITAL MARKET

It is a place where people buy and sell financial instruments, be it equity or debt.

It is a mechanism to facilitate the exchange of financial assets.

Examples of capital market

In India – BSE, and NSE are the two capital markets.

International – NYSE, LSE, and TSE are the largest capital markets.

CLASSIFICATION

1. Primary Market

2. Secondary Market

It can also be classified on the basis of life span of the asset into:

Money market – Less than one year

Capital market – More than one year

1. It helps in the capital formation of the country.

2. It maintains active trading

3. It increases liquidity of assets.

4. It also helps in price recovery process.

1. Primary or New Issue Market

Primary market is the segment in which new issues are made whereas secondary market is the segment in which outstanding issues are traded. It is for this reason that the Primary market is also called the New Issues Market and the Secondary market is called the Stock Market.

In the primary market, new issues may be made in three ways namely, public issue, right issue and private issue. Public issue involves sale of securities to members of public. Right issue involves sale of securities of the existing shareholders/debenture holders. Private placement involves selling securities privately to a selected group of investors. In the primary market, equity shares, fully convertible debentures (FCD), partially convertible investors. In the primary market, equity shares, fully convertible debentures (FCD), partially convertible debentures (PCD), and non – convertibles debentures (NCD) are the securities commonly issued by non – government shared companies issue equity shares and bonds.

2. Secondary Market

Business finance is concerned with the provision of funds for investment in business enterprise, whatever is invested in this way must be provided by an investor, and this means that the investor must forgo consumption and save to provide the funds. Savers and the users of their funds come together in the market for finance, where the normal rules of supply and

demand apply unless there is government interference with interest rates. The price of money is the rate of interest paid for the use. If the demand for investment funds is greater than the funds offered for investment by savers, then the rate of interest will rise until people in the economy are induced to forgo consumption and make their savings available for investment. the new issues of securities are made available in the 'primary market'. The securities that are already outstanding and owned by the investors are usually bought and sold through the 'secondary market' which is popularly known as 'stock market'. In the stock market, the outstanding issues are permitted to trade. In this market, a stock or bond issue has already been sold to the public, and it is traded between current and potential owners. The proceeds from a sale in the stock market do not go to the issuing organization but to the current owner of the security. Once new issues have been purchased by investors, they change hands in the stock market. There are two broad segments of the stock markets (i) The organized stock exchanges (ii) The Over – the – Counter (OTC) market. The primary middlemen in the stock market are brokers and dealers. The destination between them is, the broker acts as an agent, whereas the dealer acts as a principal in the transaction. Stock markets are said to reflect the health of the country's economy. On the other hand, major economic indicators determine stock market movements to a large extent. From a thorough analysis of the various economic indicators and its implications on the stock markets, it is known that stock market movements are largely influenced by broad money supply, inflation, credit/deposit ratio and fiscal deficit apart from political instability. Besides, fundamental factors like corporate performance, industrial growth etc, always exert a certain amount of influence on the stock markets. Because the stock market involves the trading of securities initially sold in the primary market, it is providing liquidity to the individuals who acquired these securities.

INVESTMENT INFORMATION

1. International Affairs

With increasing globalization, international events affect the economy of the nation. Nations are economically and politically linked with each other. The economic crisis of one nation has a contagion effect on the other.

2. National Affairs

The growth of the national economy and political events within the nation influence investment decisions. The political events are provided by the news papers, magazines. The economic events and their implication on the securities markets are analysed in Financial Express, Economic Times and Business Line. RBI Bulletin and annual reports give a wide range of information regarding macro economic indicators like GDP, GNP, inflation,

agriculture and industrial production, capital market, development in the banking sectors and the balance of payment. Center for Monitoring Indian Economy also publishes reports about the macro economic factors. The Economic Survey of India and reports of companies also provide information regarding the economy, industry and other sectors.

3. Industry Information

Information about the industry is required to identify the industries that perform better than the national economy as a whole. Financial news papers regularly bring out industrial studies for the benefit of the investors.

4. Company Information

A source of company information must be developed to facilitate the company analysis. The BSE, NSE and OTCEI provide details about the listed companies in the web sites. Almost all the financial journals carry out the company analysis and even suggest enter, exit and stay hints for the particular company stock.

5. Stock Market Information

All the financial dailies and investment related magazines publish the stock market news. Separate News Bulletins are issued by BSE, NSE and OTCEI providing information regarding the changes that take place in the stock market. SEBI news letter gives the changes in the rules and regulations regarding the activities of the stock market.

THE SECURITIES CONTRACTS (REGULATION) ACT, 1956 (Act No.42 of 1956)

The main purpose of the Act is to prevent the undesirable transactions in securities by regulating the business of dealing in securities.

1. Preliminary
2. Recognised Stock Exchanges
3. Contracts And Options In Securities
4. Listing Of Securities Of Public Companies
5. Penalties And Procedures
6. Miscellaneous

1. Preliminary

This Act may be called the Securities Contracts (Regulation) Act, 1956. It extends to the whole of India. It shall come into force on such date as the Central Government may, by notification in the Official Gazette appoint.

Definitions

In this Act, unless the context otherwise requires,-

(a) "contract" means a contract for or relating to the purchase or sale of securities;

(aa) "derivative" includes -

A. A security derived from a debt instrument, share, loan whether secured or unsecured, risk instrument or contract for differences or any other form of security;

B. A contract which derives its value from the prices, or index or prices, of underlying securities;

(b) "Government security" means a security created and issued, whether before or after the commencement of this Act, by the Central Government or a State Government for the purpose of raising a public loan and having one of the forms specified in clause (2) of section 2 of the Public Debt Act, 1944 (18 of 1944);

(c) «member» means a member of a recognised stock exchange;

(d) «option in securities» means a contract for the purchase or sale of a right to buy or sell, or a right to buy and sell, securities in future, and includes a teji, a mandi, a teji mandi, a galli, a put, a call or a put and call in securities;

(e) «prescribed» means prescribed by rules made under this Act;

(f) «recognised stock exchange» means a stock exchange which is for the time being recognised by the Central Government under section 4;

(g) «rules», with reference to the rules relating in general to the constitution and management of a stock exchange, includes, in the case of a stock exchange which is an incorporated association, its memorandum and articles of association;

(ga) «Securities Appellate Tribunal» means a Securities Appellate Tribunal established under sub-section (1) of section 15K of the Securities and Exchange Board of India Act, 1992.

(h)«Securities» include-

(h) Shares, scrips, stocks, bonds, debentures, debenture stock or other marketable securities of a like nature in or of any incorporated company or other body corporate;

(ia) Derivative;

(ib) Units or any other instrument issued by any collective investment scheme to the investors in such schemes

(ii) Government securities;

(iia) Such other instruments as may be declared by the Central Government to be securities; and

(iii) Rights or interests in securities;

[(i) Spot delivery contract means a contract which provides for,-

(a) Actual delivery of securities and the payment of a price therefore either on the same day as the date of the contract or on the next day, the actual period taken for the dispatch of the securities or the remittance of money therefore through the post being excluded from the computation of the period aforesaid if the parties to the contract do not reside in the same town or locality;

(b) Transfer of the securities by the depository from the account of a beneficial owner to the account of another beneficial owner when such securities are dealt with by a depository;]

(i) "stock exchange" means any body of individuals, whether incorporated or not, constituted for the purpose of assisting, regulating or controlling the business of buying, selling or dealing in securities.

2A. Words and expressions used herein and not defined in this Act but defined in the Companies Act, 1956 or the Securities and Exchange Board of India Act, 1992 or the Depositories Act, 1996 shall have the same meanings respectively assigned to them in those Acts.

Contracts and Options in Securities

Contracts in Notified Areas Illegal in Certain Circumstances

If the Central Government is satisfied, having regard to the nature or the volume of transactions in securities in any State or area, that it is necessary so to do, it may, by notification in the Official Gazette, declare this section to apply to such State or area, and thereupon every contract in such State or area which is entered into after date of the notification otherwise than between members of a recognised stock exchange in such State or area or through or with such member shall be illegal. [Additional trading floor 13A. A stock exchange may establish additional trading floor with the prior approval of the Securities and Exchange Board of India in accordance with the terms and conditions stipulated by the said Board.

Explanation

For the purposes of this section 'additional trading floor' means a trading ring or trading facility offered by a recognised stock exchange outside its area of operation to enable the investors to buy and sell securities through such trading floor under the regulatory framework of the stock exchange.

Contracts in Notified areas to be Void in Certain Circumstances

(1) Any contract entered into in any State or area specified in the notification under section 13 which is in contravention of any of the bye- laws specified in that behalf under clause (a) of sub-section (3) of section 9 shall be void:

    (i) As respects the rights of any member of the recognised stock exchange who has entered into such contract in contravention of any such bye-laws, and also

    (ii) As respects the rights of any other person who has knowingly participated in the transaction entailing such contravention.

(2) Nothing in sub-section (1) shall be construed to affect the right of any person other than a member of the recognised stock exchange to enforce any such contract or to recover any sum under or in respect of such contract if such person had no knowledge that the transaction was in contravention of any of the bye-laws specified in clause (a) of sub-section (3) of section 9.

Members may not act as Principals in Certain Circumstances

No member of a recognised stock exchange shall in respect of any securities enter into any contract as a principal with any person other than a member of a recognised stock exchange, unless he has secured the consent or authority of such person and discloses in the note, memorandum or agreement of sale or purchase that he is acting as a principal:

Provided that where the member has secured the consent or authority of such person otherwise than in writing he shall secure written confirmation by such person of such consent or authority within three days from the date of the contract:

Provided further that no such written consent or authority of such person shall be necessary for closing out any outstanding contract entered into by such person in accordance with the bye-laws, if the member discloses in the note, memorandum or agreement of sale or purchase in respect of such closing out that he is acting as a principal.

Power to Prohibit Contracts in Certain Cases

(1) If the Central Government is of opinion that it is necessary to prevent undesirable speculation in specified securities in any State or area, it may, by notification in the Official Gazette, declare that no person in the State or area specified in the notification shall, save with the permission of the Central Government, enter into any contract for the sale or purchase of any security specified in the notification except to the extent and in the manner, if any, specified therein.

(2) All contracts in contravention of the provisions of sub-section (1) entered into after the date of the notification issued there under shall be illegal.

Licensing of Dealers in Securities in Certain Cases

(1) Subject to the provision of sub-section (3) and to the other provisions contained in this Act, no person shall carry on or purport to carry on, whether on his own behalf or on behalf of any other person, the business of dealing in securities in any State or area to which section 13 has not been declared to apply and to which the Central Government may, by notification in the Official Gazette declare this section to apply, except under the authority of a licence granted by the [Securities and Exchange Board of India] in this behalf.

(2) No notification under sub- section (1) shall be issued with respect to any State or area unless the Central Government is satisfied, having regard to the manner in which securities are being dealt with in such State or area, that it is desirable or expedient in the interest of the trade or in the public interest that such dealings should be regulated by a system of licensing.

(3) The restrictions imposed by sub-section (1) in relation to dealings in securities shall not apply to the doing of anything by or on behalf of a member of any recognized stock exchange.

Exclusion of Spot Delivery Contracts

If the Central Government is of opinion that in the interest of the trade or in the public interest it is expedient to regulate and control the business of dealing in spot delivery contracts also in any State or are (whether section 13 has been declared to apply to that State or area or not), it may, by notification in the Official Gazette, declare that the provisions of section 17 shall also apply to such State or area in respect of spot delivery contracts generally or in respect of spot delivery contract for the sale or purchase of such securities as may be specified in the notification, and may also specify the manner in which, and the extent to which, the provision of that section shall so apply. 18A. Notwithstanding anything contained in any other law for the time being in force, contracts are –

a. Traded on a recognised stock exchange;

b. Settled on the clearing house of the recognised stock exchange in accordance with the rules and bye-laws of such stock exchange.

Stock exchanges other than recognised stock exchanges prohibited

(1) No person shall, except with the permission of the Central Government, organise or assist in organising or be a member of any stock exchange (other than a recognized stock exchange) for the purpose of assisting in, entering into or performing any contracts in securities.

(2) This section shall come into force in any State or area on such date, as the Central Government may, by notification in the Official Gazette, appoint.

Listing of Securities

Conditions for Listing

Where securities are listed on the application of any person in any recognised stock exchange, such person shall comply with the conditions of the listing agreement with that stock exchange.]

Right of appeal against refusal of stock exchanges to list securities of public companies

Where a recognised stock exchange acting in pursuance of any power given to it by its bye- laws, refuses to list the securities of any public company or collective investment scheme the company or scheme shall be entitled to be furnished with reasons for such refusal, any may,-

(a) Within fifteen days from the date on which the reasons for such refusal are furnished to it, or

(b) Where the stock exchange has omitted or failed to dispose of, within the time specified in sub-section (1) of section 73 of the Companies Act, 1956 (1 of 1956) (hereafter in this section referred to as the "specified time"), the application for permission for the shares or debentures to be dealt with on the stock exchange, within fifteen days from the date of expiry of the specified time or within such further period, not exceeding one month, as the Central Government may, on sufficient cause being shown, allow, appeal to the Central Government against such refusal, omission or failure, as the case may be, and thereupon the Central Government may, after giving the Stock Exchange an opportunity of being heard,-

(i) Vary or set aside the decision of the stock exchange; or

(ii) Where the stock exchange has omitted or failed to dispose of the application within the specified time, grant or refuse the permission and where the Central Government sets aside the decision of the recognised stock exchange or grants the permission, the stock exchange shall act in conformity with the orders of the Central Government.

Provided that no appeal shall be preferred against refusal, omission or failure, as the case may be, under this section on and after the commencement of the Securities Laws (Second Amendment) Act, 1999.

Right of Appeal to Securities Appellate Tribunal against refusal of stock exchange to list securities of public companies

(1) Where a recognised stock exchange, acting in pursuance of any power given to it by its bye-laws, refuses to list the securities of any public company, the company shall be entitled to be furnished with reasons for such refusal, and may, -

    a. Within fifteen days from the date on which the reasons for such refusal are furnished to it, or

    b. Where the stock exchange has omitted or failed to dispose of, within the time specified in sub-section (1A) of section 73 of the Companies Act, 1956 (hereafter in this section referred to as the "specified time"), the application for permission for the shares or debentures to be dealt with on the stock exchange, within fifteen days from the date of expiry of the specified time or within such further period, not exceeding one month, as the Securities Appellate Tribunal may, on sufficient cause being shown, allow,appeal to the Securities Appellate Tribunal having jurisdiction in the matter against such refusal, omission or failure, as the case may be, and thereupon the Securities Appellate Tribunal may, after giving the stock exchange, an opportunity of being heard,-

        i. Vary or set aside the decision of the stock exchange; or

        ii. Where the stock exchange has omitted or failed to dispose of the application within the specified time, grant or refuse the permission, and where the Securities Appellate Tribunal sets aside the decision of the recognized stock exchange or grants the permission, the stock exchange shall act in conformity with the orders of the Securities Appellate Tribunal.

(2) Every appeal under sub-section (1) shall be in such form and be accompanied by such fee as may be prescribed.

(3) The Securities Appellate Tribunal shall send a copy of every order made by it to the Board and parties to the appeal.

(4) The appeal filed before the Securities Appellate Tribunal under sub-section (1) shall be dealt with by it as expeditiously as possible and endeavour shall be made by it to dispose of the appeal finally within six months from the date of receipt of the appeal.

Procedure and powers of Securities Appellate Tribunal

(1) The Securities Appellate Tribunal shall not be guided by the principles of natural justice and, subject to the other provisions of this Act and of any rules, the Securities Appellate Tribunal shall have powers to regulate their own procedure including the places at which they shall have their sittings.

(2) The Securities Appellate Tribunal shall have for the purpose of discharging their functions under this Act, the same powers as are vested in a civil court under the Code of Civil Procedure, 1908, while trying a suit, in respect of the following matters, namely:-

   a. Summoning and enforcing the attendance of any person and examining him on oath;

   b. Requiring the discovery and production of documents;

   c. Receiving evidence on affidavits;

   d. Issuing commissions for the examination of witnesses or documents;

   e. Reviewing its decisions;

   f. Dismissing an application for default or deciding it ex-parte;

   g. Setting aside any order of dismissal of any application for default or any order passed by it ex-parte; and

   h. Any other matter which may be prescribed.

(3) Every proceeding before Securities Appellate Tribunal shall be deemed to be a judicial proceeding, within the meaning of sections 193 and 228, and for the purposes of section 196 of the Indian Penal Code and the Securities Appellate Tribunal shall be deemed to be a civil court for all the purposes of section 195 and Chapter XXVI of the Code of Criminal Procedure, 1973.

Right to Legal Representations

The appellant may either appear in person or authorise one or more chartered accountants or company secretaries or cost accountants or legal practitioners or any of its officers or present his or its case before the Securities Appellate Tribunal.

Explanation

For the purposes of this section, -

   a. "chartered accountant" means a chartered accountant as defined in clause (b) o f sub-section (1) of section 2 of the Chartered Accountants Act, 1949 and who has obtained a certificate of practice under sub-section (1) of section 6 of that Act;

   b. "company secretary" means a company secretary as defined in clause (c) of sub-section (1) of section 2 of the Company Secretaries Act, 1980 and who has obtained a certificate of practice under sub-section (1) of section 6 of that Act;

   c. "cost accountant" means a cost accountant as defined in clause (b) of subsection (1) of section 2 of the Cost and Works Accountants Act, 1959 and who has obtained a certificate of practice under sub-section (1) of section 6 of that Act;

d. "legal practitioner" means an advocate, vakil or an attorney of any High Court, and includes a pleader in practice.

Limitation

The provisions of the Limitation Act, 1963 shall as far as may be apply to an appeal made to a Securities Appellate Tribunal.

Civil court not to have jurisdiction

No civil court shall have jurisdiction to entertain any suit or proceeding in respect of any matter which a Securities Appellate Tribunal is empowered by or under this Act to determine and no injunction shall be granted by any court or other authority in respect of any action taken or to be taken in pursuance of any power conferred by or under this Act.

Appeal to High Court

Any person aggrieved by any decision or order of the Securities Appellate Tribunal may file an appeal to the High Court within sixty days from the date of communication of the decision or order of the Securities Appellate Tribunal on any question of fact or law arising out of such order;

Provided that the High Court may, if it is satisfied that the appellant was prevented by sufficient cause from filing the appeal within the said period, allow it to be filed within a further period not exceeding sixty days.

Penalties and Procedures

Penalties

(1) Any person who-

    (a) Without reasonable excuse (the burden of proving which shall be on him) fails to comply with any requisition made under sub- section (4) of section 6; or

    (b) Enters into any contract in contravention of any of the provisions contained in section 13 or section 16; or

    (c) Contravenes the provisions contained in section 17 or section 19; or

    (d) Enters into any contract in derivative in contravention of section 18 A or the rules made under section 30.

    (e) Owns or keeps a place other than that of a recognised stock exchange which is used for the purpose of entering into or performing any contracts in contravention of any of the provisions of this Act and knowingly permits such place to be used for such purposes; or

    (f) Manages, controls, or assists in keeping any place other than that of a recognised stock exchange which is used for the purpose of entering into or performing any

contracts in contravention of any of the provisions of this Act or at which contracts are recorded or adjusted or rights or liabilities arising out of contracts are adjusted, regulated or enforced in any manner whatsoever; or

(g) Not being a member of a recognised stock exchange or his agent authorised as such under the rules or bye- laws of such stock exchange or not being a dealer in securities licensed under section 17

(h) Not being a member of a recognised stock exchange or his agent authorised as such under the rules or bye- laws of such stock exchange or not being a dealer in securities licensed under section 17, canvasses, advertises or touts in any manner either for himself or on behalf of any other person for any business connected with contracts in contravention of any of the provisions of this Act; or

(i) Joins, gathers or assists in gathering at any place other than the place of business specified in the bye-laws of a recognised stock exchange any person or persons for making bids or offers or for entering into or performing any contracts in contravention of any of the provisions of this Act; shall, on conviction, be punishable with imprisonment for a term which may extend to one year, or with fine, or with both.

(2) Any person who enters into any contract in contravention of the provisions contained in section 15 [or who fails to comply with the provisions of section 21 or with the orders of] the Central Government under section 22 or with the orders of the Securities Appellate Tribunal shall, on conviction, be punishable with fine which may extend to one thousand rupees.

Offences by Companies

(1) Where an offence has been committed by a company, every person who, at the time when the offence was committed, was in charge of, and was responsible to, the company for the conduct of the business of the company, as well as the company, shall be deemed to be guilty of the offence, and shall be liable to be proceeded against and punished accordingly:

Provided that nothing contained in this sub-section shall render any such person liable to any punishment provided in this Act, if he proves that the offence was committed without his knowledge or that he exercised all due diligence to prevent the commission of such offence.

(2) Notwithstanding anything contained in sub-section (1), where an offence under this Act has been committed by a company and it is proved that the offence has been committed with the consent or connivance of, or is attributable to any gross

negligence on the part of any director, manager, secretary or other officer of the company, such director, manager, secretary or other officer of the company, shall also be deemed to be guilty of that offence and shall be liable to be proceeded against and punished accordingly.

Certain Offences to be Cognizable

Notwithstanding anything contained in the [Code of Criminal Procedure, 1898 (5 of 1898)], any offence punishable under sub-section (1) of section 23, shall be deemed to be a cognizable offence within the meaning of that Code.

Jurisdiction to try offences under this Act 26. No court inferior to that of a presidency magistrate or a magistrate of the first class shall take cognizance of or try any offence punishable under this Act.

Miscellaneous

Title to Dividends

(1) It shall be lawful for the holder of any security whose name appears on the books of the company issuing the said security to receive and retain any dividend declared by the company in respect thereof for any year, notwithstanding that the said security has already been transferred by him for consideration, unless the transferee who claims the dividend from the transferor has lodged the security and all other documents relating to the transfer which may be required by the company with the company for being registered in his name within fifteen days of the date on which the dividend became due.

(2) Nothing contained in sub- section (1) shall affect –

    a. The right of a company to pay any dividend which has become due to any person whose name is for the time being registered in the books of the company as the holder of the security in respect of which the dividend has become due; or

    b. The right of the transferee of any security to enforce against the transferor or any other person his rights, if any, in relation to the transfer in any case where the company has refused to register the transfer of the security in the name of the transferee.

Right to receive income from collective investment scheme

(1) It shall be lawful for the holder of any securities, being units or other instruments issued by collective investment scheme, whose name appears on the books of the collective investment scheme issuing the said security to receive and retain any

income in respect of units or other instruments issued by the collective investment scheme declared by the collective investment scheme in respect thereof for any year notwithstanding that the said security, being units or other instruments issued by collective investment scheme, has already been transferred by him for consideration, unless the transferee who claims the income in respect of units or other instruments issued by collective investment scheme from the transfer or has lodged the security and all other documents relating to the transfer which may be required by the collective investment scheme with the collective investment scheme for being registered in his name within fifteen days of the date on which the income in respect of units or other instruments issued by the collective investment scheme became due.

(2) **Nothing contained in sub-section (1) shall affect**

a. The right of a collective investment scheme to pay any income from units or other instruments issued by collective investment scheme which has become due to any person whose name is for the time being registered in the books of the collective investment scheme as the holder of the security being units or other instruments issued by collective investment scheme in respect of which the income in respect of units or other instruments issued by collective scheme has become due; or

b. The right of transferee of any security, being units or other instruments issued by collective investment scheme, to enforce against the transferor or any other person his rights, if any, in relation to the transfer in any case where the company has refused to register the transfer of the security being units or other instruments issued by collective investment scheme in the name of the transferee.

Act not to Apply in Certain Cases

(1) The provisions of this Act shall not apply to-

a. The Government, the Reserve Bank of India, any local authority or any corporation set up by a special law or any person who has effected any transaction with or through the agency of any such authority as is referred to in this clause;

b. Any convertible bond or share warrant or any option or right in relation thereto, in so far as it entitles the person in whose favour any of the foregoing has been issued to obtain at his option from the company or other body corporate, issuing the same or from any of its shareholders or duly appointed agents, shares of the

company or other body corporate, whether by conversion of the bond or warrant or otherwise, on the basis of the price agreed upon when the same was issued.

(2) Without prejudice to the provisions contained in sub-section (1), if the Central Government is satisfied that in the interests of trade and commerce or the economic development of the country it is necessary or expedient so to do, it may, by notification in the Official Gazette, specify any class of contracts as contracts to which this Act or any provision contained therein shall not apply, and also the conditions, limitations or restrictions, if any, subject to which it shall not so apply.

Protection of Action Taken in Good Faith

No suit, prosecution or other legal proceeding whatsoever shall lie in any court against the governing body or any member, office bearer or servant of any recognised stock exchange or against any person or persons appointed under sub-section (1) of section 11 for anything which is in good faith done or intended to be done in pursuance of this Act or of any rules or bye-laws made there under.

Power to Delegate

The Central Government may, by order published in the Official Gazette, direct that the powers (except the power under section 30) exercisable by such conditions, if any, as may be specified in the order, be exercisable also by the Securities and Exchange Board of India or the Reserve Bank of India constituted under section 3 of the Reserve Bank of India Act, 1934.

Power to Make Rules

(1) The Central Government may, by notification in the Official Gazette, make rules for the purpose of carrying into effect the objects of this Act.

(2) In particular, and without prejudice to the generality of the foregoing power, such rules may provide for,

    (a) The manner in which applications may be made, the particulars which they should contain and the levy of a fee in respect of such applications;

    (b) The manner in which any inquiry for the purpose of recognizing any stock exchange may be made, the conditions which may be imposed for the grant of such recognition, including conditions as to the admission of members if the stock exchange concerned is to be the only recognised stock exchange in the area; and the form in which such recognition shall be granted;

    (c) The particulars which should be contained in the periodical returns and annual reports to be furnished to the Central Government;

(d) The documents which should be maintained and preserved under section 6 and the periods for which they should be preserved;

(e) The manner in which any inquiry by the governing body of a stock exchange shall be made under section 6;

(f) The manner in which the bye-laws to be made or amended under this Act shall before being so made or amended be published for criticism;

(g) The manner in which applications may be made by dealers in securities for licences under section 17, the fee payable in respect thereof and the period of such licences, the conditions subject to which licences may be granted, including conditions relating to the forms which may be used in making contracts, the documents to be maintained by licensed dealers and the furnishing of periodical information to such authority as may be specified and the revocation of licences for breach of conditions;

(h) The requirements which shall be complied with –

    (a) By public companies for the purpose of getting their securities listed on any stock exchange;

    (b) By collective investment scheme for the purpose of getting their units listed on any stock exchange.

    (c) The form in which an appeal may be filed before the Securities Appellate Tribunal under section 22A and the fees payable in respect of such appeal.

(i) Any other matter which is to be or may be prescribed.

(3) Any rules made under this section shall, as soon as may be, after their publication in the Official Gazette, be laid before both Houses of Parliament. Repeal 31. Repealed by the Repealing and Amending Act, 1960 (58 of 1960), section 2 and Schedule 1.

QUESTIONS

1. What is investment? Is investment different from speculation? Explain.
2. Distinguish between the financial and economic meaning of investment.
3. What are the characteristics that an investor would like to have in an investment option? Explain each of these characteristics.
4. Sate and explain the objectives of investment activity.
5. Explain the process of investment undertaken by the investor.
6. Define securities. Give a brief account of different types of securities.
7. Explain stock markets in India and its role and stock exchange functions.
8. Write on Primary vs. Secondary market.
9. Explain in detail various investment avenues.
10. "Without adequate information the investor cannot carry out his investment programme" Elucidate.
11. What are the sources of investment information?
12. Explain in detail securities contracts regulation act.

UNIT II

INTRODUCTION

Investment is a commitment of funds for a period of time to derive a rate of return that would compensate the investors for the time during which the funds are not available for consumption, for the expected rate of inflation during the period of investment and for the uncertainty involved. Since the objective of the investment is to derive a rate of return, investors have to first specify the desired rate of return so that an investment decision can be made if the expected rate of return is equal to or greater than the desired or required rate of return. In the previous unit, it was explained that the required return increases along with an increase in the risk level of investment. Once the desired or required rate of return is identified, the second step in investment decision is to find out the expected return of investment. This is normally done by comparing the initial investment required to buy the financial asset and periodic cash flows available from the asset. In some cases, like savings bank account or investments in fixed deposits or corporate bond, the estimation of expected return is fairly easy because the issuer of the security clearly states the cash flows available from such assets. Thus decision on such investments is relatively easier than investing in equity shares. Investment in equity shares requires investors to estimate the cash flows based on the expected performance of the firm during the investment period. This is the complex and most challenging job in investment decision making process.

VALUATION

Valuation is the process of determining the current worth of an asset or a company; there are many techniques used to determine value. An analyst placing a value on a company looks at the company's management, the composition of its capital structure, the prospect of future earnings and market value of assets.

MEANING

Equity shares are those shares which are ordinary in the course of company's business. They are also called as ordinary shares. These share holders do not enjoy preference regarding payment of dividend and repayment of capital. Equity shareholders are paid dividend out of the profits made by a company. Higher the profits, higher will be the dividend and lower the profits, lower will be the dividend.

SHARE VALUATION

Share valuation is the process of assigning a rupee value to a specific share. An ideal share valuation technique would assign an accurate value to all shares. Share valuation is a

complex topic and no single valuation model can truly predict the intrinsic value of a share. Valuation models can provide a basis to compare the relative merits of two different shares. Equity valuations could be classified into the following categories:

1. Earnings valuation
2. Revenues valuation
3. Cash flow valuation
4. Asset valuation
5. Yield valuation
6. Member valuation

FEATURES OF EQUITY SHARES

1. **Owned capital:** Equity share capital is owned capital because it is the money of the shareholders who are actually the owners of the company.

2. **Fixed value or nominal value:** Every share has fixed value or a nominal value. For example, the price of a share is Rs. 10/- which indicates a fixed value or a nominal value.

3. **Distinctive number:** Every share is given a distinct number just like a roll number for the purpose of identification.

4. **Attached rights:** A share gives its owner the right to receive dividend, the right to vote, the right to attend meetings, the right to inspect the books of accounts.

5. **Return on shares:** Every shareholder is entitled to a return on shares which is known as dividend. Dividend depends on the profits made by a company. Higher the profits, higher will be the dividend and vice versa.

6. **Transfer of shares:** Equity shares are easily transferable, that is if a person buys shares of a particular company and he does not want them, he can sell them to any one, thereby transferring the shares in the name of that person.

7. **Benefit of right issue:** When a company makes fresh issue of shares, the equity shareholders are given certain rights in the company. The company has to offer the new shares first to the equity shareholders in the proportion to their existing share holding. In case they do not take up the shares offered to them, the same can be issue to others. Thus, equity shareholders get the benefits of the right issue.

8. **Benefit of Bonus shares:** Joint stock companies which make huge profits, issue bonus shares to their ordinary shareholders out of the accumulated profits. These shares are issued free of cost in proportion to the number of existing equity share

holding. In case they do not take up the shares offered to them, the same can be issued to others. Thus, equity shareholders get the benefits of the right issue.

9. **Irredeemable:** Equity shares are always irredeemable. This means equity capital is not returnable during the life time of a company.

10. **Capital appreciation:** The nominal or par value of equity shares is fixed but the market value fluctuates. The market value mainly depends upon profitability and prosperity of the company. High rate of dividend is paid with high rate of profit, the shareholders capital is appreciated through an appreciation in the market value of shares. (i.e. higher the rate of dividend, higher the market value of the shares.)

EQUITY VALUATION MODELS

We now to some of the actual models of equity valuation. The purpose of these models is to identify whether a stock is mispriced. Underpriced stocks need to be purchased; overpriced stocks should be shorted. As most modern equity valuation models are based upon the present value theory, set forth in detail by John B. Williams in Theory of Investment Value, the investment analyst must first turn to the present value estimation to know the intrinsic value of the equities.

DIVIDEND VALUATION MODEL

A difficult problem in using the dividend valuation model is the timing of cash flows from dividends. Since equity shares have no finite measure, the investor must forecast all future dividends. This might imply a forecast of intently long stream of dividends. Clearly, this would be almost impossible. And therefore, in order to manage the problem, assumptions are made with regard to the future growth of the dividend of the immediately previous period available at the time the investor wants to determine the intrinsic value of his/her equity shares. The assumptions can be:

1. Dividends do not grow in future i.e., the constant or zero growth assumption.
2. Dividends grow at a constant rate in future, i.e., the constant assumption.
3. Dividends grow at varying rates in the future time period i.e., multiple growth assumption.

The dividend valuation model is now discussed with these assumptions.

(a) The Zero – growth Case:

The growth rate of dividend D at time 't' will be known by solving for 'g' in the following

$$D_t = D_t - 1 \ (1+g_t) \qquad\qquad\qquad \ldots\ldots\ldots (1)$$

Or
$$D_t = \frac{D_t - 1\ (1+g_t)}{D_1 - 1}$$ ………. (2)

You can easily see that when $g_t = 0$, 3 equation 1 will yield $D_t = D_t - 1$ which means all future dividends would equal to be current dividend (i.e., the dividend of the immediately preceding period available as on date)

Now, the present value of the dividends for an infinite future period would be

$$V = \frac{D_o}{1+k} + \frac{D_1}{(1+k)^2} + \frac{D_2}{(1+k)^3} + \infty$$ ………. (3)

Since, $D_o = D_1 = D_2 = D_3$ under the zero – grown assumption, the numerator D_1 in equation 3 is replaced D_o.

You will appreciate that discounting cash flows over a very distant long future period would be meaningless. Mathematics tells us that if $K > 0$ then the value of an infinite series like the one in equation (4) results in following

$$V_0 = \frac{D_o}{K}\ 1 = \frac{D_o}{K}$$

And since $D_o = D_1$, equation 5 can also be written as
$$\frac{D_1}{K}$$

You may recall that equation 6 was used for the valuation of preference shares. This is one case for application of the zero – growth assumption.

This calculation underlying the zero – growth model can be illustrated.

Example: 1

Consider a preference share on which the company expects to pay a cash dividend of RKV Rs. 9 per share for an indefinite future period. The required rate of return is 10% and the current market price is Rs. 80.00. Would you buy the share at its current price?

Solution

This is zero – growth case because the dividend per share remains Rs.9 for all future time periods. You find the intrinsic value of the share using equation

$$V = Rs.\ 9.00/.10 = Rs.90$$

The intrinsic value of Rs. 90 is more than the market price of Rs. 80. You would consider buying the share.

Example: 2

Assume that the dividend per share is estimated to be Rs. 4.00 per year indefinitely and the investor requires a 20% of return.

Solution

The intrinsic value of the equity share is Rs. 4/.20 = 20. (This model is more appropriate for an analysis of preference shares because of the constant dividend assumption).

CONSTANT GROWTH CASE

When dividends grow in all future periods at a uniform rate 'g'

$$D_t = D_t - 1 \ (1+g)^t \qquad \qquad \ldots\ldots\ldots(7)$$

Substituting 'D_0' in equation 3.5 by the value of D_1 in equation 3.9, we get

$$v = \sum_{t=0}^{\infty} \frac{D_o \ (1 + g)^t}{(1+ K)^t} \qquad \qquad \ldots\ldots\ldots(8)$$

For a constant amount 'D_0' can be written out of summation to obtain the following equation

$$v = D_0 \sum_{t=0}^{\infty} \frac{D_o \ (1 + g)^t}{(1+ K)^t} \qquad \qquad \ldots\ldots\ldots(9)$$

Constant amount 'D_0' can be written out of summation to obtain the following equation

$$v = \sum_{t=0}^{\infty} \frac{(1 + g)^t}{(1+ K)^t} = \frac{1 + g}{K - g} \qquad \qquad \ldots\ldots.(10)$$

Substituting mathematical properties of infinite series, if K>g, it can then be shown that

$$v = \frac{D_0 \ (1 + g)}{(1+ K)} \qquad \qquad \ldots\ldots.(11)$$

Equation 3.13 can be re – written as follows:

$$v = \frac{D_0(1 + g)}{(1+ K)} = \frac{D_1}{K - g} \qquad \qquad \ldots\ldots.(12)$$

Example: 3

Dabba Ltd. paid a dividend of Rs. 2.00 per share for the year ending March 31, 1991. A constant growth of 10% income has been forecast for an indefinite future period. Investors' required rate of return has been estimated to 15%. You want to buy the share at a market price quoted on July 1, 1991 in the stock market at Rs. 60.00. What would be your decision?

Solution

This is case of constant – growth –rate situation. Equation 3.14 can be used to find out the intrinsic value of the equity share as under

$$V = \frac{D_1}{(K - g)} = \frac{Rs.\ 2\ (1.10)}{.15 - .10} = \frac{Rs.2.20}{.05} = Rs.44.00 \quad .....(3.15)$$

The intrinsic value of Rs.44 is less than the market price of Rs.60.00. Hence, the share is overvalued and you should not buy.

Example: 4

The company paid is first cash dividend of Rs.2.50 today and dividends are expected to grow at a rate of 30% per year for the next three years. Thereafter, cash dividends will grow at a10% rate per year. Shareholders expect to earn a 15% return on their investments. Calculate the present value of dividend.

Solution

Step 1: Calculate the present value of dividends for the first three years.

$$\sum_{t=1}^{n} D_0\ (1 + g_x)\ t\ /\ (1+K)^t$$

$$= Rs.\ 8.3473$$

Year	Dividend $D_0\ (1 + g_x)^t$ Rs. 2.50 $(1+0.30)^t$	X Capitalisation Rate x k = 0.15	= Present Value
(1)	(2)	(3)	(4) = (2) x (3)
0	Rs.2.500		
1	Rs.3.250	0.870	3.7356
2	4.225	0.756	5.5886
3	5.493	0.658	8.3473

Step 2: Value at the end of three years for the remaining life of the company

Dividend in 4th year $D_4 = D3\ (1 + gy)$

Rs. 5.493 $(1+ 0.10) = Rs.6.0423$

Value at the end of the third year

$$V_3 = D_4\ /\ (k - g_y)$$

$$V3 = 6.0423/\ (0.15 – 0.10)$$

$$Rs.\ 120.846$$

Step 3: The present value at the end of three years (V_3) discounted by the required rate of return k = 0.15

$$(V_3)\ X\ 1/(1+k)^3$$

$$= Rs.\ 120.846\ (0.658) = Rs.\ 79.516668$$

Step 4: The value per share today equals the present value of dividends for the first three years (Step – 1) plus the present value of the share price at the end of year 3 (Step – 3)

Step 1	Step 2
Vo = Rs.8.343 +	Rs.79.516668
= Rs. 87.8639668	

Step 5: Multiply the number of shares by the price per share to determine the total value of the equity. If there are 10,00,000 ordinary shares the total value of the firm is Rs.8,78,63,967.

The Multiple – Growth Case

The multiple – growth assumption has to be made in a vast number of practical situations. The infinite future period is viewed as divisible into two or more different growth segments. The investor must forecast the time to which growth would be variable and after which only the growth rate would show a pattern and would be constant. This would mean that present value calculations will have to be spread over two phases viz., one phase would last until time 'T' and other would begin after 'T' in infinity.

$$V_{T(i)} \sum_{t=1}^{n} \frac{D}{(1+K)^t} \qquad \text{.... 3.14}$$

The second phase present value is denoted by VT (2) and would based on constant – growth dividend forecast after time 'T'. The position of the investor at time 'T' after which the second phase commences is viewed as a point in time when he is forecasting a stream of dividends for time periods T + 1, T + 2, T+3 and so on , which grow at a constant rate. The second phase dividends would be

$$D_{T+1} = D_T (1+g)$$
$$D_{T+2} = D_{T+1} (1+g) D_T (1+g)^2 \qquad \text{......3.15}$$
$$D_{T+3} = D_{T+2} (1+g) D_T (1+g)^3$$

And so on. The present value of the second phase stream of dividends can, therefore, be estimated using each 3.14 and at time 'T'

$$V_T = D_{T+1} \frac{1}{K - g} \qquad \text{......3.16}$$

You may note 'V_T' given by equation 3.16 is the present value at time 'T' of all future expected dividends. Hence, when this value has to be viewed at time 'zero' it must be discounted to provide the present value at time for the second phase present value. The latter

can also be viewed at time 'zero' as a series of each dividend that grow at a constant rate as already stated. The resulting second phase value VT (2) will give the following.

$$VT\,(2) = V_{T+1} = \frac{1}{(K-g)^T} \qquad\qquad \text{……3.16}$$

$$VT\,(2) = V_{T+1} = \frac{D_{T+1}}{(K-g)\,(1+K)^T}$$

Now, the two present values of phases 1 and 2 can be added to estimate the intrinsic value of an equal that will pass through a multiple growth situation. The following describes the summation of the two phases.

$$V_{T\,(2)} = V_{T(1)} + V_{(2)}$$

$$= \sum_{t=1}^{T} \frac{D_T}{(1+K)^t} + \frac{DT_{+1}}{(K-g)\,(1+K)^T}$$

Example: 5

RKV Ltd., paid dividends amounting to Rs. 0.75 per share during the last year. The company is to pay Rs. 2.00 per share during the next year. Investors forecast a dividend of Rs. 3.00 per share in next year. At this time, the forecast is that dividends will grow at 10% per year into an indefinite future. Would you sell the share if the current price is Rs. 54.00? The required rate of return is 15%.

Solution

This is a case of multiple growth. Growth rates for the first phase must be worked out and the time between the two phases established. It is clear that 'T' = 2 years. Hence, this becomes the time – partition. Rates before 'T' are:

$$g_1 = \frac{D_1 - D_0}{D_0} = \frac{\text{Rs. }2.00 - \text{Rs. }0.75}{\text{Rs.}0.75} = 167\%$$

$$g_2 = \frac{D_2 - D_1}{D_1} = \frac{\text{Rs. }3.00 - \text{Rs. }2.00}{\text{Rs.}0.75} = 133\%$$

The values $V_{T\,(1)} + V_{T\,(2)}$ can be calculated as follows:

$$V_{T\,(1)} = \frac{\text{Rs. }2.0}{(1+0.15)^1} + \frac{\text{Rs. }3.0}{(1+0.15)^2}$$

$$= \text{Rs. }4.01$$

$$V_{T\,(2)} = \frac{3.30}{(0.15-0.10)\,(1+0.15)^2} = 49.91$$

Since $V_0 = V_{T\,(1)} + V_{T\,(2)}$ the two values can be summed to find the intrinsic value of a Cromecon equity share time 'zero'.

This is given below:

$$V_0 = \text{Rs. } 4.01 + \text{Rs.} 49.91 = \text{Rs. } 53.92$$

At the current price of Rs. 54.00, the share is fairly priced and hence you won't trade.

MODELS BASED ON PRICE RATIO ANALYSIS

Price ratios are widely used by financial analysts, more so even than dividend discount models. Of course, all valuation methods try to accomplish the same thing, which is to appraise the economic value of a company's stock.

The P/E approach to Equity Valuation

The first step here consists of estimating future earning per share. Next, the normal price – earnings ratio will be estimated. Product of these two estimates will give the expected price. For a single year holding period, with D_1 as the referred dividends in the coming year, the expected return of an investor can be found as under.

$$\text{Expected Return} = \frac{D_1 (P_1 - P_0)}{P_0}$$

Stagnating normal price – earning ratio is central to the P/E approach for valuing equity shares. The procedure has been described in the following paragraphs.

You may go back to equation 3 and introduce the earnings variable in it by expressing

$$D_t = p_1 - E_t \qquad \qquad \text{……… (13)}$$

Where P1 = pay –out ratio, and Et = earnings per share in time 't' so, if you forecast earnings per share and layout ratio you have in fact forecast dividends per share. Now, use equation 13 to restore equation 3 where it will be replaced by $p_t E_t$ as follows:

$$V = \frac{D_1}{1+K} + \frac{D_1}{(1+K)^2} + \frac{D_1}{(1+K)^3} + \ldots\ldots\ldots\ldots$$

$$= \frac{p_1 E_1}{1+K} + \frac{p_2 E_2}{(1+K)^2} + \frac{p_3 E_3}{(1+K)^3} + \ldots\ldots\ldots\ldots$$

$$= \sum_{t=1}^{T} \frac{P_1 E_1}{(1+K)1} \qquad \qquad \text{…….. (14)}$$

Now, if earnings like dividends also grow at a rate 'ge' in future time periods as

$$E_1 = E_{t-1} (1 + g_{et})$$

And which would also imply that

$$E_1 = E_{t-1} (1 + g_{et})$$
$$E_2 = E_1 (1 + g_{et}) = E_0 (1 + g_{e1}) (1+g_{e2})$$
$$E_3 = E_2 (1 + g_{e3}) = E_0 (1 + g_{e3}) (1+g_{e3})$$

and so, on where E_0 is the actual level of earnings per share over the past year, E_1 is the expected level of earnings per share for the year after E_1 and E_2 is expected level of earnings per share for the year after E_2.

$$V= \frac{P_1[E_0(1+g_{e1})]}{1+K} + \frac{P_1[E_0(1+g_{e1})]+(1+g_{e2})]}{(1+K)^2} + \frac{P_1[E_0(1+g_{e1})]+(1+g_{e2})+(1+g_{e3})]}{(1+K)^3}+\dots(15)$$

Now you may recall that 'V' is the intrinsic value or the price at which the share would sell if it were priced. Then, V/E0 would be the price – earnings ratio that must prevail if the share were fairly priced. In other words, V/E0 would be the normal price earnings ratio from equation 3.23, divide both sides of the equation by E0 and simplify. The resultant equation would be

$$\frac{V}{E_0} = \frac{P_1(1+g_{e1})}{1+K} + \frac{P_1(1+g_{e1})+(1+g_{e2})}{(1+K)^2} + \frac{P_1(1+g_{e1})+(1+g_{e2})+(1+g_{e3})}{(1+K)^3}+\dots(16)$$

You can now interpret equation 3.25 to show that a share's normal price – earnings ratio will be higher:

$(g_{e1}, g_{e1}, g_{e1}.............)$; the smaller the required rate of return (K).

The above relationships are qualified by the phrase "other things being equal", which means no change in variables. For example, the normal price earnings ratio would increase with increase with increase in payout ratio but no company can ever achieve this result concentrating on an increase in the payout ratio. What happens with an increased payout ratio is a corresponding decrease in reinvestment of earnings and consequently a diminution in the growth rate; increased payout would neutralized by decreased growth so on. Consequently, intrinsic value and therefore the normal price – earnings will not increase.

Second, equation 16 is based on the infinite series of dividends in the growth situations. The equations can be derived as follows:

The Constant Growth Situation:

$$V= \frac{P_1}{E_0} \quad \frac{1+g3}{K-g} \qquad\qquad \dots\dots(17)$$

Zero Growth Situation:

$$\frac{V}{E_0} = \frac{1}{K}$$

Reasons for company to have negative earning

There are number of reasons for a company to have negative earnings. Some of the reasons for negative earnings can be listed as follows:

1. Cyclical nature of industry
2. Unforeseeable circumstances
3. Poor management
4. Persistent negative earnings
5. Early growth stage
6. High leverage cost

1. Cyclical Nature of Industry

Companies might belong to the cyclical industry. When there is a recession in the economy, the company will post negative earnings. However, once the economic variables change, the companies in these cyclical industries also recover and show a positive growth rate. Normalised Net Income = Average ROE * Current Book Value of Equity

Normalised after – tax Operating Income = Average ROC * Current Book Value of Assets

2. Unforeseeable Circumstances

The earnings of a company may show a negative result due to a one – time unforeseen event. The extent of downtrend could depend on both external and internal factors relating to the company.

3. Poor Management

The company might have a team at the top that is responsible for the wrong business decisions or the company could have been affected by fraud or mismanagement issues. However, if it is felt that the negative earnings due to this mismanagement has been identified and corrective action by the company is on the agenda of the board, the valuation of such companies has to be done considering the industry earnings record.

Example: 6

Zee Ltd is paying dividends on its equity shares at Rs.8 per share and expects to pay it for an undefined long period in future. The equity share currently sells for Rs.65 and investors' required rate of return is 10. Determine if the Zee share is fairly priced using P/E approach valuation.

Solution

This is a zero –growth case and the normal price – earnings ratio can be found as under

$$V/E_0 = 1/K = 1/10 = 10$$

The actual price earnings ratio = P/E = Rs. 65/Rs.8 = 8.1. Since the normal price – earnings ratio of 10 is more than the actual price – earnings ratio of 8.1, the share at Rs. 65 is under priced.

Example: 7

Now, assume that Zee paid a dividend of Rs. 1.80 per share over the past year and the forecast then is that would grow at 5% per annum forever. The required rate of return is 11% and the current market price is Rs.40 per share. Using P/E approach, determine if the Zee share is fairly priced. E_0 may be taken as Rs. 2.70.

Solution

This is a constant growth case. The normal price earnings ratio (V/E_0) can be

$$\frac{V}{E_0} P = \frac{(1+g_e)}{K - g}$$

$$= 1.80/2.70 \quad \frac{1+0.5}{.11-0.05}$$

$$= .6667 \quad \frac{1.05}{.06}$$

$$= 11.67$$

$$\frac{P}{E_0} = \frac{Rs.40.0}{Rs.2.70}$$

$$= 14.81$$

Since $\dfrac{V}{E_0} = 11.67 < \dfrac{P}{E_0} = 14.81$, the share is overpriced.

Price – Book [P/S] Ratio

A very basic price ratio for a company is its price – book [P/B] ratio, sometimes called the market – book ratio. A price – book ratio is measured as the market value of a company's equity issued divided by its book value of equity. Price –book ratios are appealing because book values represent, in principle, historical costs. The stock price is an indicator of current value, so a price – book ratio simply measures what the equity is worth today, relative to what it cost. A ratio bigger than 1.0 indicates that the firm has been successful in creating value for its stockholders. A ratio smaller than 1.0 indicates that the company is actually worthless than its cost.

Price – Sales (P/S) Ratio

A price – sales ratio is calculated as the current price of a company's stock divided by its current annual sales revenue per share. A high P/S ratio would suggest high sales growth, while a low P/S ratio might indicate sluggish sales growth.

CONSIDERATIONS IN DEVELOPING AND SELECTING QUANTITATIVE STRATEGIES

Many models can be used in combination with each other and especially in combination with sound judgment. The quantitative strategy in valuation models may be defined as engineered investment strategies. In developing these strategies, consideration must be given at least to three characteristics. First, the strategy should be based on a sound theory. That is, there should be not only a reason why the strategy worked in the past, but, more importantly, a reason why it should be expected to work in the future. Second, the strategy should be put in quantified terms. Finally, a determination should be made of how the strategy would have performed in the past. This last characteristic is critical and is the reason why investment strategies are back – tested. An equity manager encounters many potential problems in the design, testing and implementation of engineered investment strategies. These include:

Random Valuation Model

The Random Valuation model begins with the premise that the next three years' growth of earnings, dividends, and price will be similar to those of the past ten years. This is similar to the Trend Valuation equation for estimating the rate of return, r. In the Random Valuation model, the ten – year growth rate of earnings and dividends is used, along with the ten year P/E ratio.

Example: 8

Ravi paid Rs.2.75 in dividends on its equity shares last year. Dividends are expected to grow at 12% annual rate for an indefinite number of years.

(a) If Ravi's current market price is Rs.37.50, what is the stock's expected rate of return?

(b) If your required rate of return is 14%, what is the value of the stock for you?

(c) Should you make the investment?

Solution

(a) Expected Rate of Return = Rs. 2.75 (1.12)/ (Rs.37.50 +0.12) = 20.21%

(b) Investor's Value = Rs. 2.75 (1.12)/(0.14 – 0.12) = Rs.154

(c) The expected rate of return is greater than the required rate of return (20.21% versus 14%). Also, the value of the stock (Rs.154) is larger than the current market price (Rs.37.50). The share is undervalued and should be purchased.

Example: 9

The market price for Super Iron's equity is Rs.65 per share. The price at the end of one year is expected to be Rs. 90, and dividends for next year should be Rs.2.90. What is the expected rate of return?

Solution

If the expected rate of return is represented by ERR:

Current Price = (Dividend in year 1)/ (1+ERR) + (Price in year 1)/(1+ERR)

ERR = [(Dividend in year 1 + Price in year 1)/Current Price] – 1

ERR = [(Rs.2.90 + Rs.90/65] – 1 = 0.30

ERR = 30.0%

Example: 10

Ravi Petro is expected to pay Rs. 3.00 in dividends next year, and the market price is projected to be Rs.75 by year – end. If the investors' required rate of return is 20%, what is the current value of the stock?

Solution

V_e = (Dividend in year 1)/ (1+Required rate) + (Price in year1)/ (1+Required rate)

= Rs.3.00/(1+0.20) + Rs.75/ (1 + 0.20)

= Rs. 2.50 + Rs.62.50

= Rs.65.00

Example: 11

On Sudha Enterprises' equity shares, the dividend was paid Rs. 1.32 per equity share last year and this is expected to grow indefinitely at an annual 7% rate. What is the value of each equity share of Sudha Enterprises if the investor requires an 11% return?

Solution

V_e = (Last year dividend {1+Growth Rate})/(Required rate of return – Growth rate)

= Rs. 1.32 (1.07)/ (0.11 – 0.07) = Rs. 35.31

Example: 12

An investor holds and equity share giving him an annual dividend of Rs.30. He expects to sell the share for Rs. 300 at the end of a year. Calculate the value of the share if the required rate of return is 10%.

Solution

The market price of a share in the beginning of the period is equal to the present value of the dividends paid at the end of the period plus the market price of the share at the end of the period. Symbolically:

$$P_0 = D_1 / (1 + i) + P_1 (1 + i)$$

OR $\qquad P_0 = (D_1 + P_1) / (1 + i)$

Where

P_0 = Current price of the share

i = Required rate of return or the cost of equity

D_1 = Dividend to be received at the end of the period

P_1 = Market price of share at the end of the period

Substituting the values, we get:

P_1 = Market price of share at the end of the period

$$P_0 = (\text{Rs. } 30 + \text{Rs.}300) / (1 + 0.10) = \text{Rs. } 330/1.10 = \text{Rs.}300$$

Example: 13

Ravi equity share currently sells for Rs. 23 per share. The company's finance manager anticipates a constant growth rate of 10.5% and an end – of – year dividend of Rs. 2.50.

(a) What is expected rate of return?

(b) If the investor requires a 17% return, should he purchase the stock?

Solution

(a) Expected rate of return = (Dividend in year 1) / (Market Price) + Growth rate

$$= (\text{Rs. } 2.50 / \text{Rs. } 23.00) + 0.105$$

$$= 21.37\%$$

(b) $\qquad$ Ve $\quad = \text{Rs.}2.50 / (0.17 – 0.105)$

$\qquad\qquad\qquad$ Rs. 38.46

The value of the stock would be Rs. 38.46. Thus, the expected rate of return exceeds the required rate of return, which means that the value of the security is greater than the current market price. Therefore, the investor should buy the stock.

Example: 14

Raj's equity shares currently sells for Rs. 22.50 per share. The finance manager of Raj anticipates a constant growth rate of 12% and an end – of – year dividend of Rs.2.50.

(a) What is your expected rate of return if you buy the stock for Rs. 25?

(b) If you require an 18% return, should you purchase the stock?

Solution

    (a) (Dividend in year 1) (Market Price) + Growth rate

$$= Rs.2.50 \,/\, Rs.25 + 0.12$$

$$= 0.22 = 22\%$$

    (b) Ve $= Rs.2.50 \,/\, (0.18 - 0.12)$

$$= Rs. \; 41.67$$

Yes, do purchase the equity shares of Raj.

Example: 15

Firms A, B and C are similar. Firm A is the most progressive and trades at a 18 / 1 P/E multiple. Firms B is less progressive, is not publicly traded, and has an EPS of Rs. 1.20. Firm C is least progressive and trades at a 15 / 1 P / E ratio. What is the intrinsic value of firm B?

Solution

Average P/E = 16.5

Intrinsic value = 16.5 x 1.20 = Rs. 19.80

Example: 16

A firm's current EPS is Rs. 6, its dividend payout is 40%, and its growth rate of EPS is 10%. The normal P/E multiple is 15/1. What is the stock's value using the capitalization of earnings method? What is its value in three years using the same method?

Solution

P/E x EPS current = PV

$$PV = 15 \times 6 = Rs.90$$

$$EPS_3 = Rs. \; 6 \, (1.10)^3$$

$$= Rs.7.986$$

Value in 3 years = 15 x Rs.7.986 = Rs. 119.79.

PREFERENCE SHARES

Preference share is often considered to be a hybrid security since it has many features of both ordinary shares and debentures. It is similar to ordinary shares in that (a) the non – payment of dividends does not force the company to insolvency, (b) dividends are not deductible for tax purposes, and (c) in some cases, it has no fixed maturity date. On the other hand, it is similar to debentures is that (a) dividend rate is fixed, (b) preference shareholders do not share in the residual earnings, (c) preference shareholders have claims on income and assets prior to ordinary shareholders, and (d) they usually do not have voting rights.

Since dividends from preference shares are assumed to be perpetual payments, the intrinsic value of shares will be estimated from the following equation valid for perpetuities in general

$$VP = \frac{C}{(1 + K_p)} + \frac{C}{(1 + K_p)^2} + \ldots\ldots\ldots$$

Where

V_p = the value of a perpetuity today

C = the constant annual payment to be received

Kp = the required rate of return appropriate for the perpetutity

You have only to substitute preference dividend (D) for 'C' and the appropriate required return (K_{ps}) for 'K_p' to obtain the following equation for valuing preference shares.

$$VP = \frac{D}{K_{ps}}$$

You may note that 'D' is a perpetuity and is known and fixed forever. A perpetuity does not involve present value calculations and the equation provides for computing any of the three variables viz., value of perpetuity (V), preference dividend (D) and required rate of return (K_{ps}) only if the remaining two variables are known. Thus, the value of a preference share can be calculated if the dividend per share and the required rate of return known. Similarly, the required rate of return (or yield) can be known if the value of the perpetuity and dividend per share are known.

Example: 17

We look at the valuation process of a preference share. Consider the issue of preference shares of Rs.100 each with a specified dividend of Rs.11.5 per share. Now, if the investors' required rate of return corresponding to the risk – level of firm A is 10% what would the value today of the share be?

Solution

$$VP = \frac{Rs.\ 11.50}{.10}$$

$$= Rs.\ 115.00$$

Should the required return increase (say in the wake of rising interest rates and, consequently the high opportunity costs) to 12%, value will be:

$$\frac{Rs.11.50}{.12} = Rs.\ 95.83$$

You may note that the value changes inversely to the required rate of return.

If you are an observer of market prices, you may notice the price of any preference share on any day and calculate its yield on that day using above formula. Thus, if the current market price of the preference share in question is Rs. 125.00, the required rate of return or yield can be calculated as under:

$$VP = \frac{D}{K_{ps}} \quad \text{Or}, \text{Rs. } 125.00 = \frac{\text{Rs.}11.50}{K_{ps}}$$

Or

$$K_{ps} = \frac{\text{Rs.}11.50}{125} \times 100 = 9.2\%$$

Thus, the yield declines after issue of the shares by 'A'. May be, interest rates decline or other changes to induce the downward shift in the yield.

You can observe price shifts over various ranges of time, say weeks, months and examine the causes of shifts in yields of preference shares. These relate to 'fundamental approach to 'flotation equity shares'

Example: 18

What is the value of a preference share where the dividend rate is 18% on a Rs.100 par value? The appropriate discount rate for a stock of this risk level is 15%.

Solution

Vp = (0.18 x Rs. 100)/0.15

= Rs. 18/0.15

= Rs. 120

Example: 19

The preference shares of RKV Group are selling for Rs. 47.50 per share and pay a dividend of Rs. 2.35 in dividends. What is your expected rate of return if you purchase the security at market price?

Solution

Expected rate of return = Dividend / Market Price

= Rs. 2.35/Rs.47.50

= 4.95%

Example: 20

You won 250 preference shares of ABC company which currently sells for Rs.38.50 per share and pays annual dividends of Rs. 6.50 per share.

(a) What is your expected return?

(b) If you require a 13% return, given the current price, should you sell or buy more preference shares?

Solution

(a) Expected return = Dividend / Market Price

= Rs. 6.50/Rs.38.50

= 16.88%

(b) Given a 13% require rate of return, the stock is growth:

Vp = Dividend / Require Rate

= Rs. 6.50/0.13

= Rs. 50.00

Because the expected rate of return (16.88%) is greater than the required rate of return (13%) or because the current market price (Rs. 38.50) is less than Rs.50.00, the stock is undervalued and it is worth buying.

FEATURES

Preference share has several features. Some of them are common to all types of preference shares while others are specific to some.

1. Claims on income and assets

Preference share is a senior security as compared to an ordinary share. It has a prior claim on the company's income in the sense that the company must first pay preference dividend before paying ordinary dividend. It also has a prior claim on the company's assets in the event of liquidation. The preference share claim is honored after that of a debenture and before that of ordinary share. Thus, in terms of risk, preference shares is less risky than ordinary share. There is a cost involved for the relative safety of preference investment. Preference shareholders generally do not have voting rights and they cannot participants in any extraordinary profits earned by the company. However, a company can issue preference share with voting rights (called participative preference shares).

2. Fixed Dividend

The dividend rate is fixed in the case of a preference share, and preference dividends are not tax deductable. The preference dividend rate is expressed as a percentage of the par value. The amount of preference dividend will thus be equal to the dividend rate multiplied by the par value. Preference share is called fixed – income security because it provides a constant income to investors. The payment of preference dividend is not a legal obligation. Usually, a profitable company will honour its commitment of paying preference dividend.

3. Cumulative dividends

Most preference shares in India carry a cumulative dividend feature, requiring that all past unpaid preference dividend are to paid before any ordinary dividends are paid. This feature is a protective device for preference shareholders. The preference dividends could be omitted or passed without the cumulative feature. Preference shareholders do not have power to force company to pay dividends; non - payment of preference dividend also does not result into insolvency. Since preference share does not have the dividend enforcement power, the cumulative feature is necessary to protect the rights of preference shareholders.

4. Redumption

Theoretically, both redeemable and perpetual (irredeemable) preference shares can be issued. Perpetual or irredeemable preference share does not have a maturity date. Redeemable preference share has a specified maturity. In practice, redeemable preference shares in India are often not retired in accordance with the stipulation since there are no serious penalties for the violation of redemption feature.

5. Sinking fund

Like in the case of debentures, a sinking fund provision may be created to redeem preference share. The money set aside for this purpose may be used either to purchase preference share in the open market or to buy back (call) the preference share. Sinking funds for preference shares are not common.

6. Call feature

The call feature permits the company to buy back preference shares at a stipulated buy – back or call price. The call price may be higher than the par value. Usually, it decreases with the passage of time. The difference between call price and par value of the preference share is called call premium.

7. Participation feature

Preference shares may, in some cases, have participation feature which entitles the preference shareholders to participate in extraordinary profit earned by the company. This means that a preference shareholder may get dividend amount in excess of the fixed dividend. The formula for determining extra dividend would differ. A company may provide for extra dividend to preference shareholders equal to the amount of ordinary dividend that is in excess of the regular preference dividend. Thus if the preference dividend rate is 10 per cent and the company pays an ordinary dividend of 16 percent, then preference shareholders will receive extra dividend at 6 percent (16 – 10 percent). Preference shareholders may also be entitled to participate in the residual assets in the event of liquidation.

8. Voting rights

Preference shareholders ordinarily do not have any voting rights. They may be entitled to contingent or conditional voting rights. In India, if a preference dividend is outstanding for two or more years in the case of cumulative preference shares, or the preference dividend is outstanding for two or more consecutive preceding years or for a period of three or more years in the preceding six years, preference shareholders can nominate a member on the board of the company.

9. Convertibility

Preference shares may be convertible or non – convertible. A convertible preference share allows preference shareholders to convert their preference shares, fully or partly, into ordinary shares, at a specified price, during a given period of time. Preference shares, particularly when the preference dividend rate is low, may sometimes be converted into debentures. For example, the Andhra Cement converted its preference shares of Re. 0.33 core into debentures in 1985. To make preference shares, attractive, the government of India has introduced convertible cumulative preference share (CCPS). Unfortunately, companies in India have hardly used this security to raise funds.

Advantages and Disadvantages of preference Shares

Preference share has a number of advantages to the company, which ultimately occur to ordinary shareholders.

1. Riskless leverage advantage

Preference share provides financial leverage advantages since preference dividend is fixed obligation. This advantage occurs without serious risk of default. The non – payment of preference dividends does not force the company into insolvency.

2. Dividend postponability

Preference share provides some financial flexibility to the company since it can postpone the payment of dividend.

3. Fixed dividend

The preference dividend payments are restricted to the stated amount. Thus preference shareholders do not participate in excess profits as do the ordinary shareholders.

The following are the limitations of preference shares:

1. Non – deductibility of dividends

The primary disadvantages of preference share is that preference dividend is not tax deductible. Thus, it is costlier than debenture.

2. Commitment to pay dividend

Although preference dividend can be omitted, they may have to be paid because of their cumulative nature. Non – payment preference dividends can adversely affect the image of a company, since equity holders cannot be paid any dividends unless preference shareholders are paid dividends.

Preference shares provide more flexibility and lesser burden to a company. The dividend rate is less than that on equity and it is fixed. Also, the company can redeem it when it does not require the capital. In practice, when a company reorganizes its capital, it may convert preference capital into equity. Sometimes equity may be converted into preference capital. For example, IDBI in 1994 proposed to convert its equity capital into preference capital.

VALUATION OF FIXED INCOME SECURITIES

A debenture is a legal document containing an acknowledgement of indebtedness by a company. It contains a promise to pay a stated rate of interest for a defined period and then to repay the principal at a given date of maturity.

In short, a debenture is a formal legal evidence of debt and is termed as the senior securities of a company.

Unlike equity holders, the bond investor does not share in the growth of a company to any appreciable extent. Thus, although serious losses can accrue to bond holders if a company suffers financial reverses, they cannot profit to any significant degree by a spectacular improvement in the company's position. It is a case of heads they lose and tails they cannot win. Therefore, their primary role in an investment portfolio is to provide continuity of income under all reasonably conceivable economic conditions.

Types of Bonds

1. Convertible and Non Convertible Bonds

Convertible bonds can be one of the finest holdings for the investor looking for both appreciation of investment and income of bond. A convertible bond is a cross between a bond and a stock. The holder can at his option, convert the bond into a predetermined number of shares of common stock at a predetermined price.

2. Collateral Trust Bonds

Instead of being secured by a pledge of tangible property, as are mortgage bonds, collateral trust issues are secured by a pledge of intangibles, usually in the form of stock and bonds of corporation. Collateral trust issues are, thus, secured by (1) shares, representing ownership in corporation, (2) bonds, representing the indirect pledge of assets, or a combination of both. Usually, the pledged securities are those of other corporations.

3. Income Bonds

Income bonds are bonds on which the payment of interest is mandatory only to the extent of current earnings. If earnings are sufficient to pay only a portion of the interest, that portion usually is required to be paid, but if the corporation is able to pay the unearned balance out of its cash resources, it is of course free to do so.

4. Redeemable and Irredeemable Bonds:

A redeemable debenture is a bond, which has been issued for a certain period on the expiry of which its holder will be repaid the amount thereof, with or without premium. A bond without the aforesaid redemption period is termed as an irredeemable debenture. These may be repaid either in the event of the winding – up of company or the happening of certain specified uncertain or contingent events.

5. Participating Bonds

Companies with poor credit positions issue participating bonds. They have a guaranteed rate of interest, but may also participate in earnings up to an additional specified percentage.

6. Sinking Fund Bonds

Sinking fund bonds arise when the company decides to retire its bond issue systematically by setting aside a certain amount each year for the purpose. The payment, usually fixed annual rupees amount or percentage installment, is made to the sinking fund agent who is usually the trustee.

7. Serial Bonds

Like sinking fund bonds, serial bonds are not special types of bonds but just names given to describe the method of repayment. Thus, any bond can be a serial bond by merely specifying it in the indenture.

8. Mortgage or Secured Bonds

The term mortgage generally refers to a lien on real property or buildings. Mortgage bonds may be open – end, close – end, and limited open – end. An open – end mortgage means that a corporation under the mortgage may issue additional bonds. But the open – end mortgage indenture usually provides that the corporation can issue more bonds only if the earnings or additional security obtained by selling the new securities meet certain tests of earnings and asset coverage.

Bond Valuation

Debt securities issued by governments, governments and quasi government organisations, and private business firms are fixed income securities. Bonds and debentures are the most common examples.

The intrinsic value of bond or debenture is equal to the present value of its expected cash flows. The coupon interest payments, and the principal repayment are known and the present value is determined by discounting these future payments from the issuer at an appropriate discount rate or market yield. The usual present value calculations are made with the help of the following equation.

$$PV = \sum_{t=1}^{n} \frac{C}{(1+r)^t} + \frac{C}{(1+r)^n}$$

Where PV   = the present value of the security today (i.e., time period zero)

      C   = coupons or interest payments per time period 't'

      C   = the terminal value repayable at maturity; this could be at par, premium, or even at discount (in extraordinary cases)

      r   = the appropriate discount rate or market yield

      n   = the number of years to maturity

Example: 21

Consider a Rs. 1,000 bond A issued with a maturity of five years at par to yield 10%. Interest is paid annually and the bond is newly issued. The appropriate discount rate is also 10%.

Solution

The value of the bond would be as follows

$$PVA = \frac{Rs.100}{1 + .10} + \frac{Rs.100}{(1 + .10)^2} + \frac{Rs.100}{(1 + .10)^3} + \frac{Rs.100}{(1 + .10)^4} + \frac{Rs.100}{(1 + .10)^5}$$

      = 100 x .9091 + 100 x .8264 + 100 x .7513 + 100 x .6830 + 1100 x .6209

      = 90.91 + 82.64 + 75.13 + 68.30 + 682.99

      = 999.97 or Rs. 1000 aprox.

You should recognize that the present value of the bond viz., Rs. 1,000 estimated above is equal to the issue price because the bond was just been sold at par of Rs. 1000.

Now, consider another Rs.1,000 Bond B which was issued ten years ago at a coupon at 6%. The bond had a maturity period of ten years and as of today, therefore, five more years are left for final repayment at par. The current discount rate is 10% as before. All other characteristics of Bond B are identical with Bond A.

It is obvious that the present value of Bond B will not be Rs. 1000 because investors will not pay this price and agree to receive Rs. 60 per year as interest for the next five years

when Bond A with similar characteristics provides annual interest payments of Rs. 100 for the five years. The present value of Bond B will be determined as:

$$PVA = \frac{Rs.60}{1+.10} + \frac{Rs.60}{(1+.10)^2} + \frac{Rs.60}{(1+.10)^3} + \frac{Rs.60}{(1+.10)^4} + \frac{Rs.1060}{(1+.10)^5}$$

$$= 60 \times .9091 + 60 \times .8264 + 60 \times .7513 + 60 \times .6830 + 1060 \times .6209$$

$$= 54.55 + 149.58 + 45.08 + 40.98 + 658.15$$

$$= Rs. 848.34$$

You will observe that the numerator of the PV equation will be given at the time of issuance of the bond or the nature. The maturity period, timing of interest is payments, and maturity value will also be specified. What should be determined is the denominator of the equation viz., the discount rate. You may notice that this comes with the same features. In other words, it is an opportunity cost. Thus, the discount rate incorporates the change of interest rates and reflects the current market yield for the issue.

Should interest payments be semi – annual, the PV equation will have to be modified as follows: divide 'Ct' both end and by multiply 'n' by 2. The resultant equation will be:

$$PV = \sum_{t=1}^{2n} \frac{ct/2}{(1+r/2)^t} + \frac{C}{(1+r/2)^{2n}}$$

Coming under semi – annual payments, the present values of Bonds A and B the above examples can be solved as under

$$PV_A = \sum_{t=1}^{10} \frac{Rs.50}{(1.05)^t} + \frac{1000}{(1.05)^{10}}$$

$$= Rs. 999.985 \text{ or } Rs. 1000 \text{ approx.}$$

ESTIMATING RETURNS ON FIXED INCOME SECURITIES

Several measures of returns on bonds are available. They are the coupon rate, the current yield and the yield maturity. The coupon rate is specified at the time of issue and is all too obvious. The other two measures can be discussed.

Current yield: This is calculated as follows:

$$Current \ yield = \frac{Stated \ (coupon) \ interest \ per \ year}{Current \ market \ price}$$

Example: 22

15% Rs. 200 debenture is currently selling for Rs.220, the annual current yield would be

$$\frac{Rs.30}{Rs.220}$$

$$= 13.64\%$$

You must notice that the 15% debenture is currently selling for Rs.220 because interest rates have subsequently declined and debenture/bond prices move inversely with interest rates. The current yields has declined to 13.64%. The coupon rate of 15% reflects this.

Current yield is a superior measure than coupon rate because it is based on the current market price. However, it does not account for the difference between the purchase price of the bond/debenture and its maturity value.

YIELD – TO – MATURITY (YTM)

This is most widely used measure of return on fixed income securities. It may be defined as the income (promised) that the compounded rate of return will receive from a bond purchased at the current market and held to maturity. Computing YTM involves equating the current market price of bond with the discount value of future interest payments and the terminal principal repayment.

Example: 23

Assume that an investor purchased a 15% Rs. 500 fully secured non – convertible debenture at par five years ago. The current market price of the debenture is Rs. 400, which implies increase in market interest rates subsidy to the issue of the security. Five years remain to maturity and the debenture is repaid at par. What is required in this case is a value of YTM, which equates Rs. 400 with the sum of present values 75 per year for 5 years and of Rs.500 receivable at the end of the fifth year:

The yield – to maturity can be estimated as follows.

Solution

Several values of YTM can be tried till the equating value emerges. Trials can be started with the current with the next trial rate increased if the present value of the preceding trial exceeds the current market and vice versa. Thus, trying at 15%, the following present value of the right hand side cash flow is estimate.

$$PV_{15\%} = Rs.75 \text{ per annum x } PVIF_{a.\ yrs} + Rs.500 \text{ x } PVIF_{15\%\ 5\ years}$$

$$= Rs.75 \text{ x } 3.3522 + Rs.500 \text{ x } .4972 = Rs.251.42 + 248.60$$

$$= Rs.\ 500.08$$

Since the PV of Rs. 500.08 exceeds Rs. 400, a higher discount rate must be tried.

$$PV20\% = Rs.\ 75 \text{ x } 2.9906 + Rs.500 \text{ x}.8333$$

$$= Rs.\ 224.295 + Rs.200.95$$

$$= Rs.\ 425.245$$

Even the second trial has failed to equate the two values. Hence, you can go over to the third trial at, say

PV24% = Rs.75 x 2.7454 + Rs.500 x .3411

= Rs.205.91 + Rs.170.55

= Rs.376.46

The third trial has lowered the present value to Rs. 376.46, which is less than Rs. 400. Hence, the required must lie between 20% and 24%. The estimate can be obtained by interpolating, thus:

$$YTM = \frac{20\% + 425.245 - 400.00 \text{ x } (24\% - 20\%)}{425.245 - 346.46}$$

$$= \frac{20\% + 25.245 \text{ x } 4\%}{48.785}$$

= 20% + 2.07% = 22.07%

It may be noted that YTM calculation is similar to calculating the internal rate of return. Calculators and computers made these calculations extremely easy. You may further note that the YTM is just a promised yield and the investor cannot earn it unless the bond/debenture is held to maturity. And if you have to hold the security till you cannot, at the same time, sell it. Thus, there would be no trading. One significant implication of such a situation is that the investor simply buys and holds and assumes all intermediate cash flows in the form of interest principal repayments to be reinvested at YTM. In others, the YTM concept is a compound interest concept, i.e. the investor is earning interest – on – interest at YTM throughout the hold period till maturity. One should understand that intermediate cash flows are not reinvested at YTM. The realized yield actually earned will differ from the rate. The receipts are reinvested at different rates (interest being receivable semi – annually).

Coupon Interest Income (Rs.)	Assumed Reinvestment (%)	Interest on Interest income (Rs.)	Total return (Rs.)	Realized Return (%)
2000	0	0	2000	5.57
2000	5	1370	3370	7.51
2000	8	2751	4751	8.94
2000	9	3352	5352	9.46
2000	10	4040	6040[*]	10.00
2000	11	4830	6830	10.56
2000	12	5738	7738	11.14

Notes:

Vol.1: Coupon interest @ 10% on Rs.1000 received for 20 years semi – annually = Rs.50 x 40 periods = Rs. 2000 Interest on interest at the assumed reinvestment rate for 40 percent.

Vol. 3: Co.1 + Col.3 + Co.4

Vol. 4: Sum of an annuity of Rs. 50 for 40 periods at 5% semi – annual reinvestment rate is, thus, period annuity factor = 120.80 x 50 = Rs. 6040*

Vol. 5: Realized return = (Future value per rupee invested) $^{1/N-1}$

$$\text{Future value per rupee invested} = \frac{\text{Total return} + \text{cost of bond}}{\text{Cost of bond}}$$

The realized return is the compound return on semi – annual basis. For an annual basis, this figure must be doubled. The table above clearly demonstrate the critical nature of the reinvestment rate assumption of YTM. You many note that the realized return is equal to the YTM of 10% only when the reinvestment rate is 10%. At a repayment rate of zero (i.e., the investor consumes away all intermediate cash flows from the bond), interest – on – interest is zero and the realized return is a low 5.57%. In contrast, at a reinvestment rate of 12%, the interest – on – interest is Rs. 5738 (i.e. 5738 (i.e.5738/7738 = around 75% of total return) and the realized return is 11.14%.

Investors must make specific assumptions about re-investment rates in order to gain ideas about realized returns. Zero coupon bonds eliminate the reinvestment rate risk because investors know that at the time of purchase of YTM that will be realized when the bond is held to maturity.

$$\text{Approximate YTM} = \frac{\text{Coupon Interest} + MP_n - MP_t}{[MP_n - MP]/2}$$

Where MP_n is market price at if maturity and MP_t is market price (or cost) at the beginning.

Example: 24

Ravi is considering investing in a bond currently selling for Rs. 8785.07. The bond has four years to maturity, a Rs. 10,000 face value, and a 8 per cent coupon rate. The next annual interest payment is due one year from today, The approximate discount factor for investments of similar risk is 10%.

   (a) Calculate the intrinsic value of the bond. Based on this calculation, should Ravi purchase the bond?

   (b) Calculate the YTM of the bond. Based on this calculation, should Ravi purchase the bond?

Solution

   (i) The intrinsic value of a bond is equal to the discounted value of the cash flows. In this particular problems:

$$V = \text{Rs.}800/(1+10)^1 + \text{Rs.}800/(1+10)^2 + \text{Rs.}800/(1+10)^3 + \text{Rs.}10,800/(1+10)^4$$

$$= Rs.727.27 + Rs.66116 + Rs.\ 601.05 + Rs.\ 7,376.55$$

$$= Rs.\ 9,366.03$$

Because the bond is actually selling for Rs. 8,785.07, the bond is underpriced and Ravi should purchase it.

(ii) The YTM is the interest rate that equates the price of the bond to the discounted value of the bond's cash flows. In this particular problem:

Rs. $8785.07 = Rs.800/(1 + YTM)^1 + Rs.800/(1 + YTM)^2 + Rs.800/(1 + YTM)^3 + Rs.800/(1 + YTM)^4$

YRM = 12%

Because the YTM (12%) is greater than the appropriate discount rate (10%) for this bond, Ravi should purchase it.

DERIVATIVES

The term 'Derivative' stands for a contract whose price is derived from or is dependent upon an underlying asset. The underlying asset could be a financial asset such as currency, stock and market index, an interest bearing security or a physical commodity. Today, around the world, derivative contracts are traded on electricity, weather, temperature and even volatility. According to the Securities Contract Regulation Act, (1956) the term "derivative" includes:

(i) A security derived from a debt instrument, share, loan, whether secured or unsecured, risk instrument or contract for differences or any other form of security;

(ii) A contract which derives its value from the prices, or index of prices, of underlying securities.

The emergence of the market for derivative products, most notably forwards, futures and options, can be traced back to the willingness of risk-averse economic agents to guard themselves against uncertainties arising out of fluctuations in asset prices. By their very nature, the financial markets are marked by a very high degree of volatility. Through the use of derivative products, it is possible to partially or fully transfer price –risks by locking in asset prices. As instruments of risk management, these generally do not influence the fluctuations in the underlying asset prices. However, by locking –in asset prices, derivative products minimize the impact of fluctuations in asset prices on the profitability and cash flow situation of risk-averse investors.

Derivative products initially emerged, as hedging devices against fluctuations in commodity prices and commodity-linked derivatives remained the sole form of such products for almost three hundred years. The financial derivatives came into spotlight in post-1970

period due to growing instability in the financial markets. However, since their emergence, these products have become very popular and by 1990s, they accounted for about two-thirds of total transactions in derivative products. In recent years, the market for financial derivatives has grown tremendously both in terms of variety of instruments available, their complexity and also turnover. In the class of equity derivatives, futures and options on stock indices have gained more popularity than on individual stocks, especially among institutional investors, who are major users of index-linked derivatives.

Even small investors find these useful due to high correlation of the popular indices with various portfolios and ease of use. The lower costs associated with index derivatives vis-à-vis derivative products based on individual securities are another reason for their growing use.

The following factors have been driving the growth of financial derivatives:

1. Increased volatility in asset prices in financial markets.
2. Increased integration of national financial markets with the international markets.
3. Market improvement in communication facilities and sharp decline in their costs.
4. Development of more sophisticated risk management tools, providing economic agents a wider choice of risk management strategies, and
5. Innovations in the derivatives markets, which optimally combine the risks and returns over a large number of financial assets, leading to higher returns, reduced risk as well as transactions costs as compared to individual financial assets.

Derivative is a product whose value is derived from the value of one or more basic variables, called bases (underling asset, index or reference rate), in a contractual manner. The underlying asset can be equity, foreign exchange, commodity or any other asset. For example, wheat farmers may wish to sell their harvest at a future date to eliminate the risk of a change in prices by that date. Such a transaction is an example of a derivative. The price of this derivative is driven by the spot price of wheat which is the 'underlying'.

In the Indian context, the Securities Contracts (Regulation) Act, 1956 (SC(R) A) defines "equity derivative" to include:

A security derived from a debt instrument, share, loan whether secured or unsecured, risk instrument for contract for differences or any 0ther form of security.

A contract, which derives, its value from the prices, or index of prices, of underlying securities.

The derivatives are securities under the SC(R) A and thus the regulatory framework under the SC(R) A governs the trading of derivatives.

According to the author, derivatives can be define as:

Derivatives are those assets whose value is determined from the value of some underlying assets. The underlying asset may be equity, commodity or currency. The list of derivative assets is long.

Derivatives are the most modern financial instruments in hedging risk. The individuals and firms who wish to avoid or reduce risk can deal with the others who are willing to accept the risk for a price. A common place where such transactions take place is called the 'derivative market'. As the financial products commonly traded in the derivatives market are themselves not primary loans or securities, but can be used to change the risk characteristics of underlying asset or liability position, they are referred to as 'derivative financial instruments' or simply 'derivatives'. These instruments are so called because they derive their value from some underlying instrument and have no intrinsic value of their own. Forwards, futures, options, swaps, caps floor collar etc. are some of more commonly used derivatives. The world over, derivatives are a key part of the financial system.

CHARACTERISTICS OF DERIVATIVES

The important characteristics are as follows:

1. Derivatives possess a combination of novel characteristics not found in any form of assets.

2. It is comfortable to take a short position in derivatives than in other assets. An investor is said to have a short position in a derivatives product if he is obliged to deliver the underlying asset in specified future date.

3. Derivatives trade on exchanges are liquid and involves the lowest possible transaction costs.

4. Derivatives can be closely matched with specific portfolio requirements.

5. The margin requirements for exchange-traded derivatives are relatively low, reflecting the relatively low level of credit-risk associated with the derivatives.

6. Derivatives are traded globally having strong popularity in financial markets.

7. Derivatives maintain a close relationship between their values and the values of underlying assets; the change in value of underlying assets will have effect on based on them.

8. In a Treasury bond futures contract, the derivatives are straightforward.

CRITERIA FOR DERIVATIVES TRADING

In the derivatives market there be a two –level system of members viz., clearing members and non-clearing members. The clearing member takes the responsibility for

settlement of trades on behalf of the non-clearing member. Thus, the clearing member acts as a guarantor for the non-cleaning member. The clearing members shall have a minimum net worth of Rs.300 lakhs as per the SEBI's definition and shall made a deposit of Rs.50 lakhs with the Exchange/Clearing Corporation in the form of liquid assets such as cash. Fixed deposits pledged in the name of the exchange, or other securities.

DERIVATIVES MARKET IN INDIA

The most notable development concerning the secondary segment of the Indian capital market is the introduction of derivatives trading in June 2000. The Securities Exchange Board of India (SEBI) approved derivatives trading based on futures contracts at both BSE and NSE in accordance with the rules/bye laws and regulations of the stock exchanges. Both BSE and NSE have made a beginning with equity derivatives with the introduction of stock index futures.

Stock Index Futures contract allows for the buying and selling of the particular stock index for a specified price at a specified future date. Stock Index Futures, inter alia, help in overcoming the problem of asymmetries in information asymmetry is mainly a problem in individual stocks as it is unlikely that a trader has market-wide private information. As such, the asymmetric information component is not likely to be present in a basket of stocks. This provides another rationale for trading in underlying individual stocks comprising the index. While the BSE introduced Stock Index Futures for S&P CNX Nifty comprising of 50 scripts.

Stock Index Futures in India are available with one month, two month and three month maturities. While derivatives trading based on the Sensitive Index (Sensex) commenced at the BSE on June 9, 2000, derivatives trading based on S&P CNX Nifty commenced at the NSE on June 12, 2000. SIF is the first attempt in the development of derivatives of derivatives trading.

EXCHANGE – TRADED AND OVER-THE-COUNTER DERIVATIVE INSTRUMENTS

OTC (over-the-counter) contracts, such as forwards and swaps, are bilaterally negotiated between two parties. The terms of an OTC contract are flexible, and are often customized to fit the specific requirements of the user. OTC contracts have substantial credit risk, which is the risk that the counterparty that owes money defaults on the payment. In India, OTC derivatives are generally prohibited with some exceptions: those that are specifically allowed by the Reserve Bank of India (RBI) or, in the case of commodities (which are regulated by the Forward Markets Commission), those that trade informally in 'havala' or forward markets.

An exchange –traded contract, such as a futures contract, has a standardized format that specifies the underlying asset to be delivered, the size of the contract, and the logistics of delivery. They trade on organized exchanges with prices determined by the interaction of many buyers and sellers. In India, two exchanges offer derivatives trading: the Bombay Stock Exchange (BSE) and the National Stock Exchange (NSE). However, NSE now accounts for virtually all exchange-traded derivatives in India, accounting for more than 99% of volume in 2003-2004. Contract performance is guaranteed by a clearinghouse, which is a wholly owned subsidiary of the NSE. Margin requirements and daily marking-to-market of futures positions substantially reduce the credit risk of exchange-traded contracts, relative to OTC contracts.

DEVELOPMENT OF DERIVATIVE MARKETS IN INDIA

Derivatives markets have been in existence in India in some form or other for a long time. In the area of commodities, the Bombay Cotton Trade Association started futures trading in 1875 and, by the early 1900s India had one of the world's largest futures industry. In 1952, the government banned cash settlement and options trading and derivatives trading shifted to informal forwards markets. In recent years, government policy has changed, allowing for an increased role for market-based pricing and less suspicion of derivatives trading. The ban on futures trading of many commodities was lifted starting in the early 2000s, and national electronic commodity exchanges were created.

In the equity markets, a system of trading called 'badla' involving some elements of forwards trading had been in existence for decades. However, the system led to a number of undesirable practices and it was prohibited off and on till the Securities and Derivatives OUP.

Volatility is measured as the yearly standard deviation of the daily exchange rate series. Exchange Board of India(SEBI) banned if for god in 2001. A series of reforms of the stock market between 1993 and 1996 paved the way for the development of exchange-traded equity derivatives markets in India. In 1993, the government created the NSE in collaboration with state-owned financial institutions. NSE improved the efficiency and transparency of the stock markets by offering a fully automated screen-based trading system and real-time price dissemination. In 1995, a prohibition on trading options was lifted. In 1996, the NSE sent a proposal to SEBI for listing exchange-traded derivatives. The report of the L.C. Gupta Committee, set up by SEBI, recommended a phased introduction of derivative products, and bi-level regulation (i.e., self regulation by exchanges with SEBI providing a supervisory and advisory role). Another report, by the J.R. Verma Committee in 1998,worked out various operational details such as margining systems. In 1999, the Securities Contracts (Regulation) Act of 1956, or SC(R)A, was amended so that derivatives could be declared 'securities' . This

allowed the regulatory framework for trading securities to be extended to derivatives. The Act considers derivatives to be legal and valid, but only if they are traded on exchanges. Finally, a 30-year ban on forward trading was also lifted in 1999.

The economic liberalization of the early nineties facilitated the introduction of derivatives based on interest rates and foreign exchange. A system of market-determined exchange rates was adopted in India in March 1993. In August 1994, the rupee was made fully convertible on current account. These reforms allowed increased integration between domestic and international markets, and created a need to manage currency risk. The figure shows how the volatility of the exchange rate between the India rupee and the US dollar has increased since 1991. The easing of various restrictions on the free movement of interest rates resulted in the need to manage interest rate risk.

DEVELOPMENT AND REGULATION OF DERIVATIVE MARKETS IN INDIA

The SEBI Board in its meeting on June 24, 2002 considered some important issues relating to the derivative markets, including:

1. Physical settlement of stock options and stock futures contracts.
2. Review of the eligibility criteria of stocks on which derivative products are permitted.
3. Use of sub-brokers in the derivative markets.
4. Norms for use of derivatives by mutual funds.

The recommendations of the Advisory Committee on Derivatives on some of these issues were also placed before the SEBI Board. The Board desired that there issues be reconsidered by the Advisory Committee on Derivatives (ACD) and requested a detailed on the aforesaid issues for the consideration of the Board.

In the meantime, several other important issues like the issue of minimum contract size, the segregation of the cash and derivative segments of the exchange and the surveillance issues in the derivatives market were also placed before the ACD for its consideration.

The Advisory Committee, therefore, decided to take this opportunity to present a comprehensive report on the development and regulation of derivative markets including a review of the recommendations of the L.C.Gupta Committee (LCGC).

Four years have elapsed since the LCGC Report of March 1998. During this period there have been several significant changes in the structure of the Indian capital markets which include, dematerialization of shares, rolling settlement on a T+3 basis, client level and Value at Risk (VaR) based margining in both the derivative and cash markets and proposed demutualization of exchanges. Equity derivative markets have now been in existence for two years and the markets have grown in size and diversity of products. This, therefore, appears

to be an appropriate time for a comprehensive review of the development and regulation of derivative markets.

REGULATORY OBJECTIVES

It is inclined towards positive regulation designed to encourage healthy activity and behavior. It has been guided by the following objectives:

1. Investor Protection: Attention needs to be given to the following four aspects:

    a. Fairness and Transparency: The trading rules should ensure that trading is conducted in a fair and transparent manner. Experience in other countries shows that in many cases, derivatives brokers/ dealers failed to disclose potential risk to the clients. In this context, sales practices adopted by dealers for derivatives would require specific regulation. In some of the most widely reported mishaps in the derivatives market elsewhere, the underlying reason was inadequate internal control system at the user-firm itself, so that overall exposure was not controlled and the use of derivatives was for speculation rather than for risk hedging. These experiences provide useful lessons for us for designing regulations.

    b. Safeguard for clients' moneys: Moneys and securities deposited by clients with the trading members should not only be kept in a separate clients' account but should also not be attachable for meeting the brokers's own debts. It should be ensured that trading by dealers on own account is totally segregated from that for clients.

    c. Competent and honest service: The eligibility criteria for trading members should be designed to encourage competent and qualified personnel so that investors/clients are served well. This makes it necessary to prescribe qualification for derivatives brokers/dealers and the sales persons appointed by them in terms of a knowledge base.

    d. Market integrity: The trading system should ensure that the market's integrity is safeguarded by minimizing the possibility of defaults. This requires framing appropriate rules about capital adequacy, margins, clearing corporation, etc.

2. **Quality of markets**

The concept of "quality of markets" goes well beyond market integrity and aims at enhancing important market qualities, such as cost-efficiency, price-continuity, and price-discovery. This is a much broader objective than market integrity.

3. **Innovation**

While curbing any undesirable tendencies, the regulatory framework should not stifle innovation which is the source of all economic progress, more so because financial

derivatives represent a new rapidly developing area, aided by advancements in information technology.

HEDGING

The term 'hedging' is fairly clear. It would cover derivative market positions that are designed to offset the potential losses from existing cash market positions. Some examples of this are as follows:

An income fund has a large portfolio of bonds. This portfolio stands to make losses when interest rates go up. Hence, the fund may choose to short an interest rate futures product in order to offset this loss.

1. An income fund has a large portfolio of corporate bonds. This portfolio stands to make losses when credit spreads of these bonds degrade or when defaults take place. Hence, the fund may choose to buy credit derivatives, which pay when these events happen.

2. Every equity portfolio has exposure to the market index. Hence, the fund may choose to sell index futures, or buy index put options, in order to reduce the losses that would take place in the event that the market index drops.

The regulatory concerns are about (a) the effectiveness of the hedge and (b) its size.

'Hedging' a Rs. 1 billion equity portfolio with an average beta of 1.1 with a Rs. 1.3 billion short position in index futures is not an acceptable hedge because the over hedged position is equivalent to a naked short potion in the future of Rs. 0.2 billion. Similarly, 'hedging' a diversified equity portfolio with an equal short position in a narrow sectoral index would not be accepted because of the concern on effectiveness. A hedge of only that part of the portfolio that is invested in stocks belonging to the same sector of the sectoral index by an equal short position in the sectoral index futures would be accepted.

'Hedging' an investment in a stock with a short position in another stocks' futures is not an acceptable hedge because of effectiveness concerns. This would be true even for merger arbitrage where long and short positions in two merging companies are combined to benefit from deviation of market prices from the swap ratio.

Hedging with options would be regarded as over-hedging if the notional value of the hedge exceeds the underlying position of the fund even if the option delta is less than the underlying position. For example, a Rs. 2 billion index put purchased at the money is not an acceptable hedge of a Rs. 1 billion, beta = 1.1 fund, though the option delta of approximately Rs. 1 billion is less than the underlying exposure of the fund of Rs. 1.1 billion.

Covered call writing is hedging if the effectiveness and size conditions are met. Again the size of the hedge in terms of notional value and not option delta must not exceed the underlying portfolio.

The position is more complicated if the option position includes long calls or short puts. The worst-case short exposure considering all possible expiration prices should meet the size condition.

PORTFOLIO REBALANCING

The use of derivatives for portfolio rebalancing covers situations where a particular desired portfolio position can be achieved more efficiently or a lower cost using derivatives rather than cash market transactions. The basic idea is that the mutual fund has a fiduciary to its unit holders to buy assets at the best possible price.

Thus if it cheaper (after adjusting for cost of carry) to buy a stock future rather than the stock itself, the fund does have a fiduciary obligation to use stock futures unless there are other tangible or intangible disadvantages to using derivatives. Similarly, if a synthetic money market position created using calendar spreads is more attractive than a direct money market position created using calendar spreads is more attractive than a direct money market position (after adjusting for the credit worthiness of the clearing corporation), the fund would normally have a fiduciary obligation to use the calendar spread. If a fund can improve upon a buy-and –hold strategy by selling a stock or an index portfolio today, investing the proceeds in the money market, and having a locked-in price to buy it back at a future date, then it would have a fiduciary obligation to do so.

DERIVATIVE PRODUCTS

Derivative is a product/contract that does not have any value on its own i.e. it derives its value from some underlying.

Forward contracts

1. A forward contract is one to one bi-partite contract, to be performed in the future, at the terms decided today.
2. (E.g. forward currency market in India).
3. Forward contracts offer tremendous flexibility to the parties to design the contract in terms of the price, quantity, quality (in case of commodities), delivery time and place.
4. Forward contracts suffer from poor liquidity and default risk.

Future contracts

1. Future contracts are organized /standardized contracts, which are traded on the exchanges.

2. These contracts, being standardized and traded on the exchanges are very liquid in nature.

3. In futures market, clearing corporation/house provides the settlement guarantee.

Every futures contract is a forward contract. They:

1. are entered into through exchange, traded on exchange and clearing corporation/house provides the settlement guarantee for trades.

2. are of standard quantity; standard quality (in case of commodities).

3. have standard delivery time and place.

Forward/Future Contracts

Features	Forward Contract	Future Contract
Operational Mechanism	Not traded on exchange	Traded on exchange
Contract Specifications	Differs from trade to trade	Contracts are standardized contracts
Counterparty Risk	Exists	Exists, but assumed by Clearing Corporation/house
Liquidation Profile	Poor liquidity as contracts are tailor-made contracts	Very high Liquidity as contracts are standardized contracts
Price Discovery	Poor; as markets are fragmented	Better; as fragmented markets are brought to the common platform

OPTIONS

Options are instruments whereby the right is given by the option seller to the option buyer to buy or sell a specific price on or before a specific date.

1. Option Seller? One who gives/writes the option. He has an obligation to perform, in case option buyer desires to exercise his option.

2. Option Buyer? One who buys the options. He has the right to exercise the option but no obligation.

3. Call Option? Option to buy.

4. Put Option? Option to sell.

5. American Option? An option that can be exercised any time on or before the expiry date.

6. European Option? An option that can be exercised only on expiry date.

7. Strike Price/ Exercise Price? Price at which the option is to be exercised.

8. Expiration Date? Date on which the option expires.

9. Exercise Date? Date on which the option gets exercised by the option holder/buyer.

10. Option Premium? The price paid by the option buyer to the option seller for granting the option.

INTRODUCTION OF FUTURES IN INDIA

1. The first derivative product to be introduced in the Indian securities market is going to be "INDEX FUTURES".

2. In the world, first index futures were traded in the U.S. on Kansas City Board of Trade (KCBT) on Value Line Arithmetic Index (VLAI) in 1982.

Index Futures

1. Index futures are the future contracts for which underlying is the cash market index.

2. For example: BSE may launch a future contract on " BSE Sensitive Index" and NSE may launch a future contract on "S&P CNX NIFTY"

FREQUENTLY USED TERMS IN INDEX FUTURES MARKET

1. **Contract Size:** The value of the contract at a specified level of index. IT is index level * multiplier.

2. **Multiplier:** It is a predetermined value, used to arrive at the contract size. It is the price per index point.

3. **Tick Size:** It is the minimum price difference between two quotes of similar nature.

4. **Contract Month:** The month in which the contract will expire.

5. **Expiry Day:** The last day on which the contract is available for trading.

6. **Open interest:** Total outstanding long or short positions in the market at any specific point in time. As total long positions for market would be equal to total short positions, for calculation of open interest, only one side of the contracts is counted.

7. **Long position:** Outstanding/ unsettled purchase position at any point of time.

8. **Short position:** Outstanding/ unsettled sales position at any point of time.

9. **Open position:** Outstanding/ unsettled long or short position at any point of time.

10. **Physical delivery:** Open position at the expiry of the contract is settled through delivery of the underlying. In futures market, delivery is low.

11. **Cash settlement:** Open position at the expiry of the contract is settled in cash. These contracts are designated as cash settled contracts. Index Futures fall in this category.

12. **Alternative Delivery Procedure (ADP):** Open position at the expiry of the contract is settled by two parties, one buyer and one seller, at the terms other than defined by the exchange. Worldwide, a significant portion of the energy and energy- related contracts (crude oil, heating and gasoline oil) are settled through Alternative Delivery Procedure.

Concept of Basis in Futures Market

1. Basis is defined as the difference between cash and futures prices:

2. Basis = Cash prices – Future prices.

3. Basis can be either positive or negative (in index futures, basis generally is negative).

4. Basis may change its sign several times during the life of the contract.

5. Basis turns to zero at maturity of the futures contract i.e. both cash and future prices converge at maturity.
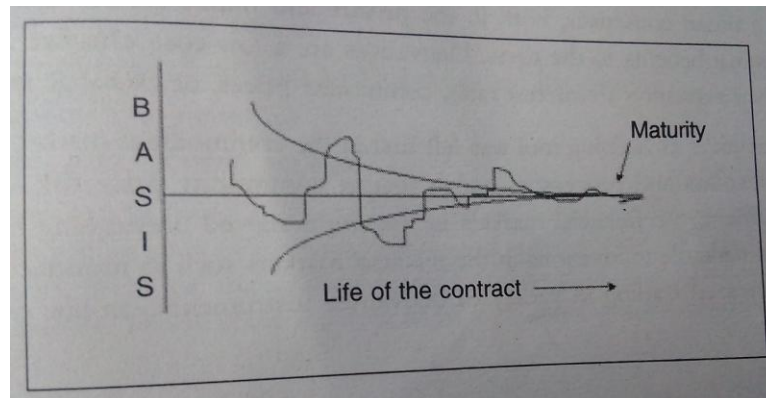

Fig. 2.1 Life of the Contract

Operators in the Derivatives Market

Hedgers: Operators, who want to transfer for a risk component of their portfolio.

Speculators: Operators, who intentionally take the risk from hedgers in pursuit of profit.

Arbitrageurs: Operators who operate in the different markets simultaneously, in pursuit of profit and eliminate mispricing.

Pricing Futures

Cost and carry model of futures pricing:

Fair price = Spot price + Cost of carry – Inflows

1. FP_{tT} = $CP_t + CP_t * (R_{tT} - D_{tT}) * (T - t)/365$

2. FP_{tT} - Fair price of the asset at time t for time T.

3. CP_t - Cash price of the asset.

4. R_{tT} -   Interest Rate at time t for the period upto T

5. D_{tT} - Inflows in terms of dividend or interest between t and T.

6. Cost of carry = financing cost, storage cost and insurance cost.

7. If future price > fair price; buy in the cash and simultaneously sell in the futures market.

8. If future price < fair price; sell in the cash and simultaneously buy in the futures market.

   This arbitrage between sash and futures markets will remain till prices in the sash and future markets get aligned.

Set of assumptions

1. No seasonal demand and supply in the underlying asset.

2. Storability of the underlying asset is not a problem.

3. The underlying asset can be sold short.

4. No transaction cost; no taxes.

5. No margin requirements, and so the analysis relates to a forward contract, rather than a futures contract.

MYTHS AND REALITIES ABOUT DERIVATIVES

Derivatives increase speculation and do not serve any economic purpose. Numerous studies of derivatives activity have led to a broad consensus, both in the private and public sectors that derivatives provide numerous and substantial benefits to the users. Derivatives are a low-cost, effective method for users to hedge and manage their exposures to interest rates, commodity prices, or exchange rates.

The need for derivatives as hedging tool was felt first in the commodities market. Agricultural futures and option helped farmers and processors hedge against commodity price risk. After the fallout of Bretton Woods Agreement, the financial markets in the world started undergoing radical changes. This period is market by remarkable innovations in the financial markets such as introduction of floating rates for the currencies, increased trading in variety of derivatives instruments, on-line trading in the capital markets, etc. As the complexity of instruments increased manifold, the accompanying risk factors grew in gigantic proportions. This situation led to development derivatives as effective risk management tools for the market participants.

Looking at the equity market, derivatives allow corporations and institutional investors to effectively manage their portfolios of assets and liabilities through instruments like stock index futures and options. An equity fund, for example, can reduce its exposure to the stock market quickly and at a relatively low cost without selling off part of its equity assets by using stock index futures or index options.

By proving investors and issuers with a wider array of tools for managing risks and raising capital, derivatives improve the allocation of credit and the sharing of risk in the global economy, lowering the cost of capital formation and stimulating economic growth. Now that global markets for trade and finance have become more integrated, derivatives have strengthened these important linkages between global markets, increasing market liquidity and efficiency and facilitating the flow of trade and finance.

INDIAN MARKET IS NOT READY FOR DERIVATIVE TRADING

Often the argument put forth against derivatives trading is that the Indian capital market is not ready for derivative trading. Here, we look into the prerequisites, which are needed for the introduction of derivatives and how Indian market fares:

1. Large market capitalization: India is one of the largest market-capitalized countries in Asia with a market capitalization of more than Rs. 765,000 crores.

2. High liquidity in the underlying: The daily average traded volume in Indian capital market today is around Rs,7500 crores. Which means on an average every month 14% of the country's market capitalization gets traded. These are clear indicators of high liquidity in the underlying.

3. Trade guarantee: The first clearing corporation guaranteeing trades have become fully functional from July 1996 in the form of National Securities Clearing Corporation limited (NSCCL). NSCCL is responsible for guaranteeing all open positions on the National Stock Exchange (NSE) for which it does the clearing.

4. A Strong Depository: National Securities Depositories Limited (NSDL), which started functioning in the year 1997 has revolutionized the security settlement in out country.

5. A Good Legal Guardian: In the Institution of SEBI (Securities and Exchange Board of India) today, the Indian capital market enjoys a strong, independent, and innovative legal guardian who is helping the market to evolve to a healthier place for trade practices.

Disasters prove that derivatives are very risky and highly leveraged instruments: Disasters can take place in any stream. The 1992 security scam is a case in point. Disasters are not necessarily due to dealing in derivatives, but derivatives make headlines. Some of the reasons behind disasters related to derivatives are:

a) Lack of independence risk management.
b) Improper internal control mechanisms.
c) Problems in external monitoring done by Exchanges and Regulators.
d) Trader taking unauthorized positions.
e) Lack of transparency in the entire process.

Derivatives are complex and exotic instruments that India investors will have difficulty in understanding. Trading in standard derivatives such as forwards, futures and options is already prevalent in India and has a long history. The Reserve Bank of India allows forward trading in rupee-dollar forward contracts, which has become a liquid market. The Reserve Bank of India also allows cross-currency options trading.

The Forward Markets Commission has allowed trading in commodity forwards on commodities exchanges, which are called futures in international markets. Commodities futures in India are available in turmeric, black pepper, coffee, gur (jaggery), hessian, castor seed oil etc. There are plans to set up commodities futures exchanges in soya bean oil as also in cotton. International markets have also been allowed (dollar-denominated contracts) in certain commodities. The Reserve Bank of India also allows the users to hedge their portfolios through derivatives exchanges aboard. Detailed guidelines have been prescribed by the RBI for the purpose of getting approvals to hedge the user's exposure in international markets.

Derivatives in commodities markets have a long history. The first commodity futures exchange was set up in 1875 in Mumbai under the aegis of Bombay Cotton Traders Association (Dr. A. S. Naik, 1968, Chairman, Forwards Markets Commission, India, 1963-68). A clearinghouse for clearing and settlement of these trades was set up in 1918. In oilseeds, a futures market was established in 1900. Wheat futures market began in Hapur in 1913. Futures market in raw jute was set up in Calcutta in 1912. Bullion futures market was set up in Mumbai in 1920.

History and existence of markets along with setting up of new markets prove that the concept of derivatives is not alien to India. In commodity markets, there is no resistance from the users or market participants to trade in commodity futures or foreign exchange markets. The Government of India has also been facilitating the setting up and operations of these markets in India by providing approvals and defining appropriate regulatory frameworks for their operations.

Approval for new exchanges in last six months by the Government of India also indicates that the Government of India does not consider this type of trading to be harmful, albeit within proper regulatory frameworks for their operations.

This amply proves that the concept of options and futures has been well-integrated in the Indian equities market for a long time and is not alien as it is made out to be. Even today, complex strategies of options are being traded in many exchanges which are called teji-mandi, jota-phatak,bhav-bhav at different places in India(Vohra and Bagari,1998). In that sense, the derivatives are not new to India and are also currently prevalent in various markets including equities markets.

THE EXISTING CAPITAL MARKET IS SAFER THAN DERIVATIVES

The world over, the spot markets in equities are operated on a principle of rolling settlement. In this kind of trading, if you trade on a particular day(T), you have to settle these trades on the third working day from the date of trading (T+3).

Futures market allow you to trade for a period of say month or 3 months and allow you to net the transaction taken place during the period for the settlement at the end of the period. In India, most of the stock exchanges allow the participants to trade during one-week period for settlement in the following week. The trades are netted for the settlement for the entire one-week period. In that sense, the Indian markets are already operation the futures style settlement rather than cash markets prevalent internationally.

In this system, additionally, many exchanges also allow the forward trading called badla in Gujarati and Contango in English, which was prevalent in the UK. This system is prevalent currently in France in their monthly settlement markets. It allowed one to even further increase the time to settle for almost 3 months under the earlier regulations. This way, a curious mix of futures style settlement with facility to carry the settlement obligations forward creates discrepancies.

The more efficient way from the regulatory perspective will be to separate out the derivatives from the cash market i.e. introduce rolling settlement in all exchanges and at the same time allow futures and options to trade. This way, the regulators will also be able to regulated both the markets easily and it will provide more flexibility to the market participants.

In addition, the existing system, although futures style, does not ask for any margins from the clients. Given the volatility of the equities market in India, this system has become quite prone to systemic collapse. This was evident in the MS Shoes scandal. At the time of default taking place on the BSE, the defaulting member of the BSE, Mr. Zaveri has a position close to Rs. 18 crores. However, due to the default, BSE had to stop trading for a period of three days. At the same time, the Barings Bank failed on the Singapore Monetary Exchange (SIMEX) for the exposure of more than Us $ 20 billion (more than Rs. 84,000 crores) with a loss of approximately US $ 900 million (around Rs. 3800 crores). Although, the exposure was so high and even the loss was very big compared to the total exposure on MS Shoes for BSE of Rs 18 crores , the SIMEX has taken so much margins that they did not stop trading for a single minute.

CAPITAL ASSET PRICING MODEL (CAPM)

The capital asset pricing model was developed in mid – 1960s by three researchers William Sharpe, John Linter and Jan Mossin independently. Consequently, the model is often referred to as Sharpe – Linter – Mossin Capital Asset Pricing Model.

The capital asset pricing model for or CAPM is really an extension of the portfolio theory of Markowitz. The portfolio theory is a description of how rational investors should build efficient portfolios and select the optimal portfolio. The capital asset pricing model derives the relationship between the expected return and risk of individual securities and portfolios in the capital markets if everyone behaved in the way the portfolio theory suggested.

Let us, therefore, begin by summarising the fundamental notions of portfolio theory.

FUNDAMENTALS NOTIONS OF PORTFOLIO THEORY

Return and risk are two important characteristics of every investment. Investors base their investment decision on the expected return and risk of investment. Risk is measured by the variability in returns.

Investors attempt to reduce the variability of returns through diversification of investment. This results in the creation of a portfolio. With a given set of securities, any number of portfolios may be created by altering the proportion of funds invested in each security. Among these portfolios some dominate others, or some are more efficient than the vast majority of portfolios because of lower risk or higher returns. Investors identify this efficient set of portfolios.

Diversification helps to reduce risk, but even a well diversified portfolio does not become risk free. If we construct portfolio including all the securities in the stock market, that would be the most diversified portfolio. Even such a portfolio would be subject to considerable variability. This variability is undiversifiable and is known as the market risk or systematic risk because it affects all the securities in the market.

The real risk of a security is the market risk which cannot be eliminated through diversification. This is indicated by the sensitivity of a security to the movements of the market and is measured by the beta coefficient of the security.

A rational investor would expect the return on a security to be commensurate with its risk. The higher the risk of a security, the higher would be the return expected from it. And since the relevant risk of a security is its market risk or systematic risk, the return is expected to be correlated with this risk only. The capital asset pricing model gives the nature of the relationship between the expected return and the systematic risk of a security.

ASSUMPTIONS OF CAPM

The capital asset pricing model is based on certain explicit assumptions regarding the behaviour of investors. The assumptions are listed below:

1. Investors make their investment decisions on the basis of risk – return assessments measured in terms of expected returns and standard deviation of returns.

2. The purchase or sale of a security can be undertaken in infinitely divisible units.

3. Purchases and sales by a single investor cannot affect prices. This means that there is perfect competition where investors in total determine prices by their actions.

4. There are no transactions costs. Given the fact that transaction costs are small, they are probably of minor importance in investment decision – making, and hence they are ignored.

5. There are no personal income taxes. Alternatively, the tax rates on dividend income and capital gains are the same, thereby making the investor indifferent to the form in which the return on the investment is received (dividends or capital gains).

6. The investor can lend or borrow any amount of funds desired at a rate of interest equal to the rate for riskless securities.

7. The investor can sell short any amount of any shares.

8. Investors share homogeneity of expectations. This implies that investors have identical expectations with regard to the decision period and decision inputs. Investors are presumed to have identical holding periods and also identical expectations regarding expected returns, variances of expected returns and covariances of all pairs of securities.

It is true that many of the above assumptions are untenable. However, they do not materially alter the real world. Moreover, the model describes the risk return relationship and the pricing of assets fairly well.

EFFICIENT FRONTIER WITH RISKLESS LENDING AND BORROWING

The portfolio theory deals with portfolios of risky assets. According to the theory, an investor faces an efficient frontier containing the set of efficient portfolios of risky assets. Now it is assumed that there exists a riskless asset available for investment. A riskless asset in one whose return is certain such as a government security. Since the return is certain, the variability of return or risk is zero. The investor can invest a portion of his funds in the riskless asset which would be equivalent to lending at the risk free asset's rate of return, namely R_f. He would then be investing in a combination of risk free asset and risky assets.

Similarly, it may be assumed that an investor may borrow at the same risk free rate for the purpose of investing in a portfolio of risky assets. He would then be using his own funds as well as some borrowed funds for investment.

The efficient frontier arising from a feasible set of portfolios of risky assets is concave in shape. When an investor is assumed to use riskless lending and borrowing in his investment activity the shape of the efficient frontier transforms into a straight line. Let us see how this happens.

Consider Fig. 2.2. The concave curve ABC represents an efficient frontier of risky portfolios. B is the optimal portfolio in the efficient frontier with $R_p = 15$ per cent and $\sigma_P = 8$ per cent. A risk free asset with rate of return $R_f = 7$ per cent is available for investment. The risk or standard deviation of this asset would be zero because it is a riskless asset. Hence, it would be plotted on the y axis. The investor may lend a part of his money at the riskless rate, i.e. invest in the risk free asset and invest the remaining portion of his funds in a risky portfolio.
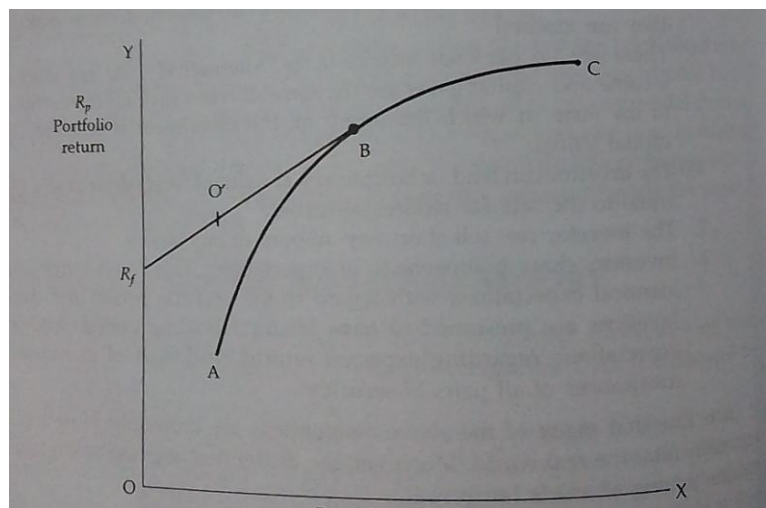

Fig. 2.2 Efficient frontier with introduction of lending

If an investor places 40 per cent of his funds in the risk free asset and the remaining 60 per cent in portfolio B, the return and risk of this combined portfolio O' may be calculated using the formulas.

Return

$$R_c = wR_m + (1 - w) R_f$$

Where

$R_c =$ Expected return on the combined portfolio.

w = Proportion of funds invested in risky portfolio.

(1 – w) = Proportion of funds invested in riskless asset.

R_m = Expected return on risky portfolio.

$R_{f\,=}$ Rate of return on riskless asset.

Risk

$$\sigma_p = w\sigma_m + (1-w)\,\sigma_f$$

Where

σ_p = Standard deviation of the combined portfolio.

w = Proportion of funds invested in risky portfolio.

σ_m = Standard deviation of risky portfolio.

σ_f = Standard deviation of riskless asset.

The second term on the right hand side of the equation, $(1-w)\,\sigma_f$ would be zero as σ_f= zero. Hence, the formula may be reduced as

$$\sigma_c = w\,\sigma_m$$

The return and risk of the combined portfolio in our illustration is worked out below:

$$R_c = (0.60)\,(15) + (0.40)\,(7)$$

$$= 11 \text{ per cent}$$

$$\sigma_c = (0.60)\,(8) = 4.8 \text{ per cent}$$

Both return and risk are lower than those of the risky portfolio B.

If we change the proportion of investment in the risky portfolio to 75 per cent, the return and risk of the combined portfolio may be calculated as shown below:

$$R_c = (0.75)\,(15) + (0.25)\,(7)$$

$$= 13 \text{ per cent}$$

$$\sigma_c = (0.75)\,(8) = 6 \text{ per cent}$$

Here again, both return and risk are lower than those of the risky portfolio B.

Similarly, the return and risk of all possible combinations of the riskless asset and the risky portfolio B may be worked out. All these points will lie in the straight line from R_f to B in Fig.2.1.

Now, let us consider borrowing funds by the investor for investing in the risky portfolio an amount which is larger than his own funds.

If w is the proportion of investor's funds invested in the risky portfolio, then we can envisage three situations. If w = 1, the investors' funds are fully committed to the risky portfolio. If w < 1, only a fraction of the funds is invested in the risky portfolio and the remainder is lend at the risk free rate. If w >1, it means the investor is borrowing at the risk free rate and investing an amount larger than his own funds in the risky portfolio.

The return and risk of such a levered portfolio can be calculated as follows:

$$R_L = wR_m + (w - 1) R_f$$

Where

$R_{L=}$ Return on the levered portfolio

w = Proportion of investors' funds invested in the risky portfolio.

R_m = Return on the risky portfolio.

$R_{f=}$ The risk free borrowing rate which would be the same as the risk free lending

rate, namely the return on the riskless asset.

The first term of the equation represents the gross return earned by investing the borrowed funds as well as investors' own funds in the risky portfolio. The second term of the equation represents the cost of borrowing funds which is deducted from the gross returns to obtain the net return on the levered portfolio.

The risk of the levered portfolio can be calculated as:

$$\sigma_L = w \, \sigma_m$$

The return and risk of the investor in our illustration may be calculated assuming w= 1.25.

$$R_L = (1.25) (15) + (0.25) (7)$$
$$= 17 \text{ per cent}$$
$$\sigma_L = (1.25) (8) = 10 \text{ per cent}$$

The return and risk of the levered portfolio are larger than those of the risky portfolio. The levered portfolio would give increased returns with increased risk. The return and risk of all levered portfolios would lie in a straight line to the right of the risky portfolio B. This is depicted in Fig. 2.3
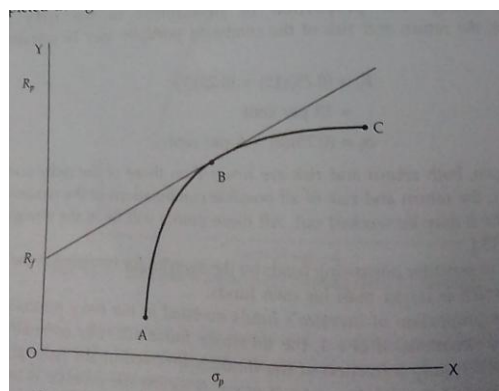

Fig. 2.3 Efficient frontier with introduction of lending

Thus, the introduction of borrowing and lending gives us an efficient frontier that is a straight line throughout. This line sets out all the alternative combinations of the risky portfolio B with risk free borrowing and lending.

The line segment from R_f to B includes all the combinations of the risky portfolio and the risk free asset. The line segment beyond point B represents all the levered portfolios (that is combinations of the risky portfolio with borrowing). Borrowing increases both the expected return and the risk, while lending (that is, combining the risky portfolio with risk free asset) reduces the expected return and risk. Thus, the investor can use borrowing or lending to attain the desired risk level. Those investors with a high risk aversion will prefer to lend and thus, hold a combination of risky assets and the risk free asset. Others with less risk aversion will borrow and invest more in the risky portfolio.

THE CAPITAL MARKET LINE

All investors are assumed to have identical (homogeneous) expectations. Hence, all of them will face the same efficient frontier depicted in Fig. 2.3. Every investor will seek to combine the same risky portfolio B with different levels of lending or borrowing according to his desired level of risk. Because all investors hold the same risky portfolio, then it will include all risky securities in the market. This portfolio of all risky securities is referred to as the market portfolio M. Each security will be held in the proportion which the market value of the security bears to the total market value of all risky securities in the market. All investors will hold combinations of only two assets, the market portfolio and a riskless security.

All these combinations will lie along the straight line representing the efficient frontier. This line formed by the action of all investors mixing the market portfolio with the risk free asset is known as the capital market line (CML). All efficient portfolios of all investors will lie along this capital market line.

The relationship between the return and risk of any efficient portfolio on the capital market line can be expressed in the form of the following equation.

$$\overline{R}_e = R_f + \left[\frac{\overline{R}_e - R_f}{\sigma_m} \right] \sigma_e$$

Where the subscript e denotes an efficient portfolio.

The risk free return R_f represents the reward for waiting. It is, in other words, the price of time. The term $[(Rm - Rf/\sigma_m]$ represents the price of risk or risk premium, i.e. the excess return earned per unit of risk or standard deviation. It measures the additional return for an additional unit of risk. When the risk of the efficient portfolio, σ_e, is multiplied with this term, we get the risk premium available for the particular efficient portfolio under consideration.

Thus, the expected return on an efficient portfolio is :

(Expected return) = (Price of time) + (Price of risk) (Amount of risk)

The CML provides a risk return relationship and a measure of risk for efficient portfolios. The appropriate measure of risk for an efficient portfolio is the standard deviation of return of the portfolio. There is a linear relationship between the risk as measured by the standard deviation and the expected return for these efficient portfolios.

THE SECURITY MARKET LINE

The CML shows the risk – return relationship for all efficient portfolios. They would all lie along the capital market line. All portfolios other than the efficient ones will lie below the capital market line. The CML does not describe the risk – return relationship of inefficient portfolios or of individual securities. The capital asset pricing model specifies the relationship between expected return and risk for all securities and all portfolios, whether efficient or inefficient.

We have seen earlier that the total risk of a security as measured by standard deviation is compared of two components: systematic risk and unsystematic risk or diversifiable risk. As investment is diversified and more and more securities are added to a portfolio, the unsystematic risk is reduced. For a very well diversified portfolio, unsystematic risk trends to become zero and the only relevant risk is systematic risk measured by beta (β). Hence, it is argued that the correct measure of a security's risk is beta.

It follows that the expected return of a security or of a portfolio should be related to the risk of that security or portfolios as measured by β. Beta is a measure of the security's sensitivity to change in market return. Beta value greater than one indicates higher sensitivity to market changes, whereas beta value less than one indicates lower sensitivity to market changes. A β value of one indicates that the security moves at the same rate and in the same direction as the market. Thus, the β of the market may be taken as one.

The relationship between expected return and β of a security can be determined graphically. Let us consider and XY graph where expected returns are plotted on the Y axis and beta coefficients are plotted on the X axis. A risk free asset has an expected return equivalent to R_f and beta coefficient of zero. The market portfolio M has a beta coefficient of one and expected return equivalent $\overline{R}_m$. A straight line joining these two points is known as the security market line (SML). This is illustrated in Fig. 2.4

The security market line provides the relationship between the expected return and beta of a security or portfolio. This relationship can be expressed in the form of the following equation:

$$\overline{R}_m - R_f + \beta_i (\overline{R}_m - R_f)$$

A part of the return on any security or portfolio is a reward for bearing risk and the rest is the reward for waiting, representing the time value of money. The risk free rate, R_f (which is earned by a security which has no risk) is the reward for waiting. The reward for bearing risk is the risk premium. The risk premium of a security is directly proportional to the risk as measured by β. The risk premium of a security is calculated as the product of beta and the risk premium of the market which is the excess of expected market return over the risk free return, that is, $[\overline{R}_m - R_f]$. Thus,

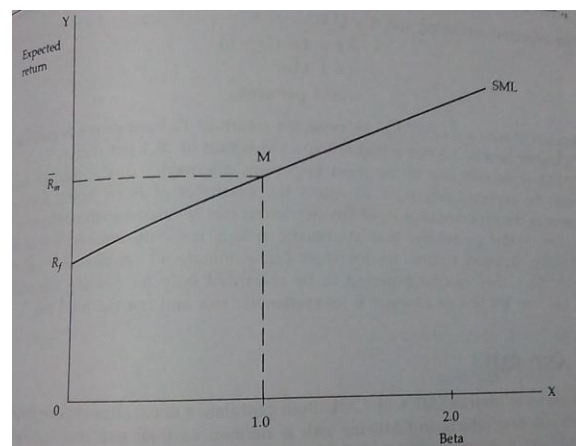Expected return on a security = Risk free return + (Beta x Risk premium of market)

Fig. 2.4 Security Market Line

CAPM

The relationship between risk and return established by the security market line in known as the capital asset pricing model. It is basically a simple linear relationship. The higher the value of beta, higher would be the risk of the security and therefore, larger would be the return expected by the investors. In other words, all securities are expected to yield returns commensurate with their riskiness as measured by β. This relationship is valid not only for individual securities, but it also valid for all portfolios whether efficient or inefficient.

The expected return on any security or portfolio can be determined from the CAPM formula if we know the beta of that security or portfolio. To illustrate the application of the CAPM, let us consider a simple example. There are two securities P and Q having values of beta as 0.7 and 1.6 respectively. The risk free rate is assumed to be 6 per cent and the market return is expected to be 15 per cent, thus providing a market risk premium of 9 per cent (i.e. $\overline{R}_m - R_f$).

The expected return on security P may be worked out as shown below:

$$\overline{R}_m = R_f + \beta_i [\overline{R}_m - R_f)$$

$$= 6 + 0.7\,(15 - 6)$$

$$= 6 + 6.3 = 12.3 \text{ per cent}$$

The expected return on security Q is

$$\overline{R}_m = 6 + 1.6\,(15 - 6)$$

$$= 6 + 14.4$$

$$= 20.4 \text{ per cent}$$

Security P with a β of 0.7 has an expected return of 12.3 per cent whereas security Q with a higher beta of 1.6 has a higher expected return of 20.4 per cent.

CAPM represents one of the most important discoveries in the field of fiancé. It describes the expected return for all assets and portfolios of assets in the economy. The difference in the expected returns of any two assets can be related to the difference in their betas. The model postulates that systematic risk is the only important ingredient in determining expected return. As investors can eliminate all unsystematic risk through diversification, they can be expected to be rewarded only for bearing systematic risk. Thus, the relevant risk of an asset is its systematic risk and not the total risk.

SML AND CML

It is necessary to contrast SML with CML. Both postulate a linear (straight line) relationship between risk and return. In CML the risk is defined as total risk and is measured by standard deviation, while in SML the risk is defined as systematic risk and is measured by β. Capital market line is valid only for efficient portfolios while security market line is valid for all portfolios and all individual securities as well. CML is the basis of the capital market theory while SML is the basis of the capital asset pricing model.

PRICING OF SECURITIES WITH CAPM

The capital asset pricing model can also be used for evaluating the pricing of securities. The CAPM provides a framework for assessing whether a security is underpriced, overpriced or correctly priced. According to CAPM, each security is expected to provide a return commensurate with its level of risk. A security may be offering more returns than the expected return, making it more attractive. On the contrary, another security may be offering less return than the expected return, making it less attractive.

The expected return on a security can be calculating using the CAPM formula. Let us designate it as the theoretical return. The real rate of return estimated to be realsied from investing in a security can be calculated by the following formula.

$$R_i = \frac{(P_1 - P_0) + D_1}{P_0}$$

Where

P$_0$ = Current market price.

P$_1$ = Estimated market price after one year

D$_1$ = Anticipated dividend for the year.

This may be designated as the estimated return.

The CAPM framework for evaluation of pricing of securities can be illustrated with Fig. 2.5
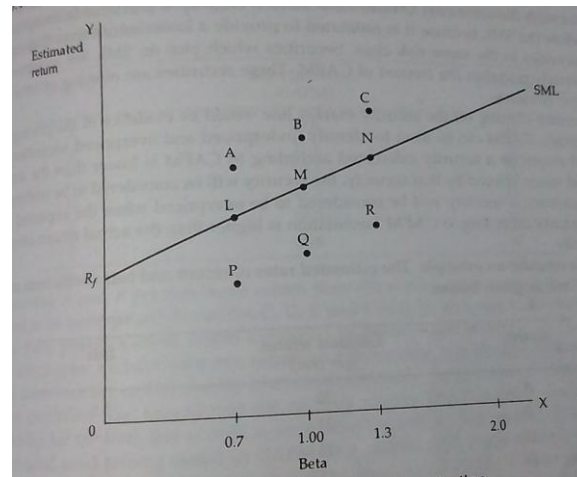

Fig. 2.5 CAPM and Security Valuation

Fig. 2.5 shows the security market line. Beta values are plotted on the X axis, while estimated returns are plotted on the Y axis. Nine securities are plotted on the graph according to their beta values and estimated return values.

Securities A, L and P are in the same risk class having an identical beta value of 0.7. The security market line shows the expected return for each level of risk. Security L plots on the SML indicating that the estimated return and expected return on security L is identical. Security A plots above the SML indicating that its estimated return is higher than its theoretical return. It is offering higher return than what is commensurate with its risk. Hence, it is attractive and is presumed to be underpriced. Stock P which plots below the SML has an estimated return which is lower than its theoretical or expected return. This makes it undesirable. The security may be considered to be overpriced.

Securities B, M and Q constitute a set of securities in the same risk class. Security B may be assumed to be underpriced because it offers more return than expected, while security Q may be assumed to be overpriced as it offers lower return than that expected on the basis of its risk. Security M can be considered to be correctly priced as it provides a return commensurate with its risk.

Securities C,N and R constitute another set of securities belonging to the same risk class, each having a beta value of 1.3. It can be seen that security C is underpriced, security R is overpriced and security N is correctly priced.

Thus, in the context of the security market line, securities that plot above the line presumably are underpriced because they offer a higher return than that expected from securities with same risk. On the other hand, a security is presumably overpriced if it plots below the SML because it is estimated to provide a lower return than that expected from securities in the same risk class. Securities which plot on SML are assumed to be appropriately priced in the context of CAPM. These securities are offering returns in line with their riskiness.

Securities plotting off the security market line would be evidence of mispricing in the market place. CAPM can be used to identify and overpriced securities. If the expected return on a security calculated according to CAPM is lower than the actual or estimated return offered by that security, the security will be considered to be underpriced. On the contrary, a security will be considered to be overpriced when the expected return on the security according to CAPM formulation is higher than the actual return offered by the security.

Let us consider an example. The estimated rates of return and beta coefficients of some securities are as given below:

Security	Estimated returns (per cent)	Beta
A	30	1.6
B	24	1.4
C	18	1.2
D	15	0.9
E	15	1.1
F	12	0.7

The risk free rate of return is 10 per cent; while the market return is expected to be 18 per cent.

We can use CAPM to determine which of these securities are correctly priced. For this we have to calculate the expected return on each security using the CAPM equation.

$$\overline{R}_i = R_f + \beta_i [\overline{R}_m - R_f)$$

Given that $R_f = 10$ and $\overline{R}_m = 18$

The equation becomes

$$\overline{R}_i = 10 + \beta_i (18 - 10)$$

The expected return on security A can be calculated by substituting the beta value of security A in the equation. Thus,

$$\overline{R}_i = 10 + \beta_i \, (18 - 10)$$
$$= 10 + 12.8$$
$$= 22.8$$

Similarly, the expected return on each security can be calculated by substituting the beta value of each security in the equation.

The expected return according to CAPM formula and the estimated return of each security are tabulated below:

Security	Estimated return (CAPM)	Estimated return
A	22.8	30
B	21.2	24
C	19.6	18
D	17.2	15
E	18.8	15
F	15.6	12

Securities A and B provide more return than the expected return and hence may be assumed to be underpriced. Securities C,D,E and F may be assumed to be overpriced as each of them provides lower return compared to the expected return.

In this chapter we have seen two equations representing risk return relationships. The first of these was the capital market line which describes the risk return relationship for efficient portfolios. The second was the security market line describing the risk return relationship for all portfolios as well as individual securities. This formula is also known as the capital asset pricing model or CAPM. It postulates that every security is expected to earn a return commensurate with its risk as measured by beta. CAPM establishes a linear relationship between the expected return and systematic risk of all assets. This relation can be used to evaluate the pricing of assets.

Example: 25

Security J has a beta of 0.75 while security K has a beta of 1.45. Calculate the expected return for these securities, assuming that the risk free rate is 5 per cent and the expected return of the market is 14 per cent.

Solution

The expected return can be calculated using CAPM

$$\overline{R}_i = R_f + \beta_i \, [\overline{R}_m - R_f)$$

For security J

$$\overline{R}_i = 5 + 0.75 \, (14 - 5)$$
$$= 5 + 6.75 = 11.75 \text{ per cent}$$

For security K

$$\overline{R}_i = 5 + 1.45 (14 - 5)$$
$$= 5 + 13.05 = 18.05 \text{ per cent}$$

Example: 26

A security pays a divided of Rs. 3.85 and sells currently at Rs. 83. The security is expected to sell at Rs. 90 at the end of the year. The security has a beta of 1.15. The risk free rate is 5 per cent and the expected return on market index is 12 per cent. Assess whether the security is correctly priced.

Solution

To assess whether a security is correctly priced, we need to calculate (a) the expected return as per CAPM formula, (b) the estimated return on the security based on the dividend and increase in price over the holding period.

Expected return

$$R_i = R_f + \beta_i [R_m - R_f)$$
$$= 5 + 1.15 (12 - 5)$$
$$= 5 + 8.05 = 13.05 \text{ per cent}$$

Estimated return

$$R_i = \frac{(P_1 - P_0) + D_1}{P_0}$$
$$= \frac{(90 - 83) + 3.85}{83}$$
$$= \frac{7 + 3.85}{83}$$
$$= 10.85 / 83 = 0.1307 = 13.07 \text{ per cent.}$$

As the estimated return on the security is more or less equal to the expected return, the security can be assessed as fairly priced.

Example: 27

The following data are available to you as portfolio manager:

Security	Estimated return (per cent)	Beta	Standard deviation (per cent)
A	30	2.0	50
B	25	1.5	40
C	20	1.0	30
D	11.5	0.8	25
E	10.0	0.5	20
Market index	15	1.0	18
Govt. security	7	0	0

a) In terms of the security market line, which of the securities listed above are underpriced?

b) Assuming that a portfolio is constructed using equal proportions of the five securities listed above, calculate the expected return and risk of such a portfolio.

Solution

(a) We can use CAPM to determine which of the securities listed are underpriced. For this we have to calculate the expected return on each securing using CAPM equation:

$$\overline{R}_i = R_f + \beta_i [\overline{R}_m - R_f)$$

Given that R_f (Govt. security return rate) = 7 and R_m = 15

The equation becomes

$$\overline{R}_i = 7 + \beta_i [15 - 7)$$

Now,

Security A = 7 + 2.0 (15 – 7) = 7 + 16 = 23 per cent

Security B = 7 + 1.5 (15 – 7) = 7 + 12 = 19 per cent

Security C = 7 + 1.0 (15 – 7) = 7 + 8 = 15 per cent

Security D = 7 + 0.8 (15 – 7) = 7 + 6.4 = 13.4 per cent

Security E = 7 + 0.5 (15 – 7) = 7 + 4 = 11 per cent

The expected return as per CAPM formula and the estimated return of each security can be tabulated.

Security	Estimated return (per cent)	Estimated return (per cent)
A	23.0	30.0
B	19.0	25.0
C	15.0	20.0
D	13.4	11.5
E	11.0	10.0

A security whose estimated return is greater than the expected return is assumed to be underpriced because it offers a higher return than expected from securities with the same risk.

According, securities A, B and C are underpriced.

(b) To calculate the expected return and risk $\overline{R}_p$ and β_p, we need to calculate β_p first

$$\beta_p = \sum_{i=1}^{n} w_i \beta_i$$

As the proportion of investment in each security is equal, $w_i = 0.20$

$\beta_p =$ (0.2) (2.0) + (0.2) (1.5) + (0.2) (1.0) +(0.2) (0.8) +(0.2) (0.5)

$\quad =$ (0.2) (2.0 +1.5 +1.0+0.8+0.5)

$$= \quad (0.2)\,(5.8) = 1.16$$

Expected return of portfolio

$$\overline{R_i} = R_f + \beta_i\,[\overline{R_m} - R_f\,)$$
$$= 7 + 1.16\,(15 - 7)$$
$$= 7 + 9.28 = 16.28 \text{ per cent}$$

Systematic risk of the portfolio $\beta_i = 1.16$

ARBITRAGE PRICING THEORY

Arbitrage pricing theory is one of the tools used by the investors and portfolio managers. The capital asset pricing theory explains the return of the securities on the basis of their respective betas. According to the previous models, the investor chooses the investment on the basis of expected return and variance. The alternative model developed in asset pricing by Stephen Ross is known as Arbitrage Pricing Theory. The APT theory explains the nature of equilibrium in the asset pricing in a less complicated manner with fewer assumptions compared to CAPM.

Arbitrage

Arbitrage is a process of earning profit by taking advantage of differential pricing for the same asset. The process generates riskless profit. In the security market, it is of selling security at a high price and the simultaneous purchase of the same security at a relatively lower price.

Since the profit earned through arbitrage is riskless, the investors have the incentive to undertake this whenever an opportunity arises. In general, some investors indulge more in this type of activities than others. However, the buying and selling activities of the arbitrageur reduce and eliminate the profit margin, bringing the market price to the equilibrium level.

The Assumptions

1. The investors have homogenous expectations.
2. The investors are risk averse and utility maximisers.
3. Perfect competition prevails in the market and there is no transaction cost.

The APT theory does not assume (1) single period investment horizon, (2) no taxes (3) investors can borrow and lend at risk free rate of interest and (4) the selection of the portfolio is based on the mean and variance analysis. These assumptions are present in the CAPM theory.

Arbitrage Portfolio

According to the APT theory an investor tries to find out the possibility to increase returns from his portfolio without increasing the funds in the portfolio. He also likes to keep the risk at the same level. For example, the investor holds A, B and C securities and he wants to change the proportion of the securities without any additional financial commitment. Now the change in proportion of securities can be denoted by XA, XB, and XC. The increase in the investment in security A could be carried out only if he reduces the proportion of investment either in B or C because it has already stated that the investor tries to earn more income without increasing his financial commitment. Thus, the changes in different securities will add up to zero. This is the basic requirement of an arbitrage portfolio. If X indicates the change in proportion,

$$\Delta X_A + \Delta X_B + \Delta X_C = 0$$

The factor sensitivity indicates the responsiveness of a security's return to a particular factor. The sensitiveness of the securities to any factor is the weighted average of the sensitivities of the securities, weights being the changes made in the proportion. For example bA, bB and b are the sensitivities, in an arbitrage portfolio the sensitivities become zero.

$$h_A\Delta X_A + b_B\Delta X_B + b\ c\Delta X_c = 0$$

The investor holds the A, B and C stocks with the following returns and sensitivity to changes in the industrial production. The total amount invested is Rs. 1,50,000.

I	R	b	Original weights
Stock A	20%	.45	.33
Stock B	15%	1.35	.33
Stock C	12%	.55	.34

Now the proportions are changed.

The changes are

$$\Delta X_A = .02$$

$$\Delta X_B = .025$$

$$\Delta X_c = -.225$$

For an arbitrage portfolio

$$\Delta X_A + \Delta X_B + \Delta X_c = 0$$

$$.2 + .025 - .225 = 0$$

The sensitivities also become zero

$$\Delta X_A b_A + \Delta X_B b_B + \Delta X_c b_c = 0$$

.2 x .45 + .025 x 1.35 -.225 x .55 = 0

In an arbitrage portfolio, the expected return should be greater than zero.

$\Delta X_A R_A + \Delta X_B R_B + \Delta X_c R_c > 0$

.2 x 20 + .025 x 15 -.225 x 12

4.375—2.7 > 0

i.e. 1675%

The investor would increase his investment in stock A and B by selling C. The new compositions of weights are

$X_A = 0.53$

$X_B = 0.355$

$X_c = 0.115$

The portfolio allocation on stocks A, B and C is as follows

= 1, 50,000 X .53 + 1, 50,000 X .355 + 1, 50,000 x .115

= Rs.79, 500 +53250 +17250

The sensitivity of the new portfolio will be

= .45x.53+ 1.35x.355+.55x.115

= .239 + .479 + .063 =.781

This is same as the old portfolio sensitivity

i.e. .45x.33+ 1.35x.33+ .55x.34= .781

The return of the new portfolio is higher than the old portfolio.

Old portfolio return

= 20x.33+ 15x.33+ 12x.34

= 6.6 + 4.95 + 4,08

= 15.63%

The new portfolio return

= 20x.53+ 15x.355+ 12x.115

= 10.6 + 5.325 + 1.38

= 17.305%

This is equivalent to the old portfolio return plus the return that occurred due to the change in portfolio

= 15.63% +1.675% = 17.305%

The variance of the new portfolio's change is only due to the changes in its non-factor risk. Hence, the change in the risk factor is negligible. From the analysis it can be concluded that

1. The return in the arbitrage portfolio is higher than the old portfolio.
2. The arbitrage and old portfolio sensitivity remains the same.
3. The non-factor risk is small enough to be ignored in an arbitrage portfolio.

Effect on Price

To buy stock A and B the investor has to sell stock C. The buying pressure on stock A and B would lead to increase in their prices. Conversely selling of stock C will result in fall in the price of the stock C. With the low price there would be rise in the expected return of stock C. For example, if the stock "C" at price Rs.100 per share have earned 12 percent return, at Rs.80 per share the return would be 12/80 x 100=15%.

At the same time, return rates would be declining in stock A and B with the rise in price. This buying and selling activity will continue until all arbitrage possibilities are eliminated. At this juncture, there exists an approximate linear relationship between expected returns and sensitivities.

The APT Model

According to Stephen Ross, returns of the securities are influenced by a number of macro economic factors. The macro economic factors are growth rate of industrial production, rate of inflation, spread between long term and short term interest rates and spread between low-grade and high grade bonds. The arbitrage theory is represented by the equation:

$$R_i = \lambda_0 + \lambda_1 bi_1 + \lambda_2 bi_2 + \ldots\ldots + \lambda_j b_{ij}$$

R_i = average expected return

λ_I = sensitivity of return to b_{il}

b_{il} = the beta co-efficient relevant to the particular factor.

The equation is derived from the model

$$Ri = \alpha_1 + b_{il} I_1 + b_{12}I_2 \ldots.. + b_{ij} I_j + e_i$$

Let us take the two factor model

$$Ri = \lambda_0 + \lambda_1 b_{12} + \lambda_2 b_{12} + b_2$$

If the portfolio is a well diversified one, unsystematic risk tends to be zero and systematic risk is represented by b_{i1} and b_{i2} in the equation.

Let us assume the existence of three well diversified portfolios as shown in the table.

Portfolio	Expected return	b12	bi2
A	12.0	1	0.5
B	13.4	3	0.2
C	12	3	-0.5

The equation $R_i = \lambda_0 + \lambda_1 b_{i1} + \lambda_2 b_{i2} + b_2$ can be determined with the help of the abovementioned details. By solving the following equations.

$$12 = \lambda_0 + 1\lambda_1 + 0.5\lambda_2$$

$$13.4 = \lambda_0 + 3\lambda_1 + 0.2\lambda_2$$

$$12 = \lambda_0 + 3\lambda_1 - 0.5\lambda_2$$

We can get

$$R_i = 10 + 1b_{il} + 2b_{i2}$$

The expected return is

$$Rp = X_i R_i$$

The risk is indicated by the sensitivities of the factors

$$b_{p1} = X_i b_{i}1 \; ; bp2 = X_i b_i 2$$

All the portfolios constructed from portfolios A, B and C lie on the plane described A, B and C. Assume there exists a portfolio D with an expected return 14%, b_{i1} 2.3 and b_{i2} = .066. This portfolio can be compared with the portfolio E having equal portion of A, B and C portfolios. Every portfolio would have a share of 33%. The portfolio b are

$$b_{p1} = 1/3 \text{ x } 1 + 1/3 \text{ x } 3 + 1/3 \text{ x } 3 = 2.33$$

$$b_{p2} = 0.5 \text{ x } l/3 + 0.2 \text{ x } 1/3 + (-0.5 \text{ x } 113) = 0.066$$

The risk for portfolio E is identical to the risk on portfolio D. The expected return for portfolio B is

$$1/3(12) + 1/3(13.4) + 1/3(12)$$

$$=12.46$$

Since the portfolio B lies on the plane described above, the return could be obtained from the equation of the plane.

$$R = 10 + 1(2.33) + 2(.066)$$

$$= 12.46$$

The portfolio D and B have the same risk but different returns. In this juncture, the arbitrageur enters in and buy portfolio D t selling portfolio B short. Thus buying of portfolio D through the funds generated from selling B would provide riskless profit with no investment and no risk. Let us assume that the investor sells Rsr1000 with of portfolio E and buys Rs1000 worth of portfolio D. The cash flow is as shown in the following table.

	Initial cash flow	End of period	bi₁	bi₂
Portfolio D	` 1000	+ 1140.0	+ 2.33	+ .06
Portfolio E	` 1000	- 1124.6	- 2.33	- .06
Arbitrage Portfolio	0	15.4	- 0	0

The arbitrage portfolio involves zero investment, has no systematic risk (b_{il} and b_{i2}) and earns Rs. 1 5.4. Arbitrage would continue until portfolio D lies on the same plane.

Arbitrage Pricing Equation

In a single factor model, the linear relationship between the return and sensitivity b can be given in the following form.

$R_i = \lambda_0 + \lambda_i b_i$

R_i = return from stock A

λ_0 = riskless rate of return

b_i = the sensitivity related to the factor

λ_i = slope of the arbitrage pricing line

The above model is known as single factor model since only one factor is considered. Here, the industrial production alone is considered. The APT one factor model is given in figure.
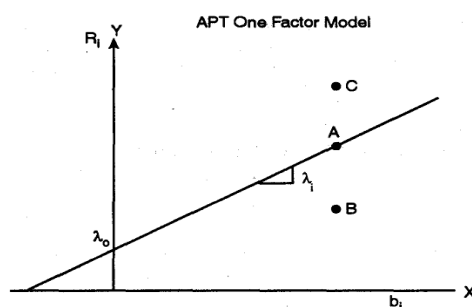
Fig. 2.6 APT One Factor Model

The risk is measured along the horizontal axis and the return on the vertical axis. The A, B and C stocks are considered to be in the same risk class The arbitrage pricing line intersects the Y axis on which represents riskless rate of interest i e the interest offered for the treasury bills Here, the investments involve zero risk and it is appealing to the investors who are highly risk averse stands for the slope of arbitrage pricing line It indicates market price of risk and measures the risk-return trade off in the security markets. The is the sensitivity coefficient or factor beta that shows the sensitivity of the asset or stock A to the respective risk factor.

The Constants of the APT Equation

The existence of the risk free asset yields a risk free rate of return that is a constant. The asset does not have sensitivity to the factor for example, the industrial production.

If $b_i = 0$

$R_i = \lambda_0 + \lambda_i O$

$R_i = \lambda_0$

In other words, λ_0 is equal to the risk free rate of return. If the single factor portfolio's sensitivity is equal to one i.e. $b1 = 1$ then

$R_i = \lambda_0 + \lambda_i 1$

This can be rewritten as

$R_i = \lambda_0 + \lambda_i$

Thus $\lambda 1$ is the expected excess return over the risk free rate of return for a portfolio with unit sensitivity to the factor. The excess return is known as risk premium.

Factors Affecting the Return

The specification of the factors is carried out by many financial analysts. Chen, Roll and Ross have taken four macro economic variables and tested them. According to them the factors are inflation, the term structure of interest rates, risk premium and industrial production. Inflation affects the discount rate or the required rate of return and the size of the future cash flows. The short term inflation is measured by monthly percentage changes in the consumer price index. The interest rates on long term bonds and short term bonds differ. This difference affects the value of payments in future relative to short term payments. The difference between the return on the high grade bonds and low grade (more risky) bonds indicates the market's reaction to risk. The industrial production represents the business cycle. Changes in the industrial production have an impact on the expectations and opportunities of the investor. The real value of the cash flow is also affected by it.

Burmeister and McElroy have estimated the sensitivities with some other factors. They are given below

1. Default risk
2. Time premium
3. Deflation
4. Change in expected sales
5. The market returns not due to the first four variables.

The default risk is measured by the difference between the return on long term government bonds and the return on long terms bonds issued by corporate plus one-half

of one per cent. Lime premium is measured by the return on long term government bonds minus one month Treasury bill rate one month ahead.

Deflation is measured by expected inflation at the beginning of the month minus actual inflation during the month. According to then, the first four factors accounted 25% of the variation in the Standard and 1or Composite Index and all the four co-efficient were significant.

Salomon Brothers identified five factors in their fundamental factor model. Inflation is the only common factor identified by others. The other factors are given below

1. Growth rate in gross national product
2. Rate of interest
3. Rate of change in oil prices
4. Rate of change in defence spending

All the three sets of factors have some common characteristics. They all affect the macro economic activities. Inflation and interest rate are identified as common factors. Thus, the stock price is related to aggregate economic activity and the discount rate of future cash flow.

APT and CAPM

The simplest form of APT model is consistent with the simple form of the CAPM model. When only one factor is taken into consideration, the APT can be stated as:

$R_i = \lambda_0 + b_i \lambda_i$

It is similar to the capital market line equation

$R = R_f + ß (R_m — R_f)$

Which is similar to the CAPM model?

APT is more general and less restrictive than CAPM. In APT, the investor has no need to bold the market portfolio because it does not make use of the market portfolio concept. The portfolios are constructed on the basis of the factors to eliminate arbitrage profits. APT is based on the law of one price to hold for all possible portfolio combinations.

The APT model takes into account of the impact of numerous factors on the security. The macro economic factors are taken into consideration and it is closer to reality than CAPM.

The market portfolio is well defined conceptually. In APT model, factors are not well specified. Hence the investor finds it difficult to establish equilibrium relationship. The well defined market portfolio is a significant advantage of the CAPM leading to the wide usage of the model in the stock market.

The factors that have impact on one group of securities may not affect another group of securities. There is a lack of consistency in the measurements of the APT model.

Further, the influences of the factors are not independent of each other. It may be difficult to identify the influence that corresponds exactly to each factor. Apart from this, not all variables that exert influence on a factor are measurable.

QUESTIONS

1. What do you mean by valuation? Explain briefly different equity evaluation models.
2. Write a note on the present value of expected stream of benefits from equity shares.
3. What is the difference between active equity management and passive equity management?
4. Define preference shares. What are their features?
5. What is the difference between participative and non participative preference shares?
6. What are the merits and demerits of preference shares?
7. Write on the derivatives market in India.
8. Explain clearing and settlement in the case of derivatives.
9. What are the factors have been driving the growth of financial derivatives?
10. Explain briefly the characteristics of derivatives.
11. What are the criteria for derivatives trading?
12. Explain step – by – step development of derivatives market in India.
13. Explain development and regulation of derivative markets in India.
14. A security currently sells for Rs. 125. It is expected to pay a dividend of Rs. 4.25 and be sold for Rs. 140 at the end of the year. The security has a beta of 1.42. The risk free rate in the market is 6 per cent and the expected return on a representative market index is 15 per cent. Assess whether the security is correctly priced.
15. The estimated rates of return, beta coefficients and standard deviations of some securities are as given below:

Security	Estimated return (per cent)	Beta	Standard deviation (per cent)
A	35	1.60	50
B	28	1.40	40
C	21	1.10	30
D	18	0.90	25
E	15	0.75	20
F	12	0.60	18

The risk free rate of return is 8 per cent. The market return is expected to be 20 per cent.

Determine which of the above securities are overpriced and which are underpriced?

16. The following data are available to you as a portfolio manager:

Security	Estimated return (per cent)	Beta	Standard deviation (per cent)
1	32	2.10	50
2	30	1.80	35
3	25	1.65	42
4	20	1.30	26
5	18	1.15	29
6	15	0.85	18
7	14	0.75	20
8	12	0.50	17
Market index	16	1.00	25
Govt. security	7.5	0	0

a) In terms of security market line, which of the securities listed above are undervalued?

b) Assuming that a portfolio is constructed investing equal proportion of funds in each of the above securities, what is the expected return and risk of such a portfolio.

17. List the assumptions of capital asset pricing model.

18. "When an investor is assumed to use riskless lending and borrowing in his investment activity, the shape of the efficient frontier transforms into a straight line". Illustrate.

19. Compare and contrast CML and SML.

20. What is Capital Asset Pricing Model?

21. "CAPM can be used to evaluate the pricing of securities". Discuss.

22. Distinguish between CAPM and APT.

UNIT III

ECONOMIC ANALYSING

The performance of a company depends on the performance of the economy. If the economy is booming, incomes rise, demand for goods increases, and hence the industries and companies in general tend to the prosperous. On the other hand, if the economy is in recession, the performance of companies will be generally bad.

Investors are concerned with those variables in the economy which affect the performance of the company in which they intend to invest. A study of these economic variables would give an idea about future corporate earnings and the payment of dividends and interest part of his fundamental analysis.

1. Growth Rates of National Income

The rate of growth of the national economy is an important variable to be considered by an investor. GNP (gross national product), NNP (net national product) and GDP (gross domestic product) are the different measures of the total income or total economic output of the country as a whole. The growth rates of these measures indicate the growth rate of the economy. The estimates of GNP, NNP and GDP and their rates are made available by the government from time to time.

The estimated growth rate of the economy would be a pointer towards the prosperity of the economy. An economy typically passes through different phases of prosperity known as the different stages of the economic or business cycle. The four stages of an economic cycle are depression, recovery, boom and recession. The stage of the economic cycle through which a country passes has a direct impact on the performance of industries and companies.

Depression is the worst of the four stages. During a depression, demand is low and declining. Inflation is often high and so are interest rates. Companies are forced to reduce production, shut down plant and lay off workers. During the recovery stage, the economy begins to revive after a depression. Demand picks up leading to more investments in the economy. Production, employment and profits are on the increase.

The boom phase of the economic cycle is characterized by high demand. Investments and production are maintained at a high level to satisfy the high demand. Companies generally post higher profits. The boom phase gradually slows down. The economy slowly begins to experience a downturn in demand, production, employment, etc. The profits of companies also start to decline. This is the recession stage of the business cycle.

While analyzing the growth rate of the economy, an investor would do well to determine the stage of the economic cycle through which the economy is passing and evaluate its impact on his investment decision.

2. Inflation

Inflation prevailing in the economy has considerable impact on the performance of companies. Higher rates of inflation upset business plans, lead to cost escalation and result in a squeeze on profit margins. On the other hand, inflation leads to erosion of purchasing power in the hands of consumers. This will result in lower demand for products. Thus, high rates of inflation in an economy are likely to affect the performance of companies adversely. Industries and companies prosper during times of low inflation.

Inflation is measured both in terms of wholesale prices through the wholesale price index (WPI) and in terms of retail prices through the consumer price index (CPI). These figures are available on weekly or monthly basis. As part of the fundamental analysis, an investor should evaluate the inflation rate prevailing in the economy currently as also the trend of inflation likely to prevail in the future.

3. Interest Rates

Interest rates determine the cost and availability of credit for companies operating in an economy. A low interest rate stimulates investment by making credit available easily and cheaply. Moreover, it implies lower cost of finance for companies and thereby assures higher profitability. On the contrary, higher interest rates result in higher cost of production which may lead to lower profitability and lower demand.

The interest rates in the organized financial sector of the economy are determined by the monetary policy of the government and the trends in money supply. These rates are thus controlled and vary within certain ranges. But the interest rates in the unorganized financial sector are not controlled and may fluctuate widely depending upon the demand and supply of funds in the market. Further, long-term interest rates differ from short-term interest rates.

An investor has to consider the interest rates prevailing in the different segments of the economy and evaluate their impact on the performance and profitability of companies.

4. Government Revenue, Expenditure and Deficits

As the government is the largest investor and spender of money, the trends in government revenue, expenditure and deficits have a significant impact on the performance of industries and companies. Expenditure by the government stimulates the economy by creating jobs and generating demand. Since a major portion of demand in the economy is

generated by government spending, the nature of government spending is of great importance in determining the fortunes of many an industry.

However, when government expenditure exceeds its revenue, there occurs a deficit. This deficit is known as budget deficit. All developing countries suffer from budget deficits as government spend large amount of money to build up infrastructure. But budget deficit is an important determinant of inflation, as it leads to deficit financing which fuels inflation.

5. Exchange Rates

The performance and profitability of industries and companies that are major importers or exporters are considerably affected by the exchange rates of the rupee against major currencies of the world. A depreciation of the rupee improves the competitive position of Indian products in foreign markets, thereby stimulating exports. But it would also make imports more expensive. A company depending heavily on imports may find devaluation of the rupee affecting its profitability adversely.

The exchange rates of the rupee are influenced by the balance of trade deficit, the balance of payments deficit and also the foreign exchange reserves of the country. The excess of imports over exports is called balance of trade deficit. The balance of payments deficit represents the net difference payable on account of all transactions such as trade, services and capital transaction. If these deficits increase, there is a possibility that the rupee may depreciate in value.

A country needs foreign exchange reserves to meet several commitments such as payment for imports and servicing of foreign debts. Balance of payment deficit typically leads to decline in foreign exchange reserves as the deficit has to be met from the reserve. The size of the foreign exchange reserve is a measure of the strength of the rupee on external account. Large foreign exchange reserves help to increase the value of the rupee against other currencies.

The exchange rates of the rupee against the major currencies of the world are published daily in the financial press. An investor has to keep track of the trend in exchange rates of rupee. An analysis of the balance of trade deficit, balance of payments deficit and the foreign exchange reserves will help to project the future trends in exchange rates.

6. Infrastructure

The development of an economy depends very much on the infrastructure available. Industry needs electricity for its manufacturing activities, roads and railways to transport raw materials and finished goods, communication channels to keep in touch with suppliers and customers.

The availability of infrastructural facilities such as power, transportation and communication systems affects the performance of companies. Bad infrastructure leads to inefficiencies, lower productivity, wastage and delays. An investor should assess the status of the infrastructural facilities available in the economy before finalizing has investment plans.

7. Monsoon

The Indian economy is essentially an agrarian economy and agriculture forms a very important sector of the Indian economy. Because of the strong forward and backward linkages between agriculture and industry, performance of several industries and companies are dependent on the performance of agriculture. Moreover, as agricultural incomes rise, the demand for industrial products and services will be good and industry will prosper. But the performance of agriculture to a very great extent depends on the monsoon. The adequacy of the monsoon determines the success or failure of the agricultural activities in India. Hence, the progress and adequacy of the monsoon becomes a matter of great concern for an investor in the Indian context.

8. Economic and Political Stability

A stable political environment is necessary for steady and balanced growth. No industry or company can grow and prosper in the midst of political turmoil. Stable longterm economic policies are what are needed for industrial growth. Such stable policies can emanate only from stable political systems as economic and political factors are interlinked. A stable government with clear cut long – term economic policies will be conducive to good performance of the economy.

ECONOMIC FORECASTING

Economy analysis is the first stage of fundamental analysis and starts with an analysis of historical performance of the economy. But as investment is a future-oriented activity, the investor is more interested in the expected future performance of the overall economy and its various segments. For this, forecasting the future direction of the economy becomes necessary. Economic forecasting thus becomes a key activity in economy analysis.

The central theme in economic forecasting is to forecast the national income with its various components. Gross national product or GNP is a measure of the national income. It is the total value of the final output of goods and services produced in the economy. It is a measure of the total economic activities over a specified period of time and is an indicator of the level and rate of growth of economic activities. An investor would be particularly interested in forecasting the various components of the national income, especially those

components that have a bearing on the particular industries and companies that he is analysing.

FORECASTING TECHNIQUES

Economic forecasting may be carried out for short-term periods (up to three years), intermediate term periods (three to five years) and long-term periods (more than five years). An investor is more concerned about short-term economic forecasts for periods ranging from a quarter to three years. Some of the techniques of short-term economic forecasting are discussed below:

1. Anticipatory Surveys

Much of the activities in government, business, trade and industry are planned in advance and stated in the form of budgets. Consumers also plan for their major spending in advance. To the extent that institutions and people plan and budget for expenditures in advance, surveys of their intentions can provide valuable input to short-term economic forecasting.

Anticipatory surveys are the surveys of intentions of people in government, business, trade and industry regarding their construction activities, plant and machinery expenditures, level of inventory, etc. Such surveys may also include the future plans of consumers with regard to their spending on durables and non-durables. Based on the results of these surveys, the analyst can form his own forecast of the future state of the economy.

The greatest shortcoming of the anticipatory surveys is that there is no guarantee that the intentions surveyed will certainly materialise. The forecast based on anticipatory surveys or surveys of intentions will be valid only to the extent that the intentions are translated into action. Hence, the analyst cannot rely solely on these surveys.

2. Barometric or Indicator Approach

In this approach to economic forecasting, various types of indicators are studied to find out how the economy is likely to perform in the future. These indicators are time series data of certain economic variables. The indicators are classified into leading, coincidental and lagging indicators. The leading indicators are those time series data that reach their high points (peaks) or their low points (troughs) in advance of the high points and low points of total economic activity. The coincidental indicators reach their peaks and troughs at approximately the same time as the economy, while the lagging indicators reach their turning points after the economy has already reached its own turning points. In this method, the indicators1 act as barometers to indicate the future level of economic activity. However, careful examination of historical data of economic series is necessary to ascertain which

economic variables have led, lagged behind or moved together with the economy. The US Department of Commerce, through its Bureau of Economic Analysis, has prepared a short list of the different indicators. Some of them are given below for illustrative purpose.

(a) Leading Indicators

Average weekly hours of manufacturing production workers

Average weekly initial unemployment claims

Contracts and orders for plant and machinery

Number of new building permits issued

Index of S and P 500 stock prices

Money supply (M2)

Change in sensitive materials prices

Change in manufactures' unfilled orders (durable goods industries)

Index of consumer expectations

(b) Coincidental Indicators

Employees on non-agricultural pay rolls

Personal income less transfer payments

Index of industrial production

Manufacturing and trade sales

(c) Lagging Indicators

Average duration of unemployment

Ratio of manufacturing and trade inventories to sales

Average prime rate

Commercial and industrial loans outstanding

Change in consumer price index for services

Of the three types of indicators, leading indicators are more useful for economic forecasting because they measure something that foreshadows a change in economic activity.

The indicator approach has its own limitations. It is useful in forecasting the direction of the change in aggregate economic activity, but it does not indicate the magnitude or duration of the change. Further, the leading indicators may give false signals. Moreover, different leading indicators may give conflicting signals. The indicator approach becomes useful for economic forecasting only if data collection and presentation are done quickly. Any delay in presentation of data defeats the purpose of the indicators.

3. Econometric Model Building

This is the most precise and scientific of the different forecasting techniques. This technique makes use of Econometrics, which is a discipline that applies mathematical and statistical techniques to economic theory.

In the economic field we find complex interrelationships between the different economic variables. The precise relationships between the dependent and independent variables are specified in a formal mathematical manner in the form of equations. The system of equations is then solved to yield a forecast that is quite precise.

In applying this technique, the analyst is forced to define clearly and precisely the interrelationships between the economic variables. The accuracy of the forecast derived from this technique would depend on the validity of the assumptions made by the analyst regarding economic interrelationships and the quality of his input data.

Econometric models used for economic forecasting are generally complex. Vast amounts of data are required to be collected and processed for the solution of the model. This may cause delay in making the results available. Undue delay may render the results obsolete for purpose of forecasting.

4. Opportunistic Model Building

This is one of the most widely used forecasting techniques. It is also known as GNP model building or sectoral analysis. Initially, an analyst estimates the total demand in the economy, and based on this he estimates the total income or GNP for the forecast period. This initial estimate takes into consideration the prevailing economic environment such as the existing tax rates, interest rates, rate of inflation and other economic and fiscal policies of the government. After this initial forecast is arrived at, the analyst now begins building up a forecast of the GNP figure by estimating the levels of various components of GNP. For this, he collects the figures of consumption expenditure, gross private domestic investment, government purchase of goods and services and net exports. He adds these figures together to arrive at the GNP forecast.

The two GNP forecasts arrived at by two different methods will be compared and necessary adjustments will be made to bring the two forecasts into line with each other. The opportunistic model building approach makes use of other forecasting techniques to build up the various components. A vast amount of judgement and ingenuity is also applied to make the overall forecast reliable.

Economic forecasting is an extremely complex and difficult process. No method is

expected to give accurate results. The investor must evaluate all economic forecasts critically before making his investment decision. Economy analysis is an important part of fundamental analysis. It gives the investor an overall picture of the expected performance of the economy in the near future. This is a valuable input to investment decision-making.

INDUSTRY ANALYSIS

An investor ultimately invests his money in the securities of one or more specific companies. Each company can be characterised as belonging to an industry. The performance of companies would, therefore, be influenced by the fortunes of the industry to which it belongs. For this reason an analyst has to undertake an industry analysis so as to study the fundamental factor affecting the performance of different industries.

At any stage in the economy, there are some industries which are fast growing while others are stagnating or declining. If an industry is growing the companies within the industry may also be prosperous. The performance of companies will depend, among other things, upon the state of the industry to which they belong. Industry analysis refers to an evaluation of the relative strengths and weaknesses of particular industry.

CONCEPT OF INDUSTRY

An industry is generally described as a homogenous group of companies. We may define an industry "as a group of firms producing reasonably similar products which serve the same needs of a common set of buyers". Industries are traditionally classified on the basis of products. According to this product – wise classification we have cement industry, steel industry, cotton textile industry, pharmaceutical industry, and so forth. However, industry classification becomes difficult when dealing with firms having a diversified product line. And such firms are now on the increase. Even though classification of industry poses practical difficulties, each country follows a standardized classification to facilitate data collection and reporting.

INDUSTRY LIFE CYCLE

The industry life cycle theory is generally attributed to Julius Grodensky. The life cycle of the industry is separated into four well defined stages such as

1. Pioneering stage
2. Rapid growth stage
3. Maturity and stabilization stage
4. Declining stage

1. Pioneering Stage

The prospective demand for the product is promising in this stage and the technology of the product is low. The demand for the product attracts many producers to produce the particular product. There would be severe competition and only fittest companies survive this stage. The producers try to develop brand name, differentiate the product and create a product image. This would lead to non-price competition too. The severe competition often leads to the change of position of the firms in terms of market shares and profit. In this situation, it is difficult to select companies for investment because the survival rate is unknown.

2. Rapid Growth Stage

This stage starts with the appearance of surviving firms from the pioneering stage. The companies that have withstood the competition grow strongly in market share and financial performance. The technology of the production would have improved resulting in low cost of production and good quality products. The companies have stable growth rate in this stage and they declare dividend to the share holders. It is advisable to invest in the shares of these companies. The pharmaceutical industry has improved its technology and the top companies in this sector are giving dividend to the shareholders. Likewise power industry and telecommunication industry can be cited as examples of expansion stage. In this stage the growth rate is more than the industry's average growth rate.

3. Maturity and Stabilization Stage

In the stabilization stage, the growth rate tends to moderate and the rate of growth would be more or less equal to the industrial growth rate or the gross domestic product growth rate. Symptoms of obsolescence may appear in the technology. The keep going, technological innovations in the production process and products should be introduced. The investors have to closely monitor the events that take place in the maturity stage of the industry.

4. Declining Stage

In this stage, demand for the particular product and the earnings of the companies in the industry decline. Now-a-days very few consumers demand black and white T.V. be increased by utilizing the capacity to full. Once the maximum capacity is reached, again capital has to invest in the fixed equipment. Hence, lower the fixed cost, adjustability to the changing demand and reaching the break even points are comparatively easier.

FACTOR TO BE CONSIDERED

Apart from industry life cycle analysis, the investor has to analyse some other factors too. They are as listed below

1. Growth of the industry

2. Cost structure and profitability

3. Nature of the product

4. Nature of the competition

5. Government policy

6. Labour

7. Research and development

1. Growth of the Industry

The historical performance of the industry in terms of growth and profitability should be analysed. Industry wise growth is published periodically by the Centre for Monitoring Indian Economy. The past variability in return and growth in reaction to macro economic factors provide an insight into the future. Even though history may not repeat in the exact manner, looking into the past growth of the industry, the analyst can predict the future. The information technology industry has witnessed a tremendous growth in the past so also the scrip prices of the IT industry. With the Y2K millennium bug creating a huge business opportunity even beyond the year 2000, the sector is expected to maintain its growth momentum.

2. Cost structure and profitability

The cost structure, that is the fixed and variable cost, affects the cost of production and profitability of the firm. In the case of oil and natural gas industry and iron and steel industry the fixed cost portion is high and the gestation period is also lengthy. Higher the fixed cost component, greater sales volume is required to reach the firm's breakeven point. Once the breakeven point is reached and the production is on the track, the profitability can be increased by utilizing the capacity to full. Once the maximum capacity is reached, again capital has to invest in the fixed equipment. Hence, lower the fixed cost, adjustability to the changing demand and reaching the break even points are comparatively easier.

3. Nature of the product

The products produced by the industries are demanded by the consumers and other industries. If industrial goods like pig iron, iron sheet and coils are produced, the demand for them depends on the construction industry. Likewise, textile machine tools industry produces tools for the textile industry and the entire demand depends upon the health of the textile industry. Several such examples can be cited. The investor has to analyse the condition of related goods producing industry and the end user industry to find out the

demand for industrial goods. In the case of consumer goods industry, the change in the consumers' preference, technological innovations and substitute products affect the demand.

4. Nature of the competition

Nature of competition is an essential factor that determines the demand for the particular product, its profitability and the price of the concerned company scrips. The supply may arise from indigenous producers and multinationals. In the case of detergents, it is produced by indigenous manufactures and distributed locally at a competitive price. This poses a threat to the company made products. The multinational are also entering into the field with sophisticated product process and better quality product. Now the companies' ability to withstand the local as well as the multinational competition counts much. If too many firms are present in the organized sector, the competition would be severe. The competition would lead to a decline in the price of the product. The investor before investing in the scrip of a company should analyse the market share of the particular company's product and should compare it with the top five companies.

5. Government policy

The government policies affect the very nerve of the industry and the effects differ from industry to industry. Tax subsidies and tax holidays are provided for export oriented products. Government regulates the size of the production and the pricing of certain products. The sugar, fertilizer and pharmaceutical industries are often affected by the inconsistent government polices. Control and decontrol of sugar price affect the profitability of the sugar industry. In some cases entry barriers are placed by the government. In the airways, private corporate are permitted to operate the domestic flights only. When selecting an industry, the government policy regarding the particular industry should be carefully evaluated. Liberalization and delicensing have brought immense threat to the existing domestic industries in several sectors.

6. Labour

The analysis of labor scenario in a particular industry is of great importance. The number of trade unions and their operating mode has impact on the labour productivity and modernization of the industry. Textile industry is known for its militant trade unions. If the trade unions are strong and strikes occur frequently, it would lead to fall in the production. In an industry of high fixed cost, the stoppage of production may lead to loss.

When trade unions oppose the introduction of automation, in the product market the company may stand to lose with high cost of production. The unhealthy labour relationship leads to loss of customers' goodwill too.

Skilled labour is needed for certain industries. In the case of Indian labour market, even in computer technology or in any other industry skilled and well-qualified labour is available at a cheaper rate. This is one of the many reasons attracting the multinationals to set up companies in India.

7. Research and development

For any industry to survive the competition in the national and international markets, product and production process have to be technically competitive. This depends on the R & D in the particular company or industry. Economies of scale and new market can be obtained only through R & D. the percentage of expenditure made on R & D should be studied diligently before making an investment.

INDUSTRY CHARACTERISTICS

In an industry analysis there are a number of key characteristics that should be considered by the analyst.

1. Demand supply gap

The demand for the product usually trends to change at a steady rate, where as the capacity to produce the product tends to change at irregular intervals, depending upon the installation of additional production capacity. As result an industry is likely to experience under supply and over supply of capacity at different times. Excess supply reduces the profitability of the industry through a decline in the unit price realization. On the contrary, insufficient supply tends to improve the profitability through higher unit price realization.

2. Competitive conditions in the industry

The level of competition among various companies in an industry is determined by certain competitive forces. These competitive forces are: barriers to entry, the threat of substitution, bargaining power of the suppliers and the rivalry among competitors.

3. Permanence

Permanence is the phenomenon related to the products and the technology used by the industry. if an analyst feels that the need for a particular industry will vanish in a short period ,or that the rapid technological changes would render the products obsolete within short period of time, it would be foolish to invest such industry.

4. Labour conditions

In our country the labour unions are very power full .if the labour in a particular industry is rebellious and is inclined to resort to strikes frequently, the prospects of that industry cannot become bright.

5. Attitude of government

The government may encourage certain industries and can assist such industries through favorable legislation. On the contrary, the government may look with disfavor on certain other industries .in India this has been the experience of alcoholic drinks and cigarette industries. A prospective investor should consider the role of government is likely to play in the industry.

6. Supply of raw materials

This is also one of the important factor determine the profitability of an industry. Some industry may have no difficulty in obtaining the major raw materials as they may be indigenously available in plenty. Other industries may have to depend on a few manufactures within the country or on imports from outside the country for their raw material supply.

7. Cost structure

The cost structure that is the fixed and variable cost, affect the cost of production and profitability of the firm. The higher the fixed cost component, higher is the sales volume necessary to achieve breakeven point. conversely, the lower the proportion of fixed cost relative to variable cost ,lower would be the breakeven point provides higher margin of safety an analyst would consider favorably an industry that has a lower breakeven point.

EXTERNAL SOURCES OF INFORMATION FOR INDUSTRY ANALYSIS

1. Federal Government

The federal government publishes a wide variety of data that can be useful during the industry phase of the analysis. It is well worth the time to thumb through the Census of Manufacturers, Federal Reserve Bulletins, and Survey of Current Business in order to appreciate more fully the wealth of information, helpful in the economic as well as industry analysis, available in these government sources. Many private sources use these government – furnished data in their own security – analysis efforts.

2. Investment Services

Many investment services are available to furnish the investor or analyst with valuable industry and corporate information. The ones we highlight in this section are perhaps the best known.

(a) Standard and Poor's

Standard and Poor' regularly covers a number of different industries in two ways: a basic analysis and a current update of the basic analysis. The basic analysis provides an in – depth report on all facets of the industry and the firms comprising the industry. A revised

basic analysis is published approximately every year. The current update, entitled Current Analysis and Outlook, is published roughly every quarter.

Standard & Poor's also publishes the Security Price Index Record, containing indexes of the S & P's groupings, which are helpful when performing an industry analysis.

(b) The Value Line

The Value Line also publishes industry data but in a considerably more condensed from than does Standard & Poor's. On a weekly basis, the Value Line ranks the probable market performance of industries over the next twelve months, and in the case of individual stocks, their probable performance over the next twelve months and the next three to five years.

(c) Forbes

The early – January issue of Forbes contains its "Annual Report on American Industry". This report includes a number of rankings of probability, growth, and stock – market performance of more than 700 U.S. corporations. Of interest here are its rankings of major industry groupings, from which the analyst can see which groups appear to be on the move.

(d) Trade Publications

Virtually every major U.S. industry has at least one trade association, which in its publications reports much data pertaining to the industry its represents. The analyst can locate these sources, as well as references to various industries in other publications, by checking the Business periodicals Index and the Science and Technology Index, as well as secondary sources.

(e) Funk and Scott Index

The Funk and Scott Index of Corporations and Industries provides a valuable indexing service for the investor or analyst seeking published industry and company information. This service, published monthly, lists articles appearing in more than 700 trade and business publications. Funk and Scott index this information by SIC and by company name. The researcher can then consult the various cited articles and obtain information on the industry, company, or competition of the firm under investigation.

QUESTIONS

1. Explain the utility of the economic analysis and state the economic factors considered for this analysis.

2. How do various indicators predict the prospect for investment in stocks?

3. Why is industry analysis important? Why should it follow the economic analysis?

4. Explain the concept of industry life cycle? Describe the different stages in the industry life cycle.

5. Describe the various characteristics of an industry that an analyst must consider while doing industry analysis.

UNIT IV

COMPANY ANALYSIS

Company analysis is the final stage of fundamental analysis. The economy analysis provides the investor a broad outline of the prospects of growth in the economy, the industry analysis helps the investor to select the industry in which investment would be rewarding. Now he has to decide the company in which he should invest his money. Company analysis provides answer to this question.

Company analysis deals with the estimation of return and risk of individual shares. This calls for information. Many pieces of information influence investment decisions. Information regarding companies can be broadly classified into two broad groups: internal and external. Internal information consists of data and events made public by companies concerning their operations. The internal information sources include annual reports to shareholders, public and private statements of officers of the company, the company's financial statements, etc. External sources of information are those generated independently outside the company. These are prepared by investment services and the financial press.

In company analysis, the analyst tries to forecast the future earnings of the company because there is a strong evidence that the earnings have a direct and powerful effect upon share prices. The level, trend and stability of earnings of a company, however depend upon a number of factors concerning the operations of the company.

FINANCIAL STATEMENTS

The prosperity of a company would depend upon its profitability and financial health. The financial statements published by company periodically help us to assess the profitability and financial health of the company. The two basic financial statements provided by a company are the balance sheet and the profit and loss account. The first gives us a picture of the company's assets and liabilities while the second gives us a picture of its earnings.

The balance sheet gives the list of assets and liabilities of a company on a specific date. The major categories of assets are fixed assets and current assets. Fixes assets are those assets which are intended to be used up over a period of several years. Current assets are those assets which are intended to be converted into cash in the near future (within one year). The major categories of liabilities are categorised of liabilities are outside liabilities and liability towards share holders. The outside liabilities are categorised as short – term and long - term liabilities. The short – term liabilities which are expected to be paid off within the next one year are known as current liabilities. The balance sheet indicates the financial position of a company on a particular date, namely the last day of the accounting year.

The profit and loss account, also called income statement, reveals the revenue earned, the cost incurred and the resulting profit or loss of the company for one accounting year. The profit after tax (PAT) divided by the number of shares gives the earnings per share (EPS) which is a figure in which most investors are interested. The profit – and – loss account summarises the activities of a company during an accounting year.

ANALYSIS OF FINANCIAL STATEMENTS

The financial statements of a company can be used to evaluate the financial performance of the company. Financial ratios are most extensively used for the purpose. Ratio analysis helps an investor to determine the strengths and weaknesses of a company. It also helps him to assess whether the financial performance and financial strength are improving or deteriorating. Ratios can be used for comparative analysis either with other firms in the industry through a cross sectional analysis or with the past data through a time series analysis.

Different ratios measure different aspects of a company's performance or health. Four groups of ratios may be used for analysing the performance of a company.

Liquidity Ratios

These measure the company's ability to fulfill its short – term obligations and reflect its short – term financial strength or liquidity. The commonly used liquidity ratios are:

1. Current Ratio $= \dfrac{\text{Total Current Assets}}{\text{Total Current Liabilities}}$

2. Quick Ratio (or Acid Test) ratio $= \dfrac{\text{Current assets – Inventory – Prepaid expenses}}{\text{Current Liabilities}}$

A higher current ratio would enable a company to meet its short – term obligations even if the value of current assets declines. The quick ratio represents the ratio between quick assets and current liabilities. It is a more rigorous measure of liquidity. However, both these ratios are to be used together to analyse the liquidity of a company.

Leverage Ratios

These ratios are also known as capital structure ratios. They measure the company's ability to meet its long – term debt obligations. They throw light on the long – term solvency of a company. The commonly used leverage ratios are the following

1. Debt - equity Ratio $= \dfrac{\text{Long – term debt}}{\text{Shareholder' equity}}$

2. Total debt ratio or Debt to total assets ratio $= \dfrac{\text{Total debt}}{\text{Total assets}}$

3. Proprietary ratio = $\dfrac{\text{Shareholders' equity}}{\text{Total assets}}$

4. Interest coverage ratio = $\dfrac{\text{Earnings before interest and taxes (EBIT)}}{\text{Interest}}$

The first three ratios indicate the relative contribution of owners and creditors in financing the assets of the company. These ratios reflect the safety margin available to the long – term creditors. The coverage ratio measures the ability of the company to meet its interest payments arising from the debt.

Profitability Ratios

The profitability of a company can be measured by the profitability ratios. These ratios are calculated by relating the profits either to sales, or to investment, or to the equity shares. Thus, we have three groups of profitability ratios. These are listed below.

1. **Profitability related to sales**

   (a) Gross profit ratio = $\dfrac{\text{Gross profit (Sales – Cost of goods sold)}}{\text{Sales}}$

   (b) Operating profit ratio = $\dfrac{\text{EBIT}}{\text{Sales}}$

   (c) Net proof ratio = $\dfrac{\text{Earnings after tax (EAT)}}{\text{Sales}}$

   (d) Administrative expenses ratio = $\dfrac{\text{Administrative expenses}}{\text{Sales}}$

   (e) Selling expenses ratio = $\dfrac{\text{Selling expenses}}{\text{Sales}}$

   (f) Operating expenses ratio = $\dfrac{\text{Administrative expenses + Selling expenses}}{\text{Sales}}$

   (g) Operating ratio = $\dfrac{\text{Cost of goods sold + Operating expenses}}{\text{Sales}}$

2. **Profitability related to sales**

   (a) Return on assets = $\dfrac{\text{Earnings after tax}}{\text{Total assets}}$

   (b) Return on capital employed = $\dfrac{\text{EBIT}}{\text{Total capital employed}}$

   (c) Return on equity = $\dfrac{\text{EAT}}{\text{Shareholders' equity}}$

3. Profitability related to equity shares

(a) Earnings per share (EPS) $= \dfrac{\text{Net profit available to equity shareholders'}}{\text{Number of equity shares}}$

(b) Earnings yield $= \dfrac{\text{EPS}}{\text{Market price per share}}$

(c) Dividend yield $= \dfrac{\text{DPS (dividend per share)}}{\text{Market price per share}}$

(d) Dividend payout ratio $= \dfrac{\text{DPS}}{\text{EPS}}$

(a) Price earnings ratio (P/E ratio) $= \dfrac{\text{Market price per share}}{\text{EPS}}$

4. Overall profitability

(d) Return on Investment (ROI) $= \dfrac{\text{EAT}}{\text{Sales}} \times \dfrac{\text{Sales}}{\text{Total assets}}$ or $\dfrac{\text{EAT}}{\text{Total assets}}$

The overall profitability is measured by the return on investment, which is the product of net profit and investment turnover. It is a central measure of the earning power or operating efficiency of a company.

Activity or Efficiency Ratios

These are also known as turnover ratios. These ratios measure the efficiency in asset management. They express the relationship between sales and the different types of assets, showing the speed with which these assets generate sales. Important activity ratios are enumerated below.

1. Current assets turnover $= \dfrac{\text{Sales}}{\text{Current assets}}$
2. Fixed assets turnover $= \dfrac{\text{Sales}}{\text{Fixed assets}}$
3. Total assets turnover $= \dfrac{\text{Sales}}{\text{Total assets}}$
4. Inventory turnover $= \dfrac{\text{Sales}}{\text{Average inventory}}$
5. Debtors turnover $= \dfrac{\text{Sales}}{\text{Average debtors}}$

Ratio analysis is a method of interpreting the financial statements of a company. A single ratio by itself is not of much use. A comprehensive evaluation of the financial performance of a company emerges only from a study of all the important ratios.

Ratios calculated from the financial statements reveal the performance during the past years. For an investor what is important is the future prospects of a company and not its past achievements. From an analysis of past performance, the analyst has to forecast the future prospects of the company. The investment decision would depend on such forecast.

Other Variables

The future prospects of a company would also depend upon a number of other variables some of which are given below.

1. Company's market share
2. Capacity utilization
3. Modernisation and expansion plans
4. Order book position
5. Availability of raw materials

Some of these informations may be available in the director's report and the chairman's speech at the annual general meeting of the company. Others may be available in financial journals and magazines.

The most important variable affecting the future prospects of a company's is perhaps the quality of its management. But assessing the quality and competence of management is perhaps the most difficult task in company analysis. Some critical aspects of a company's management which every investor must consider carefully are their commitment and competence, professionalism, future orientation, image building, investor friendliness and government relation building. The future of a company depends on the quality and competence of its management to a very great extend.

Assessment of Risk

Company analysis involves not only an estimation of future returns, but also an assessment of the variability in returns called risk. The variability in returns arises primarily because of variability in sales. The sensitivity of profits to changes in the level of sales is measured by a ratio called degree of total leverage (DTL). This ratio is used as a measure of risk. It is calculated as follows:

$$DTL = \frac{Contribution}{Profit\ before\ tax\ (PBT)}$$

It may be noted that contribution means sales minus the variable cost.

DTL may be subdivided into two components: (a) the degree of operating leverage (DOL) arising from the cost structure of the company, and (b) the degree of financial leverage (DFL) arising from the capital structure of the company.

DOL measures the percentage change in EBIT for a one per cent change in sales and is computed as:

$$DOL = \frac{Contribution}{EBIT}$$

DFL measures the percentage change in PBT for a one per cent change in EBIT and is computed as:

$$DFL = \frac{EBIT}{PBT}$$

The degree of total leverage (DTL) is the product of DOL and DFL and measures the percentage change in PBT for a one per cent change is sales.

The investment decision is ultimately a decision to invest in the shares of one or more specific companies. Company analysis deals with an analysis of various factors affecting the performance of companies so as to forecast the future earnings of a company as also its variability better known as risk.

TECHNICAL ANALYSIS

A technical analysis believes that the share prices are determined by the demand and supply forces operating in the market. These demand and supply forces in turn are influenced by a number of fundamental factors as well as certain psychological or emotional factors. Many of these factors cannot be quantified. The combined impact of all these factors is reflected in the share price movement. A technical analyst therefore concentrates on the movement of share prices. He claims that by examining past share price movements future share prices can be accurately predicted. Technical analysis is the name given to forecasting techniques that utilise historical share price data.

The rationale behind technical analysis is that share price behaviour repeats itself over time and analysts attempt to derive methods to predict this repetition. A technical analyst looks at the past share price data to see if he can establish any patterns. He then looks at current price data to see if any of the established patterns are applicable and, if so, extrapolations can be made to predict the future price movements. Although past share prices are the major data used by technical analyst, other statistics such as volume of trading and stock market indices are also utilized to some extent.

The basic premise of technical analysis is that prices move in trends or waves which may be upward or downward. It is believed that the present trends are influenced by the past trends and that the projection of future trends is possible by an analysis of past price trends. A technical analyst, therefore, analyses the price and volume movements of individual securities as well as the market index. Thus, technical analysis is really a study of past or historical price and volume movements so as to predict the future stock price behaviour.

DOW THEORY

Whatever is generally being accepted today as technical analysis has its roots in the Dow theory. The theory is so called because it was formulated by Charles H.Dow who was the editor of the Wall Street Journal in U.S.A. In fact, the theory was presented in a series of editorials in the Wall Street Journal during 1900 – 1902.

Charles Dow formulated a hypothesis that the stock market does not move on a random basis but is influenced by three distinct cyclical trends that guide its direction. According to Dow theory, the market has three movements and these movements are simultaneous in nature. These movements are the primary movements, secondary reactions and minor movements.

The primary movement is the long range cycle that carries the entire market up or down. This is the long – term trend in the market. The secondary reactions act as a restraining force on the primary movement. These are in the opposite direction to the primary movement and last only for a short while. These are also known as corrections. For example, when the market is moving upwards continuously, this upward movement will be interrupted by downward movements of short durations. These are the secondary reactions. The third movement in the market is the minor movements which are the day – to – day fluctuations in the market. The minor movements are not significant and have no analytical value as they are of very short duration. The three movements of the market have been compared to the tides, the waves and the ripples in the ocean.

According to Dow theory, the price movements in the market can be identified by means of a line chart. In this chart, the closing prices of shares or the closing values of the market index may be plotted against the corresponding trading days. The chart would help in identifying the primary and secondary movements.

Figure 3.1 shows a line chart of the closing values of the market index. The primary trend of the market is upwards but there are secondary reactions in the opposite direction. Among the three movements in the market, the primary movement is considered to be the most important.

The primary trend is said to have three phases in it, each of which would be interrupted by a counter move or secondary reaction which would retrace about 33 – 66 per cent of the earlier rise or fall.
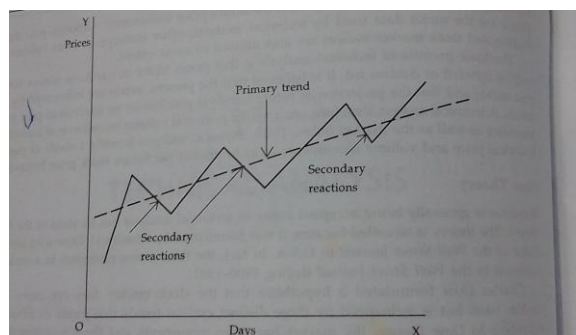

Fig. 3.1 Primary Trend and Secondary Reactions

1. Bullish Trend

During a bull market (upward moving market), in the first phase the prices would advance with the revival of confidence in the future of business. The future prospects of business in general would be perceived to be promising. This will prompt investors to buy shares of companies. During the second phase, prices would advance due to the improvements in corporate earnings. In the third phase, prices advance due to inflation and speculation. Thus, during the bull market, the line chart would exhibit the formation of three peaks. Each peak would be followed by a bottom formed by the secondary reaction. Each peak would be higher than previous peak, each successive bottom would be higher than the previous peak, each successive bottom would be higher than the previous bottom. According to Dow theory, the formation of higher bottoms and higher tops indicates a bullish trend. The three phases of bull market are depicted in Fig. 3.2

Fig.3.2 Three Phases of Bull Market

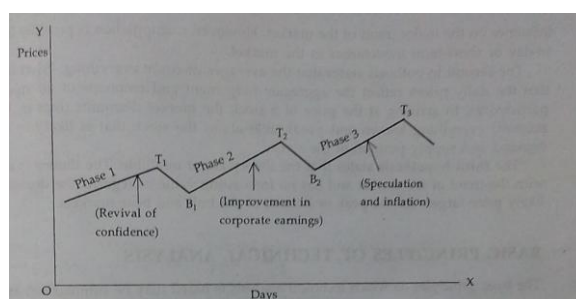## 2. Bearish Trend

The bear market is also characterised by three phases. In the first phase, prices begin to fall due to abandonment of hopes. Investors begin to sell their shares. In the second phase, companies start reporting lower profits and lower dividends. This causes further fall in prices due to increased selling pressure. In the final phase, prices fall still further due to distress

selling. A bearish market would be indicated by the formation of lower tops and lower bottoms.

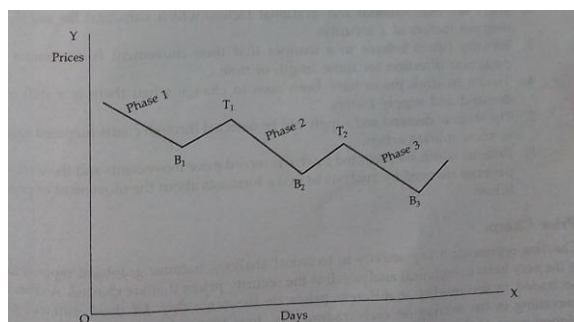The three phases of a bear market are depicted in Fig.3.3

Fig.3.3 Three Phases of a Bear Market

The Dow theory laid emphasis on volume of transactions also. According to the theory, volume should expand along the main trend. This means that if the main trend is bullish, the volume should increase with the rise in prices and fall during the intermediate reactions. In a bearish market when prices are falling, the volume should increase with the fall in prices and be smaller during the intermediate reactions.

The theory also makes certain assumptions which have been referred to as the hypothesis of the theory.

The first hypothesis states that the primary trend cannot be manipulated. It means that no single individual or institution or group of individuals and institutions can exert influence on the major trend of the market. However, manipulation is possible in the day – to – day or short – term movements in the market.

The second hypothesis states that the averages discount everything. What it means is that the daily prices reflect the aggregate judgement and emotions of all stock market participants. In arriving at the price of a stock the market discounts (that is, takes into account) everything known and predictable about the stock that is likely to affect the demand and supply position of the stock.

The third hypothesis states that the theory is not infallible. The theory is concentrated with the trend of the market and has no forecasting value as regards the duration or the likely price targets for the peak or bottom of the bull and bear markets.

BASIC PRINCIPLES OF TECHNICAL ANALYSIS

The basic principles on which technical analysis is based may be summarised as follows;

1. The market value of a security is related to demand and supply factors operating in the market.

2. There are both rational and irrational factors which surround the supply and demand factors of security.

3. Security prices behave in a manner that their movement is continuous in a particular direction for some length of time.

4. Trends in stock prices have been seen to change when there is a shift in the demand and supply factors.

5. The shifts in demand and supply can be detected through charts prepared specially to show market action.

6. Patterns which are projected by charts record price movements and these recorded patters are used by analysts to make forecasts about the movement of prices in future.

PRICE CHARTS

Charting represents a key activity in technical analysis, because graphical representation is the very basis of technical analysis. It is the security prices that are charted. A share may be traded in the market at different prices on the same day. Of these different prices prevailing in the market on each trading day, four prices are important. These are the highest price of the day, the lowest price of the day, the opening price (first price of the day) and the closing price (last price of the day). Of these four prices again, the closing price is by far the most important price of the day because it is the closing price that is used in most analysis of share prices.

The price chart is the basic tools used by the technical analyst to study the share price movement. The prices are plotted on an XY graph where the X axis represents the trading days and the Y axis denotes the prices.

The oldest charting procedure was known as the point and figure (P & F) charting. It is now out of vogue. Three types of price charts are currently used by technical analysts. These are the line chart or the closing price chart, the bar chart and the Japanese candlestick chart.

1. Line Chart

It is the simplest price chart. In this chart, the closing prices of a share are plotted on the XY graph on a day to day basis. The closing price of each day would be represented by a point on the XY graph. All these points would be connected by a straight line which would indicate the trend of the market. A line chart is illustrated in Fig. 3.4
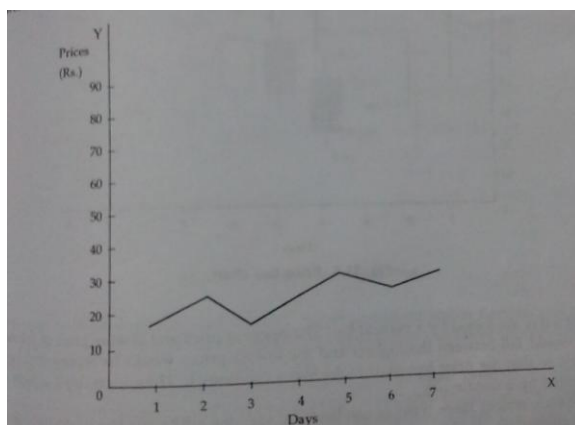
Fig.3.4 Line Chart of Closing Prices

2. Bar chart

It is perhaps the most popular chart used by technical analysts. In this chart, the highest price, the lowest price and the closing price of each day are plotted on a day – to – day basis. A bar is formed by joining the highest price and the lowest price of a particular day by a vertical line. The top of the bar represents the highest price of the day, the bottom of the bar represents the lowest price of the day and a small horizontal hash on the right of the bar is used to represent the closing price of the day. Sometimes, the opening price of the day is marked as a hash on the left side of the bar. An example of a price bar chart is shown in Fig. 3.5

Fig. 3.5 Price Bar Chart

3. Japanese Candlestick Charts

Japanese Candlestick Chart shows the highest price, the lowest price, the opening price and the closing price of shares on a day – to – day basis. The highest price and the lowest price of a day are joined by a vertical bar. The opening price and closing price of the day which would fall between the highest and the lowest prices would be represented by a

rectangle so that the price bar chart looks like a candlestick. Thus, each day's activity is represented by a candlestick.
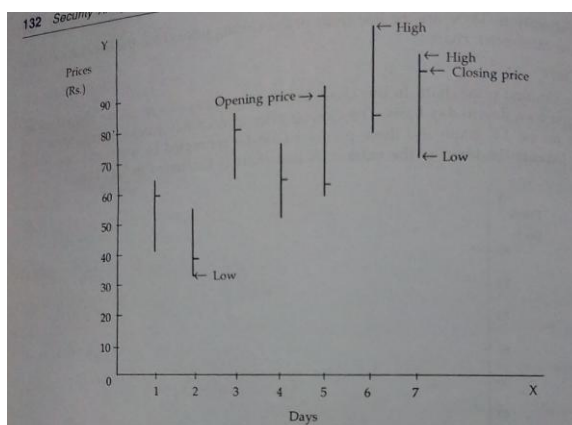
There are mainly three types of candlesticks, viz., white, the black and the doji or neutral candlestick. A white candlestick is used to represent a situation where the closing price of the day is higher than the opening price. A black candlestick is used when the closing price of the day is lower than the opening price. Thus, a white candlestick indicates a bullish trend while a black candlestick indicates a bearish trend. A doji candlestick is the one where the opening price and the closing price of the day are same. Japanese Candlestick Chart is illustrated in Fig. 3.6.
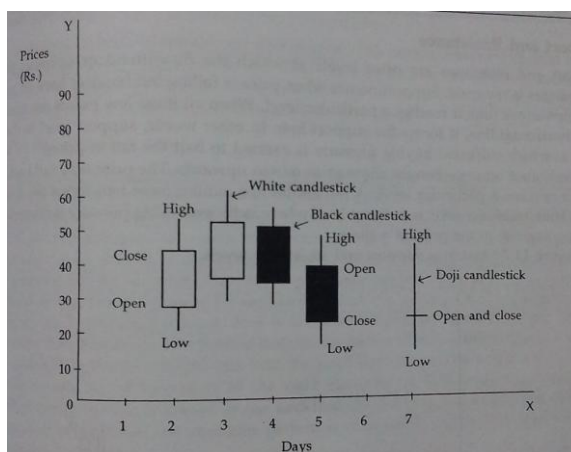
Fig. 3.6 Japanese Candlestick Chart

TRENDS AND TREND REVERSALS

Trend is the direction of movement of share prices in the market. When the prices move upwards, it is a rising trend or uptrend. When the prices move downwards, we have a falling trend or downtrend. We have a flat trend when the prices move within a narrow range.

Share prices seldom move in a straight line. The main trend is interrupted by short-term counter movements known as secondary reactions. The result is a zig-zag movement giving rise to alternating tops and bottoms. The formation of higher bottoms and higher tops indicates a rising trend, while the formation of lower tops and lower bottoms indicates a falling trend.

The change in the direction of trend is referred to as trend reversal. A share that exhibits a rising trend may start to move narrowly or fall after sometime. This change in the direction of movement represents a trend reversal. The reversal from a rising trend to a falling trend is marked by the formation of a lower top and a lower bottom. In the same way, the reversal from a falling trend to a rising trend is characterized by the formation of a higher bottom and a higher top.

A technical analyst tries to identify the trend reversals at an early stage so as to trade profitably in the market. When the trend reverses and begin to rise the technical analyst would recommend purchase of the share. When the trend begins to fall, sale is indicated. During a flat trend the investor should stay away from the market.

CHART PATTERNS

When the price bar charts of several days are drawn close together, certain patterns emerge. These patterns are used by the technical analyst to identify trend reversal and predict the future movement of prices. The chart patterns may be classified as support and resistance patterns, reversal patterns and continuation patterns.

1. Support and Resistance

Support and resistance are price levels at which the downtrend or uptrend in price movements is reversed. Support occurs when price is falling but bounces back or reverses direction every time it reaches a particular level. When all these low points are connected by a horizontal line, it forms the support line. In other words, support level is the price level at which sufficient buying pressure is exerted to halt the fall in prices.

Resistance occurs when the share price moves upwards. The price may fall back every time it reaches a particular level. A horizontal line joining these tops forms the resistance level. Thus, resistance level is the price level where sufficient selling pressure is exerted to halt the ongoing rise in the price of a share. Fig. 3.7 illustrates support and resistance levels. If the scrip were to break the support level and move downwards, it has bearish implications signaling the possibility of a further fall in prices. Similarly, if the scrip were to penetrate the resistance level it would be indicative of a bullish trend or a further rise in prices.

Once a support level is violated, it would reverse roles and become a resistance level for any future upward movement in price. Similarly, resistance level which is violated becomes the new support level for any future downward movement in price.
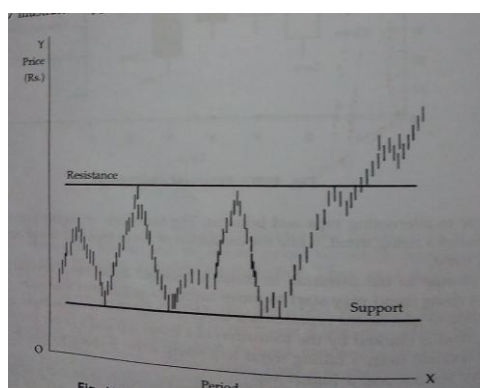

Fig. 3.7 Support and Resistance Levels

2. **Reversal Patterns**

Price movements exhibit uptrends and downtrends. The trends reverse direction after a period of time. These reversals can be identified with the help of certain chart formations that typically occur during these trend reversals. Thus, reversal patterns are chart formations that tend to signal a change in direction of the earlier trend.

a)Head and Shoulder Formation

The most popular reversal pattern is the Head and Shoulder formation which usually occurs at the end of a long uptrend. This formation exhibits a hump or top followed by a still higher top or peak and then another hump or lower top. This formation resembles the head and two shoulders of a man and hence the name head and shoulder formation.

The first hump, known as the left shoulder, is formed when the prices reach the top under a strong buying impulse. Then trading volume becomes less and there is a short downward swing. This is followed by another high volume advance, which takes the price to a higher top known as the head. This is followed by another reaction on less volume which takes the price down to a bottom near to the earlier downsizing. A third rally now occurs taking the price to a height less than the head but comparable to the left shoulder. This rally results in the formation of the right shoulder. A horizontal line joining the bottoms of this formation is known as the neckline. As the price penetrates this neckline, the formation of the head and shoulder pattern is completed. Fig.3.8 shows a header and shoulder formation. The head and shoulder formation usually occurs at the end of a bull phase and is indicative of a reversal of trend. After breaking the neckline, the price is expected to decline sharply.
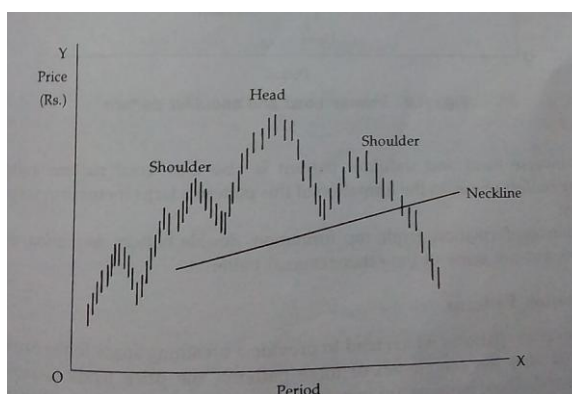

Fig.3.8 Head and Shoulder Formation

b) Inverse Head and Shoulder Formation

This pattern is the reverse of the head and shoulder formation described above and is really an inverted head and shoulder pattern. This occurs at the end of a bear phase and consists of three distinct bottoms. The first bottom is the left shoulder, then comes a lower

bottom which forms a head, followed by a third bottom which is termed the right shoulder. The neckline is drawn by joining the tops from which the head and the right shoulder originate. When the price rises above the neckline the formation of the pattern is considered to be completed. An inverse head and shoulder formation is shown in Fig.3.9.

The inverse head and shoulder pattern is also a reversal pattern indicative of an oncoming bullish phase. In the formation of this pattern a large increase in volume becomes necessary.

Double top formation, triple top formation, double bottom formation, triple bottom formation etc are some of the other reversal patterns.
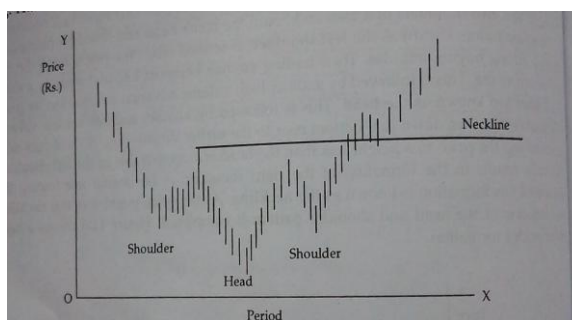
Fig.3.9 Inverse Head and Shoulder Pattern

3. Continuation Patterns

There are certain patterns which tend to provide a breathing space to the earlier sharp rise or fall and after the completion of these patterns, the price tends to move along the original trend. These patterns are formed during side way movements of share prices and are called continuation patterns because they indicate a continuation of the trend prevailing before the formation of the pattern.

a) Triangles

Triangles are the most popular among the continuation patterns. Triangles are formed when the price movements result in two or more consecutive descending tops and two or more consecutive ascending bottoms. The triangle becomes apparent on the chart when the consecutive tops are joined by a straight line and the consecutive bottoms are joined by another straight line. The two straight lines are the upper trend line and the lower trend line respectively. A triangle is illustrated in fig. 3.10.

The triangle formation may occur during a bull phase or a bear phase. In either case it would indicate a continuation of the trend. It is generally seen that the volume diminishes during the movement within the triangular pattern. The breakout from the pattern is usually accompanied by increasing volume.
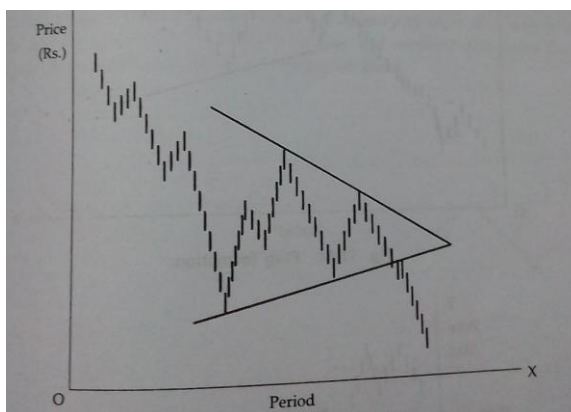
Fig. 3.10 Triangle Formation

c) Flags and Pennants

These are considered to be very reliable continuation patterns. They represent a brief pause in a fast moving market. They occur mid-way between a sharp rise in price or a steep fall in price.

The flag formation looks like a parallelogram with the two lines forming two parallel lines. The volume of trading is expected to fall during the formation of the flag and again pick up on breaking out from the pattern. The fig.3.11 illustrates the flag formation.

The pennant formation looks like a symmetrical triangle. The upper trendline formed by connecting the tops stoops downwards, whereas the lower trendline formed by connecting the bottoms rises upwards. A pennant formation is illustrated in fig. 3.12

The pennant is formed midway between either a bullish trend or a bearish trend and signals the continuation of the same trend. The break out from the pattern is market by increased volume of trading.
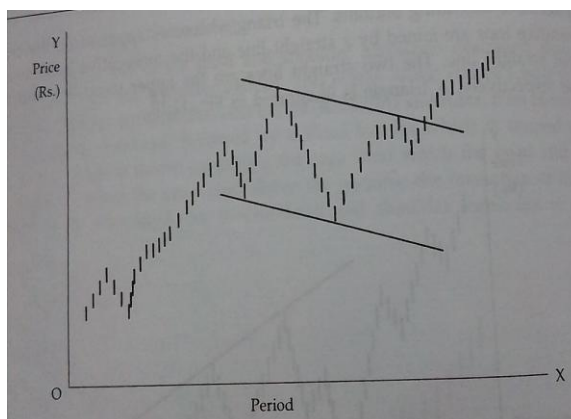
Fig. 3.11 Flag Formation
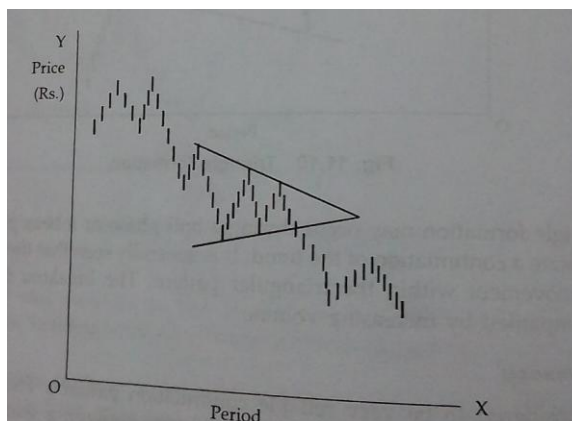
Fig. 3.12 Pennant Formation

ELLIOT WAVE THEORY

There are many theories which seek to explain the behaviour of the stock market. One such theory, in technical analysis, is the wave theory formulated by Ralph Elliot, known as the Elliot wave theory.

The theory was formulated in 1934 by Elliot after analyzing seventy five years of stock price movements and charts. From his studies he concluded that the market movement was quite orderly and followed a pattern of waves.

A wave is a movement of the market price from one change in the direction to the next change in the same direction. The waves are the result of buying and selling impulses emerging from the demand and supply pleasures on the market. Depending on the demand and supply pressures, waves are generated in the prices.

According to this theory, the market moves in waves. A movement in a particular direction can be represented by five distinct waves. Of these five waves, three waves are in the direction of the movement and are termed as impulse waves. Two waves are against the direction of the movement and are termed as corrective waves or reaction wave. Waves 1, 3 and 5 are the impulse waves and waves 2 and 4 are the corrective waves. Figure 3.13 illustrates the wave theory of Elliot.

The wave 1 is upwards and wave 2 corrects the wave 1. Similarly, wave 3 and 5 are those with and upward impulse and wave 4 corrects wave 3.

Corrections involve correcting the earlier rise. Thus, wave 2 would correct the rise of wave 1; wave 4 would correct the rise of wave 3 and after the completion of wave, 5 there would come a correction which would be labeled ABC. This correction would be in three waves in which waves A and C will be against the trend and wave b will be along the trend. This ABC correction following the fifth wave would correct the entire rise from the start of

wave 1 to the end of the fifth wave. It would be greater in dimension than either the second or fourth corrective wave.

One complete cycle consists of waves made up of two distinct phases, bullish and bearish. One the full cycle of waves is completed after the termination of the 8 wave movement, there will be a fresh cycle starting with similar impulses arising out of market trading.

The Elliot wave theory is based on the principle that action is followed by reaction. Although the wave theory is not perfect and there are many limitations in its practical use, it is accepted as one of the tools of technical analysis. The theory is used for predicting the future price changes and in deciding the timing of investment.
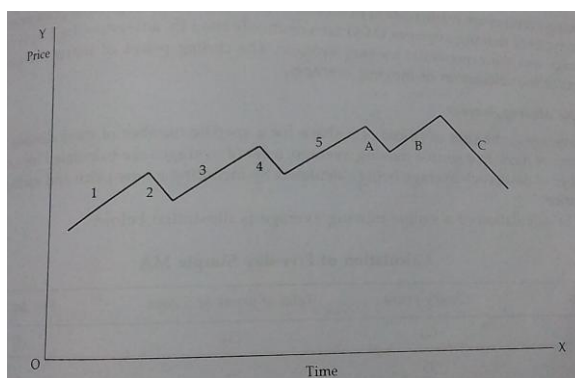
Fig.3.13 Representation of Elliot Wave Theory

MATHEMATICAL INDICATORS

Share prices do not rise or fall in straight lines. The movements are erratic. This makes it difficult for the analyst to gauge the underlying trend. He can use the mathematical tool of moving averages to smoothen out the apparent erratic movements of share prices and highlight the underlying trend.

1. Moving Average

Moving averages are mathematical indicators of the underlying trend of the price movement. Two types of moving averages (MA) are commonly used by analysts – the simple moving average and the exponential moving average. The closing prices of shares are generally used for the calculation of moving averages.

a) Simple Moving Average

An average is the sum of prices of a share for a specific number of days divided by the number of days. In a simple moving average, a set of averages are calculated for a specific number of days, each average being calculated by including a new price and excluding an old price. The calculation of a simple moving averages is illustrated below:

Calculation of Five – Day Simple MA

Days	Closing Prices	Total of Prices of 5 Days	Five Day MA
1.	33	-	-
2.	35	-	-
3.	37.5	-	-
4.	36	-	-
5.	39	180.5	36.1
6.	40	187.5	37.5
7.	40.5	193.0	38.6
8.	38.5	194.0	38.8
9.	41	198.0	39.6
10.	42	202.0	40.4
11.	44	206.0	41.2
12.	42.5	208.0	41.6
13.	42	211.5	42.3
14.	44	214.5	42.9
15.	45	217.5	43.5

The first total of 180.5 in column 3 is obtained by adding the prices of the first five days, that is, (33 + 35 + 37.5 + 36 + 39). The second total of 187.5 in column 3 is obtained by adding the price of the 6th day and deleting the price of the first day from the first total, that is, (180.5 + 40 – 33). This process is continued. The moving average in column 4 is obtained by dividing the total figure in column 3 by the number of days, namely 5.

b)Exponential Moving Average

Exponential moving average (EMA) is calculated by using the following formula:

EMA = (Current closing price – Previous EMS) x Factor + Previous EMA

Where

$$\text{Factor} = \frac{2}{n+1}$$

and n = number of days for which the average is to be calculated.

The calculation of exponential moving average is illustrated below.

Calculation of Five – Day EMA

Days	Closing Prices	EMA
1.	33	33
2.	35	33.66
3.	37.5	34.93
4.	36	35.28
5.	39	36.51
6.	40	37.66
7.	40.5	38.60
8.	38.5	38.57
9.	41	39.37
10.	42	40.24

Here,

$$\text{Factor} = \frac{2}{n+1} = \frac{2}{5+1} = \frac{2}{6} = 0.33$$

The EMA for the first day is taken as the closing price of that day itself. The EMA for the second day is calculated as shown below.

EMA = (Closing price – Previous EMA) x Factor + Previous EMA

= (35 – 33) x 0.33 + 33 = 33.66

EMA for the third day = (37.5 – 33.66) x 0.33 + 33.66 = 34.93

If we are calculating the five day exponential moving average, the correct five day EMA will be available from the sixth day onwards.

A moving average represents the underlying trend in the share price movement. The period of the average indicates the type of trend being identified. For example, a five day or ten day average would indicate the short – term trend; a 50 day average would indicate the medium – term trend and a 200 day average would represent the long – term trend.

The moving averages are plotted on the price charts. The curved line joining these moving averages represent the trend line. When the price of the share intersects and moves above or below this trendline, it may be taken as the first sign of trend reversal.

Sometimes, two moving averages – one short term and the other longer – term – are used in combination. In this case, trend reversal is indicated by the intersection of the two moving averages.

c) Oscillators

Oscillators are mathematical indicators calculated with the help of the closing price data. They help to identify overbought and oversold conditions and also the possibility of trend reversals. These indicators are called oscillators because they move across a reference point.

d) Rate of change indicator (ROC)

It is very popular oscillator which measures the rate of change of the current price as compared to the price a certain number of days or weeks back. To calculate a 7 day rate of change, each day's price is divided by the price which prevailed 7 days ago and then 1 is subtracted from this price ratio.

$$\text{ROC} = \frac{\text{Current price}}{\text{Price 'n' period age}} - 1$$

The calculation of ROC is illustrated below:

Calculation of 7 Day ROC

Days	Closing Prices	Closing Price 7 days ago	Price ratio	ROC = Ratio - 1
1.	70	-	-	-
2.	72	-	-	-
3.	73	-	-	-
4.	70	-	-	-
5.	74	-	-	-
6.	76	-	-	-
7.	77	-	-	-
8.	75	70	1.07	0.07
9.	78	72	1.08	0.08
10.	80	73	1.10	0.10
11.	79	70	1.13	0.13
12.	78	74	1.05	0.05
13.	76	76	1.00	0.00
14.	75	77	0.97	-0.03
15.	77	75	1.03	0.03
16.	78	78	1.00	0.00
17.	76	80	0.95	-0.05
18.	75	79	0.95	-0.05

The ROC values may be positive, negative or zero. An ROC chart is shown in Fig. 3.14 where the X axis represents the time and the Y axis represents the values of the ROC. The ROC values oscillate across the zero line. When the ROC line is above the zero line, the price is rising and when it is below the zero line, the price is falling.

Ideally, one should buy a share that is oversold and sell a share that is overbought. In the ROC chart, the overbought zone is above the zero line and the oversold zone is below the zero line. Many analysts use the zero line for identifying buying and selling opportunities. Upside crossing (from below to above the zero line) indicates a buying opportunity, while a downside crossing (from above to below the zero line) indicated a selling opportunity.

The ROC has to be used along with the price chart. The buying and selling signals indicated by the ROC should also be confirmed by the price chart.
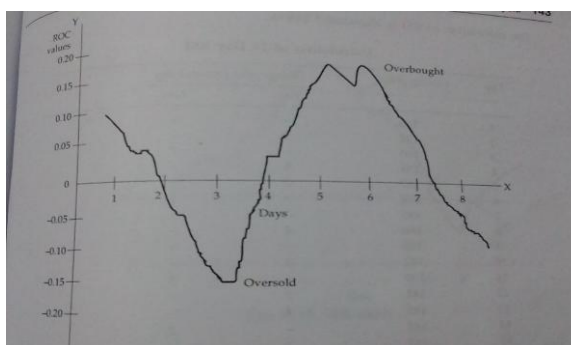
Fig.3.14 ROC Chart

e) Relative Strength Index (RSI)

This is a powerful indicator that signals buying and selling opportunities ahead of the market. RSI for a share is calculated by using the following formula.

$$RSI = 100 - [100 / (1 + RS)]$$

Where

$$RS = \frac{\text{Average gain per day}}{\text{Average loss per day}}$$

The most commonly used time period for the calculation of RSI is 14 days. For the calculation a 14 day RSI, the gain per day or loss per day is arrived at by comparing the closing price of a day with that of the previous day for a period of 14 days. Similarly, the losses are added up and divided by 14 to get the average loss per day. The average gain per day and the average loss per day are used in the above formula for calculating the RSI for a day. In this way RSI values can be calculated for a number of days.

The calculation of RSI is illustrated below.

Calculation of 14 Day RSI

Day	Closing price	Change over previous day	
		Gain	Loss
1	130	-	-
2	132	2	-
3	130	-	2
4	135	5	-
5	137	2	-
6	134	-	3
7	136	2	-
8	140	4	-
9	140	-	-
10	142	2	-
11	139	-	3
12	141	2	-
13	145	4	-
14	143	-	2
15	145	2	-
Total		**25**	**10**
14 Day Average		**(25/14)=1.786**	**(10/14)=0.714**

$$RS = (1.786/0.714) = 2.50$$

$$RSI = 100 - [100/(1+2.50)]$$

$$= 100 - (100/3.50)$$

$$= 100 - 28.58 = 71.42$$

This is the RSI for day 15. In this way the RSI values for the subsequent days can be calculated by taking the closing prices of 14 previous days. The RSI values range from 0 to 100. These values are then plotted on an XY graph as shown in below fig. 3.15

RSI values above 70 are considered to denote overbought condition and values below 30 are considered to denote oversold condition. When the RSI has crossed the 30 lines from below to above and is rising, a buying opportunity is indicated. When it has crossed the 70 line from above to below and is falling, a sell signal is indicated.

f) Moving Average Convergence and Divergence (MACD)

MACD is an oscillator that measures the convergence and divergence between two exponential moving averages. A short –term exponential moving average and a long –term exponential moving average are calculated with the help of the closing price data. A 12-day and 48-day exponential moving averages constitute a popular combination. The difference between the short-term EMA and the long-term EMA represents MACD.

The MACD values for different days are derived by deducting the long-term EMA for each day from the corresponding short-term EMA for the day. These MACD values are plotted on an XY graph with MACD values on the Y axis and time periods on X axis. The MACD line would oscillate across the zero line. If the MACD line crosses the zero line from above, the trend can be considered to have turned bearish, signaling a selling opportunity. On the other hand, if the MACD line moves above the zero line from below, the trend can be said to have turned bullish and indicates a buying opportunity.

Sometimes, a simple moving average or an exponential moving average of the MACD values is superimposed over the MACD graph. Then buy and sell signals are generated by the cross over of the average line and the MACD line. When the lines are below the zero line, if the MACD line crosses the average line from below to above, it indicates a buying opportunity. When the lines are above the zero line, crossing of the MACD line from above to below the average line signals a selling opportunity.
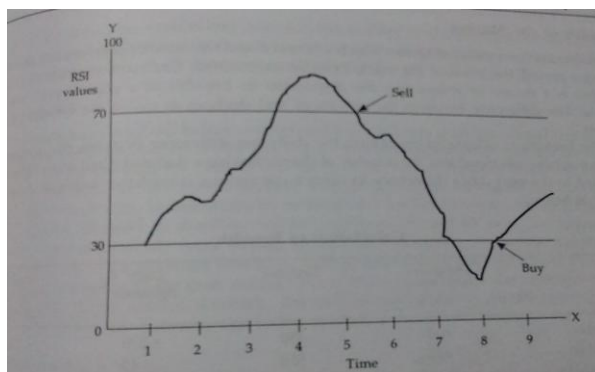
Fig. 3.15 RSI Chart

MARKET INDICATORS

Technical analysis focuses its attention not only on individual stock price behavior, but also on the general trend of the market. Indicators used by technical analyst to study the trend of the market as a whole are known as market indicators. Some of these indicators

a) Breadth of the Market

By comparing the number of shares which advanced and the number of shares that declined during a period, the trend of the market can be ascertained. Comparison of advances and decline is a means of measuring the dispersion or breadth of a general price rise or decline. The difference between the advances and declines is called the breadth of the market

The breadth is calculated by taking the daily net difference between the number of shares that have advanced and the number of shares that have declined. Each day's difference is added to the next day's difference to form a continuous cumulative index as shown in the table below.

Calculation of Breadth

Day	Advances	Declines	Daily difference	Bread=th (Cumulative difference)
Monday	620	350	+270	+270
Tuesday	470	510	-40	+230
Wednesday	360	610	-250	-20
Thursday	585	380	+250	+185
Friday	705	270	+435	+620

The index is plotted as a line graph and compared with the market index. Normally, breadth and market index move in unison. When they diverge, a key signal occurs. In case of divergence, the breadth line shows the true direction of the market. For instances, during a bull market if breadth declines to new lows while the market index makes new highs a peak

is suggested followed by a downturn in stock prices. Breadth may also signal recovery. This happens when the breadth line begins to rise even as the market index is reaching new lows.

b) Short Interest

A speculator often resorts to short selling which is selling a share that is not owned by the person. This is done when the speculator feels that the price of the stock will fall in future. He hopes to purchase the share at a later date (cover his short position) below the selling price and reap a profit.

The volume of short sales in the market can be used as a market indicator. As a technical indicator, short selling is called short interest. The expectation is that short sellers must eventually cover this positions. This buying activity increases the demand for stocks. Thus, short interest has significance for the market as a whole.

Monthly short selling volume is related to the average daily volume for the preceding month. Thus, monthly short selling volume is divided by average daily volume to give a ratio which indicates how many days of trading it would take to cover up total short sales.

In general, when the ratio is less than 1.0, the market is considered to be weakening or 'overbought'. A decline should follow sooner or later. Values above 1.5 are considered to indicate that the market is 'oversold' and is likely to turn bullish shortly.

c) Odd-Lot Index

Small investors are presumed to buy smaller number of shares than the normal trading lot of 100 shares. These are known as odd lots and the buyers and sellers of odd lots are called odd lotters. Technical analysis believe that the odd lotters are inclined to do the wrong thing at critical turns in the market because of their presumed lack of sophistication.

An odd-lot index can be calculated by relating odd-lot purchases to odd-lot sales. The odd-lot index is obtained by dividing odd-lot by odd-lot sales. An increase in this index suggest relatively more buying activity and vice versa. At or near the peak of a bull market, when the investors should be selling their shares, the odd lotters would be buying proportionately more than selling. Thus, the odd-lot index rises noticeably just before a decline in the market. Similarly, the odd-lot sales increase greatly causing a fall in the odd-lot index just before a rise in the market.

d) Mutual Fund Cash Ratio

Mutual funds represent one of the most important institutional forces in the market. Mutual fund cash as a percentage of their net assets on a daily or weekly basis has been a popular market indicator. Mutual funds keep cash to take advantage of favourable market opportunities and to provide for redemption of their units by holders. The theory is that a low

cash ratio of, say about five per cent, would indicate a reasonably fully invested position leaving negligible buying power in their hands. Low cash ratios are equated with market highs indicating that the market is about to decline. At market bottoms the cash ratio would be high. This is an indication of potential purchasing power which can propel a rise in prices. Thus, high mutual fund cash ratio signals a rise in prices of shares.

A few other market indicators are also being used but technical analysts to predict changes in the direction of the overall market.

e) Technical Analysis vs Fundamental Analysis

Fundamental analysis tries to estimate the intrinsic value of a security by evaluating the fundamental factors affecting the economy, industry and company. This is a tedious process and takes a rather long time to complete the process.

Technical analysis studies the price and volume movements in the market and by carefully examining the pattern of these movements, the future price of the stock is predicted. Since the whole process involves much less time and data analysis, compared to fundamental analysis, it facilitates timely decision.

Fundamental analysis helps in identifying undervalued or overvalued securities. But technical analysis helps in identifying the best timing of an investment, i.e. the best time to buy or sell a security identified by fundamental analysis as undervalued or overvalued. Thus, technical analysis may be used as a supplement to fundamental analysis rather than as a substitute to it. The two approaches, however, differ in terms of their databases and tools of analysis. Fundamental analysis and technical analysis are two alternative approaches to predicting stock price behavior. Neither of them is perfect nor complete by itself.

Technical analysis has several limitations. It is not an accurate method of analysis. It is often difficult to identify the patterns underlying stock price movements. Moreover, it is not easy to interpret the meaning of patterns and their likely impact on future price movements.

THE BASIS OF TECHNICAL ANALYSIS

What makes Technical Analysis an effective tool to analyze price behavior is explained by following theories given by Charles Dow:

1. Price discount everything
2. Price movements are not totally random
3. What is more important than why

1. Price discount everything

"Each price represents a momentary consensus of value of all market participants – large commercial interests and small speculators, fundamental researchers, technicians and gamblers- at the moment of transaction" – Dr Alexander Elder

Technical analysts believe that the current price fully reflects all the possible material information which could affect the price. The market price reflects the sum knowledge of all participants, including traders, investors, portfolio managers, buy-side analysts, sell-side analysts, market strategist, technical analysts, fundamental analysts and many others. It would be folly to disagree with the price set by such an impressive array of people with impeccable credentials. Technical analysis looks at the price and what it has done in the past and assumes it will perform similarly in future under similar circumstances. Technical analysis looks at the price and assumes that it will perform in the same way as done in the past under similar circumstances in future.

2. Price movements are not totally random

Technical analysis is a trend following system. Most technicians acknowledge that hundreds of years of price charts have shown us one basic truth – prices move in trends. If prices were always random, it would be extremely difficult to make money using technical analysis. A technician believes that it is possible to identify a trend, invest or trade based on the trend and make money as the trend unfolds. Because technical analysis can be applied to many different time frames, it is possible to spot both short-term and long-term trends.

3. What is more important than why

It is said that "A technical analyst knows the price of everything, but the value of nothing". Technical analysts are mainly concerned with two things:

1. The current price

2. The history of the price movement

Technical analysis represents a direct approach. The price is the final result of the fight between the forces of supply and demand for any tradable instrument. The objective of analysis is to forecast the direction of the future price. Fundamentalists are concerned with why the price is what it is. For technicians, the why portion of the equation is too broad and many times the fundamental reasons given are highly suspect. Technicians believe it is best to concentrate on what and never mind why. Why did the price go up? It is simple, more buyers (demand) than sellers (supply). The principles of technical analysis are universally applicable. The principles of support, resistance, trend, trading range and other aspects can be

applied to any chart. Technical analysis can be used for any time horizon; for any marketable instrument like stocks, futures and commodities, fixedincome securities, forex, etc.

TECHNICAL ANALYSIS: THE BASIC ASSUMPTIONS

The field of technical analysis is based on three assumptions:

1. The market discounts everything.

2. Price moves in trends.

3. History tends to repeat itself.

1. The market discounts everything

Technical analysis is criticized for considering only prices and ignoring the fundamental analysis of the company, economy etc. Technical analysis assumes that, at any given time, a stock's price reflects everything that has or could affect the company including fundamental factors. The market is driven by mass psychology and pulses with the flow of human emotions. Emotions may respond rapidly to extreme events, but normally change gradually over time. It is believed that the company's fundamentals, along with broader economic factors and market psychology, are all priced into the stock, removing the need to actually consider these factors separately. This only leaves the analysis of price movement, which technical theory views as a product of the supply and demand for a particular Stock in the market.

2. Price moves in trends

"Trade with the trend" is the basic logic behind technical analysis. Once a trend has been established, the future price movement is more likely to be in the same direction as the trend than to be against it. Technical analysts frame strategies based on this assumption only.

3. History tends to repeat itself

People have been using charts and patterns for several decades to demonstrate patterns in price movements that often repeat themselves. The repetitive nature of price movements is attributed to market psychology; in other words, market participants tend to provide a consistent reaction to similar market stimuli over time. Technical analysis uses chart patterns to analyze market movements and understand trends.

Strengths of Technical Analysis

1. Not Just for stocks

Technical analysis has universal applicability. It can be applied to any financial instrument - stocks, futures and commodities, fi xed-income securities, forex, etc

2. Focus on price

Fundamental developments are followed by price movements. By focusing only on price action, technicians focus on the future. The price pattern is considered as a leading indicator and generally leads the economy by 6 to 9 months. To track the market, it makes sense to look directly at the price movements. More often than not, change is a subtle beast. Even though the market is prone to sudden unexpected reactions, hints usually develop before significant movements. You should refer to periods of accumulation as evidence of an impending advance and periods of distribution as evidence of an impending decline.

3. Supply, demand, and price action

Technicians make use of high, low and closing prices to analyze the price action of a stock. A good analysis can be made only when all the above information is present separately, these will not be able to tell much. However, taken together, the open, high, low and close reflect forces of supply and demand.

4. Support and resistance

Charting is a technique used in analysis of support and resistance level. These are trading range in which the prices move for an extended period of time, saying that forces of demand and supply are deadlocked. When prices move out of the trading range, it signals that either supply or demand has started to get the upper hand. If prices move above the upper band of the trading range, then demand is winning. If prices move below the lower band, then supply is winning.

5. Pictorial price history

A price chart offers most valuable information that facilitates reading historical account of a security's price movement over a period of time. Charts are much easier to read than a table of numbers. On most stock charts, volume bars are displayed at the bottom. With this historical picture, it is easy to identify the following:

i) Market reactions before and after important events

ii) Past and present volatility

iii) Historical volume or trading levels

iv) Relative strength of the stock versus the index.

6. Assist with entry point

Technical analysis helps in tracking a proper entry point. Fundamental analysis is used to decide what to buy and technical analysis is used to decide when to buy. Timings in this context play a very important role in performance. Technical analysis can help spot

demand (support) and supply (resistance) levels as well as breakouts. Checking out for a breakout above resistance or buying near support levels can improve returns. First of all you should analyze stock's price history. If a stock selected by you was great for the last three years has traded fl at for those three years, it would appear that market has a different opinion. If a stock has already advanced significantly, it may be prudent to wait for a pullback. Or, if the stock is trending lower, it might pay to wait for buying interest and a trend reversal.

Weaknesses of Technical Analysis

1. Analyst bias

Technical analysis is not hard core science. It is subjective in nature and your personal biases can be reflected in the analysis. It is important to be aware of these biases when analyzing a chart. If the analyst is a perpetual bull, then a bullish bias will overshadow the analysis. On the other hand, if the analyst is a disgruntled eternal bear, then the analysis will probably have a bearish tilt.

2. Open to interpretation

Technical analysis is a combination of science and art and is always open to interpretation. Even though there are standards, many times two technicians will look at the same chart and paint two different scenarios or see different patterns. Both will be able to come up with logical support and resistance levels as well as key breaks to justify their position. Is the cup half-empty or half-full? It is in the eye of the beholder.

3. Too late

You can criticize the technical analysis for being too late. By the time the trend is identified, a substantial move has already taken place. After such a large move, the reward to risk ratio is not great. Lateness is a particular criticism of Dow Theory.

4. Always another level

Technical analysts always wait for another new level. Even after a new trend has been identified, there is always another "important" level close at hand. Technicians have been accused of sitting on the fence and never taking an unqualified stance. Even if they are bullish, there is always some indicator or some level that will qualify their opinion.

QUESTIONS

1. What is company analysis? Explain how financial ratios can be used to determine the strengths and weaknesses of a company?

2. How does ratio analysis reflect the financial health of a company?

3. What are the ratios calculated by investor before making investments?

4. Explain the Dow theory.

5. Describe the formation of bullish trend and bearish trend in the market.

6. What are price charts? Describe the different types of price charts used by technical analysts.

7. Describe the chart patterns that help to identify trend reversal.

8. "The Elliot Wave Theory is based on the principle that action is followed by reaction".

9. How are moving averages useful in studying trends and trend reversals?

10. What are oscillators? Explain the calculation and interpretation of any one oscillator.

11. What is RSI? Explain its calculation and interpretation.

12. Describe the important market indicators that are useful in studying the trend of the market.

13. Explain the merits and demerits of technical analysis as a tool of security analysis.

UNIT – V

INTRODUCTION

Investing in securities such as shares, debentures and bonds is profitable as well as exiting. It is indeed rewarding, but involves a great deal of risk and calls for scientific knowledge as well as artistic skill. In such investments, both rational as well as emotional responses are involved. Investing in financial securities in now considered to be one of the best avenues for investing one's savings while it is acknowledged to be one of the most risky avenues of investment.

It is rare to find investors investing their entire savings in a single security. Instead, they tend to invest in a group of securities. Such a group of securities is called a portfolio. Creation of a portfolio helps to reduce risk without sacrificing returns. Portfolio management deals with the analysis of individual securities as well as with the theory and practice of optimally combining securities into portfolios. An investor who understands the fundamental principles and analytical aspects of portfolio management has a better chance of success.

WHAT IS PORTFOLIO MANAGEMENT?

An investor considering investment in securities is faced with the problem of choosing from among a large number of securities. His choice depends upon the risk – return characteristics of individual securities. He would attempt to choose the most desirable securities and like to allocate his funds over this group of securities. Again he is faced with the problem of dealing which securities to hold and how much to invest in each. The investor faces an infinite number of possible portfolios or groups of securities. The risk and return characteristics of portfolio differ from those of individual securities combining to form a portfolio. The investor tries to choose the optimal portfolio taking into consideration the risk – return characteristics of all possible portfolios.

As the economic and financial environment keeps changing, the risk – return characteristics of individual securities as well as portfolios also change. This calls for periodic review and revision of investment portfolios of investors.

An investor invests his funds in a portfolio expecting to get a good return consistent with the risk that he has to bear. The return realised from the portfolio has to be measured and the performance of the portfolio has to be evaluated.

It is evident that rational investment activity involves creation of an investment portfolio. Portfolio management comprises all the processes involved in the creation and maintenance of an investment portfolio. It deals specifically with security analysis, portfolio

analysis, portfolio selection, portfolio revision and portfolio evaluation. It also makes use of analytical techniques of analysis and conceptual theories regarding rational allocation of funds. Portfolio management is a complex process which tries to make investment activity more rewarding and less risky.

PORTFOLIO CONSTRUCTION

Portfolio is a combination of securities such as stocks, bonds and money market instruments. The process of blending together the broad asset classes so as to obtain optimum return with minimum risk is called portfolio construction. Diversification of investments helps to spread risk over many assets. A diversification of securities gives the assurance of obtaining the anticipated return on the portfolio. In a diversified portfolio, some securities may not perform as expected, but others may exceed the expectation and making the actual return of the portfolio reasonably close to the anticipated one. Keeping a portfolio of single security may lead to a greater livelihood of the actual return somewhat different from that of the expected return. Hence, it is a common practice to diversify securities in the portfolio.

APPROACHES IN PORTFOLIO CONSTRUCTION

Commonly, there are t approaches in the construction of the portfolio of securities viz, traditional approach and Markowitz efficient frontier approach. In the traditional approach, investor's needs in terms of income and capital appreciation re evaluated and appropriate securities are selected to meet the needs of the investor. The common practice in the traditional approach is to evaluate the entire financial plan of the individual. In the modem approach, portfolios are constructed to maximize the expected return for a given level of risk. It views portfolio construction in terms of the expected return and the risk associated with obtaining the expected return.

1. The Traditional Approach

The traditional approach basically deals with two major decisions. They are:

   a) Determining the objectives of the portfolio
   b) Selection of securities to be included in the portfolio.

Normally, this is carried out in four to six steps. Before formulating the objectives, the constraints of the investor should be analysed. Within the given frame work of constraints, objectives are formulated. Then based on the objectives, securities are selected. After that, the risk and return of the securities should be studied. The investor has to assess the major risk categories that he or she is trying to minimize. Compromise on risk and non-risk factors has to be carried out. Finally relative portfolio weights are assigned to securities

like bonds, stocks and debentures and then diversification is carried out. The flow chart 4.5 explains this

Analysis of Constraints

The constraints normally discussed are: income needs, liquidity time harizon, safety, tax considerations and the temperament.

Income Needs

The income needs depend on the need for income in constant rupees and current rupees. The need for income in current rupees arises from the investor's need to meet all or part of the living expenses. At the same time inflation may erode the purchasing power, the investor may like to offset the effect of the inflation and so, needs income in constant rupees.

Steps In Traditional Approach

```
┌─────────────────────────────┐
│   Analysis of constraints   │
└─────────────────────────────┘
              ↓
┌─────────────────────────────┐
│  Determination of Objectives │
└─────────────────────────────┘
              ↓
┌─────────────────────────────┐
│    Selection of Portfolio   │
└─────────────────────────────┘
              ↓
┌─────────────────────────────┐
│    Bond and Common Stock    │
└─────────────────────────────┘
              ↓
┌─────────────────────────────┐
│  Assessment of risk and return │
└─────────────────────────────┘
              ↓
┌─────────────────────────────┐
│       Diversification       │
└─────────────────────────────┘
```
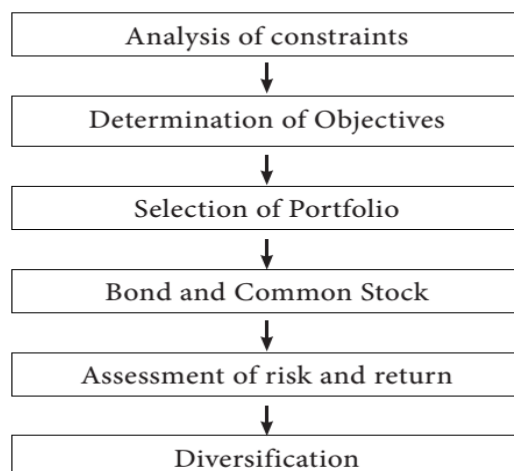
(a) **Need for current income**

The investor should establish the income which the portfolio should generate. The current income need depends upon the entire current financial plan of the investor. The expenditure required to maintain a certain level of standard of living and the other entire income generating source should be determined. Once this information is arrived at, it is possible to decide how much income must be provided for the port1olio of securities.

(b) **Need for Constant Income**

Inflation reduces the purchasing power of the money. Hence, the investor estimates the impact of inflation on his estimated stream of income and tries to build a portfolio which could offset the effect of inflation. Funds should be invested in such securities where income from them might increase at a rate that would offset the effect of inflation. The

inflation or purchasing power risk must be recognized but this does not pose a serious constraint on portfolio if growth stocks are selected.

Liquidity

Liquidity need of the investment is highly individualistic of the investor. If the investor prefers to have high liquidity then funds should be invested in high quality short term debt maturity issues such as money market funds, commercial papers and shares that are widely traded. Keeping, the funds in shares that are poorly traded or stocks in closely held business and real estate lack liquidity. The investor should plan his cash drain and the need for net cash inflows during the investment period.

Safety of the Principal

Another serious constraint to be considered by the investor is the safety of the principal value at the time of liquidation. Investing in bonds and debentures is safer than investing in the stocks. Even among the stocks, the money should be invested in regularly traded companies of longstanding. Investing money in the unregistered finance companies may not provide adequate safety.

Time Horizon

Time horizon is the investment-planning period of the individuals. This varies from individual to individual. Individual's risk and return preferences are often described in terms of his "life cycle". The stages of the life cycle determine the nature of investment. The first stage is the early career situation. At the career starting point assets are lesser than their liabilities. More goods are purchased on credit. His house might have been built with the help of housing loan scheme. His major asset may be the house he owns. His priority towards investments may be in the form of savings for liquidity purposes. He takes life insurance for protecting him from unforeseen events like death and accidents and then he thinks of the investments. The investor is young at this stage and has long horizon of life expectancy with possibilities of growth in income, he can invest in high-risk and growth oriented investments.

The other stage of the time horizon is the mid-career individual. At this stage, his assets are larger than his liabilities. Potential pension benefits are available to him. By this time he establishes his investment program. The time horizon before him is not as long as the earlier stage and he wants to protect his capital investment. He may wish to reduce the overall risk exposure of the portfolio but, he may continue to invest in high risk and high return securities.

The final stage is the late career or the retirement stage. Here, the time horizon of the investment is very much limited. He needs stable income and once he retires, the size of income he needs from investment also increases. In this stage, most of his loans are repaid by him and his assets far exceed the liabilities. His pension and life insurance programmes are completed by him. He shifts his investment to low return and low risk category investments, because safety of the principal is given priority. Mostly he likes to have lower risk with high interest or dividend paying component to be included in his portfolio. Thus, the time horizon puts restrictions on the investment decisions.

Tax Consideration

Investors in the income tax paying group consider the tax concessions they could get from their investments. For all practical purpose, they would like to reduce the taxes. For income tax purpose, interests and dividends are taxed under the head "income from other sources". The capital appreciation is taxed under the head "capital gains" only when the investor sells the securities and realises the gain. The tax is then at a concessional rate depending on the period for which the asset has been held before being sold. From the tax point of view, the form in which the income is received i. e. interest, dividend, short term capital gains and long term capital gains are important. If the investor cannot avoid taxes, he can delay the taxes. Investing in government bonds and NSC can avoid taxation. This constraint makes the investor to include the items which will reduce the tax.

Temperament

The temperament of the investor himself poses a constraint on framing his investment objectives. Some investors are risk lovers or takers who would like to take up higher risk even for low return while some investors are risk averse, who may not be willing to undertake higher level of risk even for higher level of return. The risk neutral investors match the return and the risk. For example, if a stock is highly volatile in nature then the stock may be selling in a range of ` l00 - 200 and returns may fluctuate. Investors who are risk averse would find it disturbing and do not have the temperament to invest in this stock. Hence, the temperament of the investor plays an important role in setting the objectives.

Determination of Objectives

Portfolios have the common objective of financing present and future expenditures from a large pool of assets. The return that the investor requires and the degree of risk he is willing to take depend upon the constraints. The objectives of portfolio range from income to capital appreciation. The common objectives are stated below.

a) Current income

b) Growth in income

c) Capital appreciation

d) Preservation of capital

The investor in general would like to achieve all the four objectives; nobody would like to lose his investment. But, it is not possible to achieve all the four objectives simultaneously. If the investor aims at capital appreciator, he should include risky securities where there is an equal likelihood of losing the capital. Thus, there is a conflict among the objectives.

Selection of Portfolio

The selection of portfolio depends on the various objectives of the investor. The selections of portfolio under different objectives are dealt subsequently.

Objectives and Asset Mix

If the main objective is getting adequate amount of current income, sixty per cent of the investment is made on debts and 40 per cent on equities. The proportions of investments on debt and equity differ according to the individual's preferences. Money is invested in short term debt and fixed income securities. Here the growth of income becomes the secondary objective and stability of principal amount may become the third. Even within the debt portfolio, the funds invested in short term bonds depends on the need for stability of principal amount in comparison with the stability of income. If the appreciation of capital is given third priority, instead of short term debt the investor opts for long term debt. The maturity period may not be a constraint.

Growth and Income and Asset Mix

Here the investor requires a certain percentage of growth in the e received from his investment. The investor's portfolio may consist of 60 to 100 percent equities and 0 to 40 percent debt instrument. The debt portion of the portfolio may consist of concession regarding tax exemption. Appreciation of principal amount is given third priority. For example computer software, hardware and non-conventional energy producing company shares provide good possibility of growth in dividend.

Capital Appreciation and Asset Mix

Capital appreciation and asset mix Capital appreciation means that the value of the original investment increases over the years. Investment in real estate's like land and house may provide a faster rate of capital appreciation but they lack liquidity. In the capital market, the values of the shares are much higher than their original issue prices. For example Satyam Computers, share value was ` 306 in April 1998 but in October 1999 the value was ` 1658.

Likewise, several examples can be cited. The market capitalisation also has increased. Next to real assets, the stock markets provide best opportunity for capital appreciation. If the investor's objective is capital appreciation, 90 to 100 per cent of his portfolio may consist of equities and 0-10% of debts. The growth of income becomes the secondary objective.
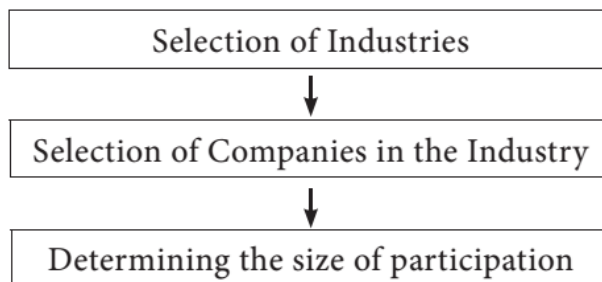
Safety of Principal and Asset Mix

Usually, the risk averse investors are very particular about the stability of principal. According to the life cycle theory, people in the third stage of life also give more importance to the safety of the principal. All the investors have this objective in their mind. No one likes to lose his money invested in different assets. But, the degree may differ. The investor's portfolio may consist more of debt instruments and within the debt portfolio more would be on short term debts.

Risk and Return Analysis

The traditional approach to portfolio building has some basic assumptions. First, the individual prefers larger to smaller returns from securities. To achieve this goal, the investor has to take more risk. The ability to achieve higher returns is dependent upon his ability to judge risk and his ability to take specific risks. The risks are namely interest rate risk, purchasing power risk, financial risk and market risk. The investor analyses the varying degrees of risk and constructs his portfolio. At first, he establishes the minimum income that he must have to avoid hardships under most adverse economic condition and then he decides risk of loss of income that can be tolerated. The investor makes a series of compromises on risk and non-risk factors like taxation and marketability after he has assessed the major risk categories, which he is trying to minimize.

Diversification

Once the asset mix is determined and the risk and return are analysed, the final step is the diversification of portfolio. Financial risk can be minimized by commitments to top-quality bonds, but these securities offer poor resistance to inflation. Stocks provide better inflation protection than bonds but are more vulnerable to financial risks. Good quality convertibles may balance the financial risk and purchasing power risk. According to the investor's need for income and risk tolerance level portfolio is diversified. In the bond portfolio, the investor has to strike a balance between the short term and long term bonds. Short term fixed income securities offer more risk to income and long term fixed income securities offer more risk to principal. In the stock portfolio, he has to adopt the following steps which are shown in the following figure:

```
┌─────────────────────────────────────────┐
│          Selection of Industries         │
└─────────────────────────────────────────┘
                     ↓
┌─────────────────────────────────────────┐
│    Selection of Companies in the Industry │
└─────────────────────────────────────────┘
                     ↓
┌─────────────────────────────────────────┐
│     Determining the size of participation │
└─────────────────────────────────────────┘
```

The investor has to select the industries appropriate to his investment objectives. Each industry corresponds to specific goals of the investor. The sales of some industries like two wheelers and steel tend to move in tandem with the business cycle, the housing industry sales move counter cyclically. If regular income is the criterion then industries, which resist the trade cycle should be selected. Likewise, the investor has to select one or two companies from each industry. The selection of the company depends upon its growth, yield, expected earnings, past earnings, expected price earning ratio, dividend and the amount spent on research and development. Selecting the best company is widely followed by all the investors but this depends upon the investors' knowledge and perceptions regarding the company. The final step in this process is to determine the number of shares of each stock to be purchased. This involves determining the number of different stocks that is required to give adequate diversification. Depending upon the size of the portfolio, equal amount is allocated to each stock. The investor has to purchase round lots to avoid transaction costs.

2. Modern Approach

The traditional approach is a comprehensive financial plan for the individual. It takes into account the individual needs such as housing, life insurance and pension plans. But these types of financial planning approaches are not done in the Markowitz approach. Markowitz gives more attention to the process of selecting the portfolio. His planning can be applied more in the selection of common stocks portfolio than the bond portfolio. The stocks are not selected on the basis of need for income or appreciation. But the selection is based on the risk and return analysis. Return includes the market return and dividend. The investor needs return and it may be either in the form of market return or dividend. They are assumed to be indifferent towards the form of return. From the list of stocks quoted at the Bombay Stock Exchange or at any other regional stock exchange, the investor selects roughly some group of shares say of 10 or 15 stocks. For these stocks' expected return and risk would be calculated. The investor is assumed to have the objective of maximizing the expected return and minimising the risk. Further, it

is assumed that investors would take up risk in a situation when adequately rewarded for it. This implies that individuals would prefer the portfolio of highest expected return for a given level of risk. In the modern approach, the final step is asset allocation process that is to choose the portfolio that meets the requirement of the investor. The risk taker i.e. who are willing to accept a higher probability of risk for getting the expected return would choose high risk portfolio. Investor with lower tolerance for risk would choose low level risk portfolio. The risk neutral investor would choose the medium level risk portfolio.

MANAGING THE PORTFOLIO

After establishing the asset allocation, the investor has to decide how to manage the portfolio over time. He can adopt passive approach or active approach towards the management of the portfolio. In the passive approach the investor would maintain the percentage allocation for asset classes and keep the security holdings within its place over the established holding period. In the active approach the investor continuously assess the risk and return of the securities within the asset classes and changes them. He would be studying the risks (1) market related (2) group related and (3) security specific and changes the components of the portfolio to suit his objectives.

CONSTRUCTION OF THE OPTIMAL PORTFOLIO

After determining the securities to be selected, the portfolio manager should find out how much should be invested in each security. The percentage of funds to be invested in each security can be estimated as follows:

$$X_i = \frac{Z_i}{\sum\limits_{i=1}^{N_c} Z_i}$$

$$Z_i = \frac{\beta_i}{\sigma_{ei}^2}\left(\frac{R_i - R_f}{\beta_i} - C^*\right)$$

The first expression indicates the weights on each security and they sum upto one. The second shows the relative investment in each security. The residual variance or the unsystematic risk has a role in determining the amount to be invested in each security.

Taking up the previous example

Z1 = 1/20 (14 – 8.29) = 0.285

Z2 = 1.5/30 (12 – 8.29) = 0.186

Z3 = 0.5/10 (12 – 8.29) = 0.086

Z4 = 2/40 (10 – 8.29) = 0.086

$$\sum_{i=1}^{n} +0.285 + 0.186 + 0.186 + 0.086$$

$= .743$

$X1 = 0.285/0.743 = 0.38$

$X2 = 0.186/0.743 = 0.25$

$X3 = 0.186/0.743 = 0.25$

$X4 = 0.086/0.743 = 0.12$

Thus, the proportions to be invested in different securities are obtained. The largest investment should be made in security 1 and the smallest in security 4.

OPTIMUM PORTFOLIO WITH SHORT SALES

The procedure used to calculate the optimal portfolio when short sales are allowed is, more or less similar to the procedure adopted for no short sales, except the cut-off point concept. At first, the stocks have to be ranked by excess return to beta. Here, all the stocks are added to the portfolio. They are either held long or short. All the stocks affect the cut-off point. The Z value has to be calculated for each stock. If the Z value is positive, the stock will be held long and if negative, it will be sold short. Stocks which are having excess return to beta above C* are held long as in the case of the portfolio without short sales. Stocks with an excess return to beta below C* aresold short. In the case of previous example C* = C = 7.9, if short sales are permitted, then

$$Z_i = \frac{\beta_i}{\sigma_{ei}^2} \left(\frac{R_i - R_f}{\beta_i} - C^* \right)$$

$Z_1 = 1/20(14 - 7.9) = 0.305$

$Z_2 = 1.5/30(12 - 7.9) = 0.205$

$Z_3 = 0.5/10(12 - 7.9) = 0.205$

$Z_4 = 2/40(10 - 7.9) = 0.105$

$Z_5 = 1/20(8 - 7.9) = 0.005$

$Z_6 = 0.5/50(8 - 7.9) = 0.001$

$Z_7 = 1.5/30(8 - 7.9) = - 0.095$

Example: 1

Calculate the expected return and variance of a portfolio comprising two securities, assuming that the portfolio weights are 0.75 for security 1 and 0.25 for security 2. The expected return for security 1 is 18 per cent and its standard deviation is 12 per cent,

while the expected return and standard deviation for security 2 are 22 per cent and 20 per cent respectively. The correlation between the two securities is 0.6.

Solution

Calculation of expected return of portfolio:

$$r_p = \sum_{i=1}^{n} x_i r_i$$

$= (0.75 \times 18) + (0.25 \times 22)$

$= 13.5 + 5.5 \ 19$ per cent

Calculation of portfolio variance:

$$\sigma_p^2 = x_1^2 \, \sigma_2^2 + x_2^2 \, \sigma_2^2 + 2x_1.x_2(r_{12}\sigma_1\sigma_2)$$

$(0.75)^2 \, (12)^2 + (0.25)^2 \, (20)^2 + 2 \, (0.75) \, (0.25) \, (0.6 \times 12 \times 20)$

$= 81 + 25 + 54 = 160$ percent

Example: 2

Consider two securities, P and Q, with expected returns of 15 per cent and 24 per cent respectively, and standard deviation of 35 per cent and 52 per cent respectively. Calculate the standard deviation of a portfolio weighted equally between the two securities if their correlation is -0.9.

Solution

Calculation of portfolio standard deviation:

$$\sigma_p^2 = x_1^2 \, \sigma_2^2 + x_2^2 \, \sigma_2^2 + 2x_1.x_2(r_{12}\sigma_1\sigma_2)$$

$(0.5)^2 \, (35)^2 + (0.5)^2 \, (52)^2 + 2 \, (0.5) \, (0.5) \, (-0.9 \times 35 \times 52)$

$= 306.25 + 676 - 819 = 163.25$

$\sigma = \sqrt{163.25} = 12.78$ percent.

Example: 3

The historical rates of return of two securities over the past ten years are given. Calculate the covariance and the correlation of the two securities.

Years	11	12	13	14	15	16	17	18	19	10
Security 1 (return percent)	112	18	17	114	116	115	118	220	116	222
Security 2 (return percent)	220	222	224	118	115	220	224	225	222	220

Solution

Calculation of Covariance

Year	R_1	Deviation (R1 – R1)	R_2	Deviation (R2 – R2)	Product of Deviations
1.	12	-2.8	20	-1	2.8
2.	8	-6.8	22	1	-6.8
3.	7	-7.8	24	3	-23.4
4.	14	-0.8	18	-3	2.4
5.	16	1.2	15	-6	-7.2
6.	15	0.2	20	-1	-0.2
7.	18	3.2	24	3	9.6
8.	20	5.2	25	4	20.8
9.	16	1.2	22	1	1.2
10.	22	7.2	20	-1	-7.2
	R1= 148/10= 14.8		R2= 210/10= 21		-8.00

$$\text{Covariance} = \frac{\sum_{i=1}^{N} [R_1 - R_1]}{N}$$

= -8/10 = -0.8

For calculation of correlation, the standard deviation of the two securities are also required.

Year	R_1	R_1	R_1	R_1
1.	12	144	20	400
2.	8	64	22	484
3.	7	49	24	576
4.	14	196	18	324
5.	16	256	15	225
6.	15	225	20	400
7.	18	324	24	576
8.	20	400	25	625
9.	16	256	22	484
10.	22	484	20	400
	148	2398	210	4494

Standard deviation of security 1

$$\sigma_1 = \sqrt{\frac{N\Sigma R_1^2 - (\Sigma R_1)^2}{N^2}}$$

$$= \sqrt{\frac{(10 \times 2398) - (148)^2}{10 \times 10}} \qquad = \sqrt{\frac{23980 - 21904}{100}}$$

$$= \sqrt{20.76} = 4.56 \qquad\qquad =$$

Standard deviation of security 2

$$\sigma_1 = \sqrt{\frac{N\Sigma R_2^2 - (\Sigma R_2)^2}{N^2}}$$

$$= \sqrt{\frac{(10 \times 4494) - (210)^2}{10 \times 10}}$$

$$= \sqrt{20.76} = 28.98$$

Correlation

$$r_{12} = \frac{cov_{12}}{\sigma_1 \sigma_2}$$

$$= \frac{-0.8}{4.56 \times 28.98} = \frac{-0.8}{132.15}$$

$$= -0.0061$$

Example: 4

A portfolio is constituted with four securities having the following characteristics:

Security	Return (per cent)	Proportion of investment
P	17.5	0.15
Q	24.8	0.25
R	15.7	0.45
S	21.3	0.15

Calculate the expected return of the portfolio.

Solution

$$r_p = \sum_{i=1}^{n} xiri$$

$$= (0.15 \times 17.5) + (0.25 \times 24.8) + (0.45 \times 15.7) + (0.15 \times 21.3)$$

= 2.625 + 6.200 + 7.065 + 3.195

= 19.085 per cent.

Example: 5

Given the following variance – covariance matrix for three securities, as well as the percentage of the portfolio that each security comprises, calculate the portfolio's standard deviation.

Security	A	B	C
A	425	-190	120
B	-190	320	205
C	120	205	175
	$W_A = 0.35$	$W_B = 0.25$	$W_C = 0.40$

Solution

The formula for the calculation of portfolio variance of a portfolio with more than two securities is as follows:

$$\sigma_p^2 = \sum_{i=1}^{n} \sum_{j=1}^{n} x_i x_j \sigma_{ij}$$

Weight	Security	0.35 A	0.25 B	0.40 C
0.35	A	425	-190	120
0.25	B	-190	320	205
0.40	C	120	205	175

σ_p = (0.35 x 0.35 x 425) + (0.35 x 0.25 x – 190) + (0.35 x 0.4 x 120) + (0.25 x 0.35 x -190) +

(0.25 x 0.25 x 320) + (0.25 x 0.4 x 205) + (0.4 x 0.35 x 120) + (0.4 x 0.25 x 205) +

(0.4 x 0.4 x 175)

= 52.06 – 16.63 + 16.8 – 16.63 + 20 + 20.5 + 16.8 + 20.5 + 28

= 141.40

The portfolio standard deviation is

$\sigma_p = \sqrt{141.40\ 11.89}$

PORTFOLIO REVISION

In portfolio management, the maximum emphasis is placed on portfolio analysis and selection which leads to the construction of the optimal portfolio. Very little discussion is seen on portfolio revision which is as important as portfolio analysis and selection.

The financial markets are continually changing. In this dynamic environment, a portfolio that was optimal when constructed may not continue to be optimal with the passage of time. It may have to be revised periodically so as to ensure that it continues to be optimal.

NEED FOR REVISION

The primary factor necessitating portfolio revision is changes in the financial markets since the creation of the portfolio. The need for portfolio revision may arise because of some investor related factors also. These factors may be listed as:

1. Availability of additional funds for investment
2. Change in risk tolerance
3. Change in the investment goals
4. Need to liquidate a part of the portfolio to provide funds for some alternative use

The portfolio needs to be revised to accommodate the changes in the investor's position. Thus, the need for portfolio revision may arise from changes in the financial market or changes in the investor's position, namely his financial status and preferences.

MEANING OF PORTFOLIO REVISION

A portfolio is a mix of securities selected from a vast universe of securities. Two variables determine the composition of a portfolio; the first is the securities included in the portfolio and the second is the proportion of total funds invested in each security.

Portfolio revision involves changing the existing mix of securities. This may be effected either by changing the securities currently included in the portfolio or by altering the proportion of funds invested in the securities. New securities may be added to the portfolio or some of the existing securities may be removed from the portfolio. Portfolio revision thus leads to purchases and sales of securities. The objective of portfolio revision is the same as the objective of portfolio selection, i.e. maximizing the return for a given level of risk or minimizing the risk for a given level of return. The ultimate aim of portfolio revision is maximization of returns and minimization of risk.

CONSTRAINTS IN PORTFOLIO REVISION

Portfolio revision is the process of adjusting the existing portfolio in accordance with the changes in financial markets and the investor's position so as to ensure maximum return from the portfolio with the minimum of risk. Portfolio revision or adjustment necessitates purchase and sale of securities. The practice of portfolio adjustment involving purchase and sale of securities gives rise to certain problems which act as constraints in portfolio revision. Some of these are discussed below:

1. Transaction Cost

Buying and selling of securities involve transaction costs such as commission and brokerage. Frequent buying and selling of securities for portfolio revision may push up transaction costs thereby reducing the gains from portfolio revision. Hence, the transaction costs involved in portfolio revision may act as a constraint to timely revision of portfolio.

2. Taxes

Tax is payable on the capital gains arising from sale of securities. Usually, long – term capital gains are taxed at a lower rate than short – term capital gains. To qualify as long – term capital gain, a security must be held by an investor for a period of not less than 12 months before sale. Frequent sales of securities in the course of periodic portfolio revision or adjustment will result in short – term capital gains which would be taxed at a higher rate compared to long term capital gains. The higher tax on short – term capital gains may act as a constraint to frequent portfolio revisions.

3. Statutory Stipulations

The largest portfolios in every country are managed by investment companies and mutual funds. These institutional investors are normally governed by certain statutory stipulations regarding their investment activity. These stipulations often act as constraints in timely portfolio revision.

4. Intrinsic Difficulty

Portfolio revision is a difficult and time consuming exercise. The methodology to be followed for portfolio revision is also not clearly established. Different approaches may be adopted for the purpose. The difficulty of carrying out portfolio revision itself may act as a constraint to portfolio revision.

PORTFOLIO REVISION STRATEGIES

Two different strategies may be adopted for portfolio revision, namely an active revision strategy and a passive revision strategy. The choice of the strategy would depend on the investor's objectives, skill, resources and time.

Active revision strategy involves frequent and sometimes substantial adjustments to the portfolio. Investors who undertake active revision strategy believe that security markets are not continuously efficient. They believe that securities can be mispriced at times giving an opportunity for earning excess returns through trading in them. Moreover, they believe that different investors have divergent or heterogeneous expectations regarding the risk and return of securities in the market. The practitioners of active revision strategy are confident of developing better estimates of the true risk and return of securities than the rest of the market.

They hope to use their better estimates to generate excess returns. Thus, the objective of active revision strategy is to beat the market.

Active portfolio revision is essentially carrying out portfolio analysis and portfolio selection all over again. It is based on an analysis of the fundamental factors affecting the economy, industry and company as also the technical factors like demand and supply. Consequently, the time, skill and resources required for implementing active revision strategy will be much higher. The frequently of trading is likely to be much higher under active revision strategy resulting in higher transaction costs.

Passive revision strategy, in contrast, involves only minor and infrequent adjustment to the portfolio over time. The practitioners of passive revision strategy believe in market efficiency and homogeneity of expectation among investors. They find little incentive for actively trading and revising portfolios periodically.

Under passive revision strategy, adjustment to the portfolio is carried out according to certain predetermined rules and procedures designated as formula plans. These formula plans help the investor to adjust his portfolio according to changes in the securities market.

FORMULA PLANS

In the market, the prices of securities fluctuate. Ideally, investors should buy when prices are low and sell when prices are high. If portfolio revision is done according to this principle, investors would be able to benefit from the price fluctuations in the securities market. But investors are hesitant to buy when prices are low either expecting that prices will fall further lower or fearing that prices would not move upwards again. Similarly, when prices are high, investors hesitate to sell because they feel that prices may rise further and they may be able to realise larger profits.

Thus, left to themselves, investors would not be acting in the way required to benefit from price fluctuations. Hence, certain mechanical revision techniques or procedures have been developed to enable the investors to benefit from price fluctuations in the market by buying stocks when prices are low and selling them when prices are high. These techniques are referred to as formula plans.

Formula plans represent an attempt to exploit the price fluctuations in the market and make them a source of profit to the investor. They make the decisions on timings of buying and selling securities automatic and eliminate the emotions surrounding the timing decisions. Formula plans consist of predetermined rules call for specified actions when there are changes in the securities market.

The use of formula plans demands that the investor divide his investments funds into two portfolios, one aggressive and the other conservative or defensive. The aggressive portfolio usually consists of equity shares while the defensive portfolio consists of bonds and debentures. The formula plans specify predetermined rules for the transfer of funds from the aggressive portfolio to the defensive portfolio and vice versa. These rules enable the investor to automatically sell shares when their prices are rising and buy shares when their prices are falling.

There are different formula plans for implementing passive portfolio revision. Let us discuss some of the important ones.

1. Constant Rupee Value Plan

This is one of the most popular or commonly used formula plans. In this plan, the investor constructs two portfolios, one aggressive, consisting of equity shares and the other, defensive, consisting of bonds and debentures. The purpose of this plan is to keep the value of the aggressive portfolio constant, i.e. at the original amount invested in the aggressive portfolio.

As share prices fluctuate, the value of the aggressive portfolio keeps changing. When share prices are increasing, the total value of the aggressive portfolio increases. The investor has to sell some of the shares from his portfolio to bring down the total value of the aggressive portfolio to the level of his original investment in it. The sale proceeds will be invested in the defensive portfolio by buying bonds and debentures.

On the contrary, when share prices are falling, the total value of the aggressive portfolio would also decline. To keep the total value of the aggressive portfolio at its original level, the investor has to buy some shares from the market to be included in his portfolio. For this purpose, a part of the defensive portfolio will be liquidated to raise the money needed to buy additional shares.

Under this plan, the investor is effectively transferring funds from the aggressive portfolio to the defensive portfolio and thereby looking profit when share prices are increasing. Funds are transferred from the defensive portfolio to the aggressive portfolio when share prices are low. Thus, the plan helps the investor to buy shares when their prices are low and sell them when their prices are high.

In order to implement this plan, the investor has to decide the action points, i.e. when he should make the transfer of funds to keep the rupee value of the aggressive portfolio constant. These action points, or revision points, should be predetermined and should be chosen carefully. The revision points have a significant effect on the returns of the investor.

For instance, the revision points may be predetermined as 10 per cent, 15 per cent, 20 per cent etc. above or below the original investment in the aggressive portfolio. If the revision points are too close, the number of transactions would be more and the transactions costs would increase reducing the benefits of revision. If the revision points are set too far apart, it may not be possible to profit from the price fluctuations occurring between these revision points. We can understand the working of the constant rupee value plan by considering an example. Let us consider an investor who has Rs. 1, 00, 000 for investment. He decides to invest Rs. 50,000 in an aggressive portfolio of equity shares and the remaining Rs. 50,000 in a defensive portfolio of bonds and debentures. He purchases 1250 shares selling at Rs. 40 per share for his aggressive portfolio. The revision points are fixed as 20 per cent above or below the original investment of Rs. 50,000.

After the construction of the portfolios, the share price will fluctuate. If the price of the share increases to Rs. 45, the value of the aggressive portfolio increases to Rs. 56, 250 (that is, 1250 x Rs. 45). Since the revision points are fixed at 20 per cent above or below the original investment, the investor will act only when the value of the aggressive portfolio increases to Rs. 60,000 or falls to Rs. 40,000. If the price of the share increases to Rs. 48 or above, the value of the aggressive portfolio will exceed Rs. 60,000. Let us suppose that the price of the share increases to Rs. 50, the value of the aggressive portfolio will be Rs. 62,500. The investor will sell shares worth Rs. 12,500 (that is 250 shares at Rs. 50 per share) and transfer the amount to the defensive portfolio by buying bonds for Rs. 12,500. The value of the aggressive and defensive portfolios would now be Rs. 50,000 and Rs. 62,500 respectively. The aggressive portfolio now has only 1000 shares valued at Rs. 50 per share.

Let us now suppose that the share price falls to Rs. 40 per share. The value of the aggressive portfolio would then be Rs. 40,000(i.e.1000 shares x Rs. 40) which is 20 per cent less than the original investment. The investor now has to buy shares worth Rs. 10,000 (that is, 250 shares at Rs. 40 per share) to bring the value of the aggressive portfolio to its original level of Rs. 50,000. The money required for buying the shares will be raised by selling bonds from the defensive portfolio.

The two portfolios now will have values of Rs. 50,000 (aggressive) and Rs. 52,500 (i.e. Rs. 62,500 – Rs.10,000) (defensive), aggregating to Rs. 1,02,500. It may be recalled that the investor started with Rs. 1,00, 000 as investment in the two portfolios.

Thus, when the 'constant rupee value plan' is being implemented, funds will be transferred from one portfolio to the other, whenever the value of the aggressive portfolio increases or declines to the predetermined levels.

2. Constant Ratio Plan

This is variation of the constant rupee value plan. Here again the investor would construct two portfolios, one aggressive and the other defensive with his investment funds. The ratio between the investments in the aggressive portfolio and the defensive portfolio would be predetermined such as 1: 1 or 1.5:1 etc. The purpose of this plan is to keep this ratio constant by readjusting the two portfolios when share prices fluctuate from time to time. For this purpose, a revision point will also have to be predetermined. The revision points may be fixed as ± 0.10 for example. This means that when the ratio between the values of the aggressive portfolio and the defensive portfolio moves up by 0.10 points or moves down by 0.10 points, the portfolios would be adjusted by transfer of funds from one to the other.

Let us assume that an investor starts with Rs. 20,000, investing Rs. 10,000 each in the aggressive portfolio and the defensive portfolio. The initial ratio is then 1:1. He has predetermined the revision points as ± 0.20. As share price increases the value of the aggressive portfolio would rise. When the value of the aggressive portfolio rises to Rs. 12,000, the ratio becomes 1.2:1 (i.e. Rs. 12,000: Rs.10,000) Shares worth Rs. 1,000 will be sold and the amount transferred to the defensive portfolio by buying bonds. Now, the value of both the portfolios would be Rs. 11,000 and the ratio would become 1:1.

Now let us assume that the share prices are falling. The value of the aggressive portfolio would start declining. If, for instance, the value declines to Rs. 8,500, the ratio becomes0.77:1 (i.e. Rs. 8,500: Rs. 11,000). The ratio has declined by more than 0.20 points. The investor now has to make the value of both portfolios equal. He has to buy shares worth Rs. 1250 by selling bonds for an equivalent amount from his defensive portfolio. Now the value of the aggressive portfolio increases by Rs. 1,250 and that of the defensive portfolio decreases by Rs. 1,250. The values of both portfolios become Rs. 9,750 and the ratio becomes 1:1.

The adjustment of portfolios is done periodically in this manner.

3. Dollar Cost Averaging

This is another method of passive portfolio revision. This is, however, different from the two formula plans discussed above. All formula plans assume that stock prices fluctuate up and down in cycles. Dollar cost averaging utilizes this cyclic movement in share prices to construct a portfolio at low cost.

The plan stipulates that the investor invest a constant sum, such as Rs. 5,000, Rs. 10,000, etc. in a specified share or portfolio of shares regularly at periodical intervals, such as a month, two months, a quarter, etc. regardless of the price of the shares at the time of

investment. This periodic investment is to be continued over a fairly long period to cover a complete cycle of share price movements.

If the plan is implemented over a complete cycle of stock prices, the investor will obtain his shares at a lower average cost per share than the average price prevailing in the market over the period. This occurs because more shares would be purchased at lower prices than at higher prices.

The dollar cost averaging is really a technique of building up a portfolio over a period of time. The plan does not envisage withdrawal of funds from the portfolio in between. When a large portfolio has been built up over a complete cycle of share price movements, the investor may switch over to one of the other formula plans for its subsequent revision. The dollar cost averaging is specially suited to investors who have periodic sums to invest.

The various formula plans attempt to make portfolio revision a simple and almost mechanical exercise enabling the investor to automatically buy shares when their prices are low and sell them when their prices are high. But formula plans have their limitations. By their very nature they are inflexible. Further, these plans do not indicate which securities from the portfolio are to be sold and which securities from the portfolio are to be sold and which securities are to be bought to be indicated in the portfolio. Only active portfolio revision can provide answers to these questions.

EFFICIENT MARKET THEORY

Stock prices are determined by a number of factors such as fundamental factors, technical factors and psychological factors. The behavior of stock prices is studied with the help of different methods such as fundamental analysis and technical analysis. Fundamental analysis seeks to evaluate the intrinsic value of securities by studying the fundamental factors affecting the performance of the economy, industry and companies. Technical analysis believes that the past behavior of stock prices gives an indication of the future behavior. It tries to study the patterns in stock price behavior through charts and predict the future movement in prices. There is a third theory on stock price behavior which questions the assumptions of technical analysis.

The basic assumption in technical analysis is that stock pie movement is quite orderly and not random. The new theory questions this assumption. From the results of several empirical studies on stock price movements, the advocates of the new theory assert that share price movements are random. The new theory came to be known as Random Walk Theory because of its principal contention that share price movements represent a random walk rather than an orderly movement.

RANDOM WALK THEORY

Stock price behavior is explained by the theory in the following manner. A change occurs in the price of a stock only because of certain changes in the economy, industry or company. Information about these changes alters the stock prices immediately and the stock moves to a new level, either upwards or downwards, depending on the type of information. This rapid shift to a new equilibrium level whenever new information is received is recognition of the fact that all information which is known is fully reflected in the price of the stock. Further change in the price of the stock will occur only as a result of some other new piece of information which was not available earlier. Thus, according to this theory, changes in stock prices show independent behavior and are dependent on the new pieces of information that are received but within themselves are independent of each other. Each price change is independent of other price changes because each change is caused by a new piece of information.

The basic premise in random walk theory is that the information on changes in the economy, industry and company performance is immediately and fully spread so that all investors have full knowledge of the information. There is an instant adjustment in stock prices either upwards or downwards. Thus, the current stock price fully reflects all available information on the stock. Therefore, the price of a security two days ago can in no way help in speculating the price two days later. The price of each day is independent. It may be unchanged, higher or lower from the previous price, but that depends on new pieces of information being received each day.

The random walk theory presupposes that the stock markets are so efficient and competitive that there is immediate price adjustment. This is the result of good communication system through which information can be spread almost anywhere in the country instantaneously. Thus, the random walk theory is based on the hypothesis that the stock markets are efficient. Hence, this theory later came to be known as the efficient market hypothesis (EMH) or the efficient market model.

THE EFFICIENT MARKET HYPOTHESIS

This hypothesis states that the capital market is efficient in processing information. An efficient capital market is one in which security prices equal their intrinsic values at all times, and where most securities are correctly priced. The concept of an efficient capital market has been one of the dominant themes in academic literature since the 1960s. According to Elton and Gruber, "when someone refers to efficient capital markets, they mean that security prices fully reflect all available information".' According to Eugene

Fama, in an efficient market, prices fully reflect all available information. The prices of securities observed at any time are based on correct evaluation of all information available at that time.

The efficient market model is actually concerned with the speed with which information is incorporated into security prices. The technicians believe that past price sequence contains information about the future price movements because they believe that information is slowly incorporated in security prices. This gives technicians an opportunity to earn excess returns by studying the patterns in price movements and trading accordingly.

Fundamentalists believe that it may take several days or weeks before investors can fully assess the impact of new information. As a consequence, the price may be volatile for a number of days before it adjusts to a new level. This provides an opportunity to the analyst who has superior analytical skills to earn excess returns.

The efficient market theory holds the view that in an efficient market, new information is processed and evaluated as it arrives and prices instantaneously adjust to new and correct levels. Consequently, an investor cannot consistently earn excess returns by undertaking fundamental analysis or technical analysis.

FORMS OF MARKET EFFICIENCY

The capital market is considered to be efficient in three different forms: the weak form, semi-strong form and the strong form. Thus, the efficient market hypothesis has been subdivided into three forms, each dealing with a different type of information. The weak form deals with the information regarding the past sequence of security price movements, the semi-strong form deals with the publicly available information, while the strong form deals with all information, both public and private (or inside).

The different forms of efficient market hypothesis have been tested through several empirical studies. The tests of the weak form hypothesis are essentially tests of whether all information contained in historical prices of securities is fully reflected in current prices. Semi-strong form tests of the efficient market hypothesis are tests of whether publicly available information is fully reflected in current stock prices. Finally, strong form tests of the efficient market hypothesis are tests of whether all information, both public and private (or inside), is fully reflected in security prices and whether any type of investor is able to earn excess returns.

1. Empirical Tests of Weak Form Efficiency

The weak form of the efficient market hypothesis (EMH) says that the current prices of stocks already fully reflect all the information that is contained in the historical sequence

of prices. The new price movements are completely random. They are produced by new pieces of information and are not related or dependent on past price movements. Therefore, there is no benefit in studying the historical sequence of prices to gain abnormal returns from trading in securities. This implies that technical analysis, which relies on charts of price movements in the past, is not a meaningful analysis for making abnormal trading profits.

The weak form of the efficient market hypothesis is thus a direct repudiation of technical analysis.

Two approaches have been used to test the weak form of the efficient market hypothesis. One approach looks for statistically significant patterns in security price changes. The alternative approach searches for profitable short-term trading rules.

a) Serial Correlation Test

Since the weak form EMH postulates independence between successive price changes, such independence or randomness in stock price movements can be tested by calculating the correlation between price changes in one period and changes for the same stock in another period. The correlation coefficient can take on a value ranging from -1 to 1; a positive number indicates a direct relation, a negative value implies an inverse relationship and a value close to zero implies no relationship. Thus, if correlation coefficient is close to zero, the price changes can be considered to be serially independent.

b) Run Test

The run test is another test used to test the randomness in stock price movements. In this test, the absolute values of price changes are ignored; only the direction of change is considered. An increase in price is represented by + signs. The decrease is represented by – sign. When there is no change in prices, it is represented by 'O'. A consecutive sequence of the same sign is considered as a run. For example, the sequence + + + - - - has two runs. In other words, a change of sign indicates a new run. The sequence - - - + + 0 - - - + + + + has five runs; a run of three - 's, followed by a run of two + 's, another run of one 0, a fourth run of three - 's and a fifth run of four + 's. In a run test, the actual number of runs observed in a series of stock price movements is compared with the number of runs in a randomly generated number series. If no significant differences are found, then the security price changes are considered to be random in nature.

c) Filter Tests

If stock price changes are random in nature, it would be extremely difficult to develop successful mechanical trading systems. Filter tests have been developed as direct tests of specific mechanical trading strategies to examine their validity and usefulness.

It is often believed that, as long as no new information enters the market, the price fluctuates randomly within two barriers—one lower, and the other higher—around the fair price. When new information comes into the market, a new equilibrium price will be determined. If the news is favorable, then the price should move up to a new equilibrium above the old price. Investors will know that this is occurring when the price breaks through the old barrier. If investors purchase at this point, they will benefit from the price increase to the new equilibrium level.

Likewise, if the news received is unfavorable, the price of the stock will decline to a lower equilibrium level. If investors sell the stock as it breaks the lower barrier, they will avoid much of the decline. Technicians set up trading strategies based on such patterns to earn excess returns.

The strategy is called a filter rule. The filter rule is usually stated in the following way: Purchase the stock when it rises by x per cent from the previous low and sell it when it declines by x per cent from the subsequent high. The filters may range from 1 per cent to 50 per cent or more. The alternative to this active trading strategy is the passive buy and hold strategy.

The returns generated by trading according to the filter rule are compared with the returns earned by an investor following the buy and hold strategy. If trading with filters results in superior returns that would suggest the existence of patterns in price movements and negate the weak form EMH.

d) Distribution Pattern

It is a rule of statistics that the distribution of random occurrences will conform to a normal distribution. Then, if price changes are random, their distribution should also be approximately normal. Therefore, the distribution of price changes can be studied to test the randomness or otherwise of stock price movements.

In the 1960s the efficient market theory was known as the random walk theory. The empirical studies regarding share price movements were testing whether prices followed a random walk.

Two articles by Roberts and Osborne, both published in 1959, stimulated a great deal of discussion of the new theory then called random walk theory.

Roberts' study compared the movements in the Dow Jones Industrial Average (an American stock market index) with the movement of a variable generated from a random walk process. He found that the random walk process produced patterns which were very similar to those of the Dow Jones index.

Osborne's study found a close resemblance between share price changes and the random movement of small particles suspended in a solution, which is known in Physics as the Brownian motion. Both the studies suggested that share price changes are random in nature and that past prices had no predictive value.

During the 1960s there was an enormous growth in serial correlation testing. None of these found any substantial linear dependence in price changes. Studies by Moore, Fama and Hagerman and Richmond are some of the early studies in this area. Moore found an average serial correlation coefficient of — 0.06 for price changes measured over weekly intervals. Fama's study tested the serial correlation for the thirty stocks comprising the Dow Jones industrial average for the five years prior to 1962. The average serial correlation coefficient was found to be 0.03. Both the coefficients were not statistically different from zero; thus both the studies supported the random walk theory.

Fama also used run tests to measure dependency. The results again supported the random walk theory. Many studies followed Moore's and Fama's work each of which used different databases. The results of these studies were much the same as those of Moore and Fama.

Hagerman and Richmond conducted similar studies on securities traded in the 'over- the-counter' market and found little serial correlation. Serial correlation tests of dependence have also been carried out in various other stock markets around the world. These have similarly revealed little or no serial correlation.

Much research has also been directed towards testing whether mechanical trading strategies are able to earn above average returns. Many studies have tested the filter rules for its ability to earn superior returns. Early American studies were those by Alexander, who originally advocated the filter strategy, and by Fama and Blume. There were similar studies in the United Kingdom by Dryden and in Australia by Praetz. All these studies have found that filter strategies did not achieve above average returns. Thus, the results of empirical studies have been virtually unanimous in finding little or no statistical dependence and price patterns and this has corroborated the weak form efficient market hypothesis.

2. Empirical Tests of Semi-Strong Form Efficiency

The semi-strong form of the efficient market hypothesis says that current prices of stocks not only reflect all informational content of historical prices, but also reflect all publicly available information about the company being studied. Examples of publicly available information are—corporate annual reports, company announcements, press releases, announcements of forthcoming dividends, stock splits, etc. The semi-strong hypothesis maintains that as soon as the information becomes public the stock prices change and absorb the full information. In other words, stock prices instantaneously adjust to the information that is received.

The implication of semi-strong hypothesis is that fundamental analysts cannot make superior gains by undertaking fundamental analysis because stock prices adjust to new pieces of information as soon as they are received. There is no time gap in which a fundamental analyst can trade for superior gains. Thus, the semi-strong hypothesis repudiates fundamental analysis.

Semi-strong form tests deal with whether or not security prices fully reflect all publicly available information. These tests attempt to establish whether share prices react precisely and quickly to new items of information. If prices do not react quickly and adequately, then an opportunity exists for investors or analysts to earn excess returns by using this information. Therefore, these tests also attempt to find if analysts are able to earn superior returns by using publicly available information.

There is an enormous amount and variety of public information. Semi-strong form tests have been performed with respect to many different types of information. Much of the methodology used in semi-strong form tests has been introduced by Fama, Fisher, Jensen and Roll. Theirs was the first of the studies that were directly concerned with the testing of the semi-strong form of EMH. Subsequent to their study, a number of refinements have been developed in the test procedure.

The general methodology followed in these studies has been to take an economic event and measure its impact on the share price. The impact is measured by taking the difference between the actual return and expected return on a security. The expected return on a security is generally estimated by using the market model (or single index model) suggested by William Sharpe. The model used for estimating expected returns is the following:

$$R_i = a_i + b_i R_m + e_i$$

Where

R_i = Return on security i.

R_m = Return on a market index.

a_i & b_i = Constants.

e_i = Random error.

This analysis is known as Residual analysis. The positive difference between the actual return and the expected return represents the excess return earned on a security. If the excess return is close to zero, it implies that the price reaction following the public announcement of information is immediate and the price adjusts to a new level almost immediately. Thus, the lack of excess returns would validate the semi-strong form EMH.

Major studies on the impact of capitalization issues such as stock splits and stock dividends have been conducted in the United States by Fama, Fisher, Jensen and Roll and Johnson, in Canada by Finn, and in the United Kingdom by Firth. All these studies found that the market adjusted share prices instantaneously and accurately for the new information. Both Pettit and Watts have investigated the market's reaction to dividend announcements. They both found that all the price adjustment was over immediately after the announcement and thus, the market had acted quickly in evaluating the information.

Other items of information whose impact on share prices have been tested include announcements of purchase and sale of large blocks of shares of a company, takeovers, annual earnings of companies, quarterly earnings, accounting procedure changes, and earnings estimates made by company officials. All these studies which made use of the Residual analysis approach, showed the market to be relatively efficient.

Ball and Brown tested the stock market's ability to absorb the informational content of reported annual earnings per share information. They found that companies with good earnings report experienced price increase in stock, while companies with bad earnings report experienced decline in stock prices. But surprisingly, about 85 per cent of the informational content of the earnings announcements was reflected in stock price movements prior to the release of the actual earnings figure. The market seems to adjust to new information rapidly with much of the impact taking place in anticipation of the announcement.

Joy, Litzenberger and McEnally tested the impact of quarterly earnings announcements on the stock price adjustment mechanism. Some of their results, however, contradicted the semi-strong form of the efficient market hypothesis. They found that the favorable information contained in published quarterly earnings reports was not always

instantaneously adjusted in stock prices. This may suggest that the market does not adjust share prices equally well for all types of information.

By way of summary it may be stated that a great majority of the semi- strong efficiency tests provide strong empirical support for the hypothesis; however, there have been some contradictory results too. Most of the reported results show that stock prices do adjust rapidly to announcements of new information and that investors are typically unable to utilize this information to earn consistently above average returns.

3. Tests of Strong Form Efficiency

The strong form hypothesis represents the extreme case of market efficiency. The strong form of the efficient market hypothesis maintains that the current security prices reflect all information both publicly available information as well as private or inside information. This implies that no information, whether public or inside, can be used to earn superior returns consistently.

The directors of companies and other persons occupying senior management positions within companies have access to much information that is not available to the general public. This is known as inside information. Mutual funds and other professional analysts who have large research facilities may gather much private information regarding different stocks on their own. These are private information not available to the investing public at large.

The strong form efficiency tests involve two types of tests. The first type of tests attempt to find whether those who have access to inside information have been able to utilize profitably such inside information to earn excess returns. The second type of tests examine the performance of mutual funds and the recommendations of investment analysts to see if these have succeeded in achieving superior returns with the use of private information generated by them.

Jaffe, Lorie and Niederhoffer studied the profitability of insider trading (i.e. the investment activities of people who had inside information on companies). They found that insiders earned returns in excess of expected returns. Although there have been only a few empirical studies on the profitability of using inside information, the results show, as expected, that excess returns can be made. These results indicate that markets are probably not efficient in the strong form.

Many studies have been carried out regarding the performance of American mutual funds using fairly sophisticated evaluation models. All the major studies have found that mutual funds did no better than randomly constructed portfolios of similar risk. Firth

studied the performance of Unit Trusts in the United Kingdom during the period 1965—75. He also found that unit trusts did not outperform the market index for their given levels of risk. A small research has been conducted into the profitability of investment recommendations by investment analysts. Such studies suggest that few analysts or firms of advisers can claim above average success with their forecasts.

The results of research on strong form EMH may be summarized as follows:

1. Inside information can be used to earn above average returns.

2. Mutual funds and investment analysts have not been able to earn superior returns by using their private information.

In conclusion, it may be stated that the strong form hypothesis is invalid as regards inside information, but valid as regards private information other than inside information.

EMH VS. FUNDAMENTAL AND TECHNICAL ANALYSES

There are three broad theories concerning stock price movements. These are the fundamental analysis, technical analysis and efficient market hypothesis. Fundamental analysts believe that by analyzing key economic and financial variables they can estimate the intrinsic worth of a security and then determine what investment action to take. Fundamental analysis seeks to identify under priced securities and overpriced securities. Their investment strategy consists in buying under priced securities and selling overpriced securities, thereby earning superior returns.

A technical analyst maintains that fundamental analysis is unnecessary. He believes that history repeats itself. Hence, he tries to predict future movements in share prices by studying the historical patterns in share price movements.

The efficient market hypothesis is expressed in three forms. The weak form of the EMH directly contradicts technical analysis by maintaining that past prices and past price changes cannot be used to forecast future price changes because successive price changes are independent of each other. The semi-strong form of the EMH contradicts fundamental analysis to some extent by claiming that the market is efficient in the dissemination and processing of information and hence, publicly available information cannot be used consistently to earn superior investment returns.

The strong form of the EMH maintains that not only is publicly available information useless to the investor or analyst but all information is useless.

Even though the EMH repudiates both fundamental analysis and technical analysis, the market is efficient precisely because of the organized and systematic efforts of thousands of analysts undertaking fundamental and technical analysis. Thus, the paradox of efficient

market hypothesis is that both fundamental and technical analyses are required to make the market efficient and thereby validate the hypothesis.

COMPETITIVE MARKET HYPOTHESIS

An efficient market has been defined as one where share prices always fully reflect available information on companies. In practice, no existing stock market is perfectly efficient. There are evident shortcomings in the pricing mechanism. Often, the complete body of knowledge about a company's prospects is not publicly available to market participants. Further, the available information would not be always interpreted in a completely accurate fashion. The research studies on EMH have shown that price changes are random or independent and hence unpredictable. The prices are also seen to adjust quickly to new information. Whether the price adjustments are correct and accurate, reflecting correctly and accurately the meaning of publicly available information is difficult to determine.

All that can be validly concluded is that prices are set in a very competitive market, but not necessarily in an efficient market. This competitive market hypothesis provides scope for earning superior returns by undertaking security analysis and following portfolio management strategies.

PORTFOLIO ANALYSIS

Individual securities have risk return characteristics of their own. The future return expected from a security is variable and this variability of returns is termed risk. It is rare to find investors investing their entire wealth in a single security. This is because most investors have an aversion to risk. It is hoped that if money is invested in several securities simultaneously, the loss in one will be compensated by the gain in others. Thus, holding more than one security at a time is an attempt to spread and minimize risk by not putting all our eggs in one basket.

Most investors thus tend to invest in a group of securities rather than a single security. Such a group of securities held together as an investment is what is known as a portfolio. The process of creating such a portfolio is called diversification. It is an attempt to spread and minimize the risk in investment. This is sought to be achieved by holding different types of securities across different industry groups.

From a given set of securities, any number of portfolios can be constructed. A rational investor attempts to find the most efficient of these portfolios. The efficiency of each portfolio can be evaluated only in terms of the expected return and risk of the portfolio as such. Thus, determining the expected return and risk of different portfolios is a primary step in portfolio management. This step is designated as portfolio analysis.

EXPECTED RETURN OF A PORTFOLIO

As a first step in portfolio analysis, an investor needs to specify the list of securities eligible for selection or inclusion in the portfolio. Next he has to generate the risk-return expectations for these securities. These are typically expressed as the expected rate of return (mean) and the variance or standard deviation of the return.

The expected return of a portfolio of assets is simply the weighted average of the return of the individual securities held in the portfolio. The weight applied to each return is the fraction of the portfolio invested in that security.

Let us consider a portfolio of two equity shares P and Q with expected returns of 15 per cent and 20 per cent respectively.

If 40 per cent of the total funds are invested in share P and the remaining 60 per cent, in share Q, then the expected portfolio return will be:

(0.40 x 15) + (0.60 x 20) = 18 per cent

The formula for the calculation of expected portfolio return may be expressed as shown below:

$$\bar{r}_p = \sum_{i=1}^{n} x_i r_i$$

Where

$\bar{r}_p$ = Expected return of the portfolio

x_i = Proportion of funds invested in security i.

$\bar{r}_i$ = Expected return of security i.

n = Number of securities in the portfolio

RISK OF A PORTFOLIO

The variance of return and standard deviation of return are alternative statistical measures that are used for measuring risk in investment. These statistics measure the extent to which returns are expected to vary around an average over time. The calculation of variance of a portfolio is a little more difficult than determining its expected return.

The variance or standard deviation of an individual security measures the riskiness of a security in absolute sense. For calculating the risk of a portfolio of securities, the riskiness of each security within the context of the overall portfolio has to be considered.

This depends on their interactive risk, i.e. how the returns of a security move with the returns of other securities in the portfolio and contribute to the overall risk of the portfolio.

Covariance is the statistical measure that indicates the interactive risk of a security relative to others in a portfolio of securities. In other words, the way security returns vary with each other affects the overall risk of the portfolio.

The covariance between two securities X and Y may be calculated using the following

formula:

$$Cov_{xy} = \frac{[Rx - Rx][Ry - Ry]}{N}$$

Where:

Covxy = Covariance between x and y.

R_x = Return of security x.

R_y = Return of security y

R_x = Expected or mean return of security x.

R_y = Expected or mean return of security y.

N   = Number of observations.

Calculation of Covariance

Year	Rx	Deviation Rx – Rx	R...3 y	Deviation Ry – Ry	Product of deviations (Rx – Rx) (Ry – Ry)
1	10	-4	17	5	-20
2	12	-2	13	1	-2
3	16	2	10	-2	-4
4	18	4	8	-4	-16

$$Cov_{xy} = \sum_{i=1}^{n} \frac{[Rx - Rx][Ry - Ry]}{N}$$

= -42 / 4 = -10.5

The covariance is a measure of how returns of two securities move together. If the returns of the two securities move in the same direction consistently the covariance would be positive. If the returns of the two securities move in opposite direction consistently the covariance would be negative. If the movements of returns are independent of each other, covariance would be close to zero.

Covariance is an absolute measure of interactive risk between two securities. To facilitate comparison, covariance can be standardized. Dividing the covariance between two

securities by product of the standard deviation of each security gives such a standardised measure. This measure is called the coefficient of correlation. This may be expressed as:

$$r_{xy} = \frac{Cov_{xy}}{\sigma_x \sigma_y}$$

Where

R_{xy} = Coefficient of correlation between x and y

Co_{vxy} = Covariance between x and y.

σ_x = Standard deviation of x.

σy = Standard deviation of y

It may be noted from the above formula that covariance may be expressed as the product of correlation between the securities and the standard deviation of each of the securities. Thus,

$$Cov_{xy} = r_{xy} \sigma_x \sigma_y$$

The correlation coefficients may range from - 1 to 1. A value of -1 indicates perfect negative correlation between security returns, while a value of +1 indicates a perfect positive correlation. A value close to zero would indicate that the returns are independent.

The variance (or risk) of a portfolio is not simply a weighted average of the variances of the individual securities in the portfolio. The relationship between each security in the portfolio with every other security as measured by the covariance of return has also to be considered. The variance of a portfolio with only two securities in it may be calculated with the following formula.

$$\sigma^2_p = x_1^2 \sigma_1^2 + x_2^2 \sigma_2^2 + 2x_1 x_2 (r_{12} \sigma_1 \sigma_2)$$

Where

σ_{2p} = Portfolio variance.

x_1 = Proportion of funds invested in the first security.

x_2 = Proportion of funds invested in the second security.

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 first and second security.

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 P and Q generate the following sets of expected returns, standard deviations and correlation coefficient:

	P	**Q**
	r = 15 percent	20 percent
	σ = 50 percent	30 percent
	r_{pq} = -0.60	

A portfolio is constructed with 40 per cent of funds invested in P and the remaining 60 per cent of funds in Q.

The expected return of the portfolio is given by:

$$r_P = \sum_{i=1}^{n} x_i r_i$$

= (0.40 x 15) + (0.60 x 20) = 18 percent

The variance of the portfolio is given by:

$\sigma_{2p} = x_1^2 \sigma_1^2 + x_2^2 \sigma_2^2 + 2x_1 x_2 (r_{12} \sigma_1 \sigma_2)$

$= (0.40)^2 (50)^2 + (0.60)^2 (30)^2 + 2(0.40)(0.60)(-0.60)(50)(30)$

$= 400 + 324 - 432 = 292$

The standard deviation of the portfolio is:

sp= $\sqrt{292}$ = 17.09 per cent.

The return and risk of a portfolio depends on two sets of factors (a) the returns and risks of individual securities and the covariance between securities in the portfolio, (b) the proportion of investment in each security.

The first set of factors is parametric to the investor in the sense that he has no control over the returns, risks and covariances of individual securities. The second sets of factors are choice variables in the sense that the investor can choose the proportions of each security in the portfolio.

REDUCTION OF PORTFOLIO RISK THROUGH DIVERSIFICATION

The process of combining securities in a portfolio is known as diversification. The aim of diversification is to reduce total risk without sacrificing portfolio return. In the example considered 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.

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 examine three cases: (a) when security returns are perfectly positively correlated, (b) when security returns are perfectly negatively correlated, and (c) when security returns are not correlated.

1. Security Returns Perfectly Positively Correlated

When security returns are perfectly positively correlated the correlation coefficient between the two securities will be +1. The returns of the two securities then move up or down together.

The portfolio variance is calculated using the formula:

$$\sigma^2 p = x_1^2 \sigma_1^2 + x_2^2 \sigma_2^2 + 2x_1 x_2 (r_{12} \sigma_1 \sigma_2)$$

Since $r_{12} = 1$, this may be rewritten as:

$$\sigma^2_p = x_1^2 \sigma_1^2 + x_2^2 \sigma_2^2 + 2x_1 x_2 \sigma_1 \sigma_2$$

The right hand side of the equation has the same form as the expansion of the identity $(a + b)^2$, namely $a^2 + 2ab + b^2$. Hence, it may be reduced as

$$\sigma^2 p = (x_1 \sigma_1 + x_2 \sigma_2)^2$$

The standard 1deviation then becomes

$$\sigma_p = x_1 \sigma_1 + x_2 \sigma_2$$

This is simply the weighted average of the standard deviations of the individual securities.

Taking the same example that we considered earlier for calculating portfolio variance, we shall calculate the portfolio standard deviation when correlation coefficient is +1.

Standard deviation of security P = 50

Standard deviation of security Q = 30

Proportion of investment in P = 0.4

Proportion of investment in Q = 0.6

Correlation coefficient = +1.0

Portfolio standard deviation may be calculated as:

$$\sigma_p = x_1 \sigma_1 + x_2 \sigma_2$$

= (0.4) (50) + (0.6) (30)

= 38

Being the weighted average of the standard deviations of individual securities, the portfolio standard deviation will lie between the standard deviations of the two individual securities. In our example, it will vary between 50 and 30 as the proportion of investment in each security changes.

For example, if the proportion of investment in P and Q are 0.75 and 0.25 respectively,

portfolio standard deviation becomes:

σ_p= (0.75) (50) + (0.25) (30) = 45

Thus, 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, diversification is not a productive activity when security returns are perfectly positively correlated.

2. Security Returns Perfectly Negatively Correlated

When security returns are perfectly negatively correlated, the correlation coefficient between them becomes -1. The two returns always move in exactly opposite directions.

The portfolio variance may be calculated as:

$\sigma^2 p = x_1^2\sigma_1^2 + x_2^2\sigma_2^2 + 2x_1x_2(r_{12}\sigma_1\sigma_2)$

Since r_{12} = -1, this may be rewritten as:

$\sigma^2 p = x_1^2\sigma_1^2 + x_2^2\sigma_2^2 - 2x_1x_2(\sigma_1\sigma_2)$

The right hand side of the equation has the same form as the expansion of the identity (a - b) 2, namely a2 - 2ab + b2. Hence, it may be reduced as:

$\sigma_2 p = (x_1\sigma_1 - x_2\sigma_2)^2$

The standard deviation then becomes:

$\sigma_p = x_1\sigma_1 - x_2\sigma_2$

For the illustrative portfolio considered above, we can calculate the portfolio standard deviation when the correlation coefficient is —1.

σ_p = (0.4)(50) - (0.6)(30) = 2

The portfolio risk is very low. It may even be reduced to zero. For example, if the proportion of investment in P and Q are 0.375 and 0.625 respectively, portfolio standard deviation becomes:

σ_p = (0.375)(50) - (0.625)(30) = 0

Here, although 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. Hence, diversification becomes a highly productive activity when securities are perfectly negatively correlated, because portfolio risk can be considerably reduced and sometimes even eliminated. But, in reality, it is rare to find securities that are perfectly negatively correlated.

3. Security Returns Uncorrelated

When the returns of two securities are entirely uncorrelated, the correlation coefficient would be zero.

The formula for portfolio variance is:

$$\sigma^2_p = x_1^2 \sigma_1^2 + x_2^2 \sigma_2^2 + 2x^1 x^2 (r_{12} \sigma_1 \sigma_2)$$

Since $r_{12} = 0$, the last term in the equation becomes zero; the formula may be rewritten

$$\sigma^2_p = x_1^2 s_1^2 + x_2^2 \sigma_2^2$$

The standard deviation then becomes:

$$\sigma_p = \sqrt{x_1 \sigma_1 + x_2 \sigma_2}$$

For the illustrative portfolio considered above the standard deviation can be calculated when the correction coefficient is zero.

$$\sigma_p = \sqrt{(0.4)^2 (50)^2 + (.6)^2 (30)^2}$$

$$= \sqrt{400 + 324}$$

$$= 26.91$$

The portfolio standard deviation is less than the standard deviations of individual securities in the portfolio. Thus, when security returns are uncorrelated, diversification reduces risk and is a productive activity.

We may now tabulate the portfolio standard deviations of our illustrative portfolio having two securities P and Q, for different values of correlation coefficients between them. The proportion of investments in P and Q are 0.4 and 0.6 respectively. The individual standard deviations of P and Q are 50 and 30 respectively.

Portfolio Standard Deviations

Correlation Portfolio coefficients	Correlation Portfolio standard deviations
1.0	38.00
0.6	34.00
0.0	26.91
-0.6	17.09
-1.0	2.00

From the above analysis we may conclude that diversification reduces risk in all cases except when the security returns are perfectly positively correlated. As correlation coefficient declines from +1 to -1, the portfolio standard deviation also declines. But the risk reduction is greater when the security returns are negatively correlated.

PORTFOLIOS 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. Figure depicts the diversification of risk in a portfolio.
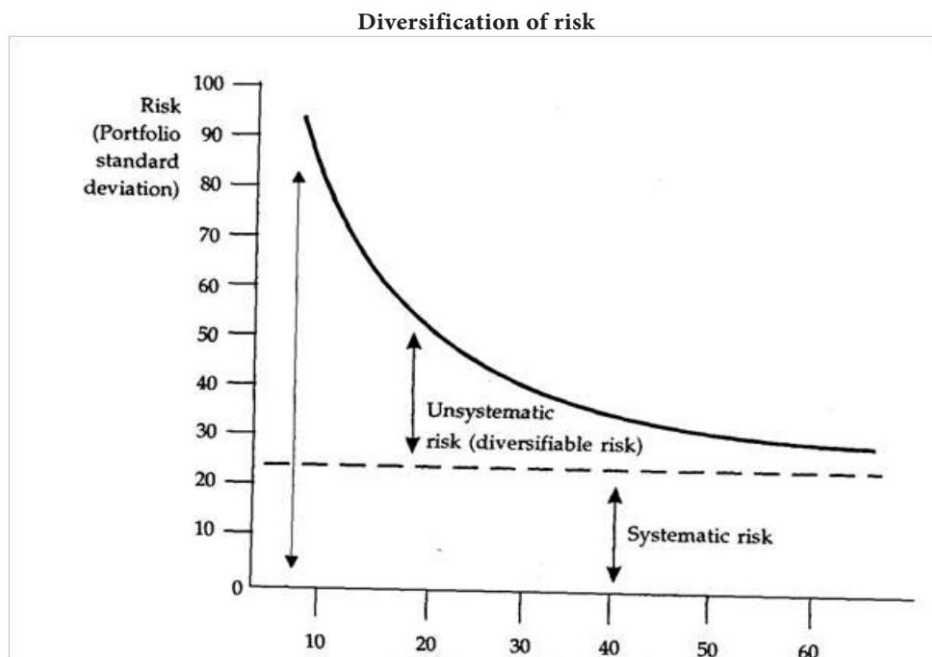

Figure 5.1 Diversification of Risk

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.

RISK-RETURN CALCULATIONS OF PORTFOLIOS 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:

$$\bar{r}_p = \sum_{i=1}^{n} x_i r_i$$

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)	Returns (Per cent)	Proportion of investment
A	12	0.2
B	17	0.3
C	23	0.1
D	20	0.4

The expected return of this portfolio may be calculated using the formula:

$$\overline{r_P} = \sum_{i=1}^{n} x_i r$$

$$\overline{r_p} = (0.2)(12) + (0.3)(17) + (0.1)(23) + (0.4)(20)$$

$$= 17.8 \text{ per cent}$$

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:

$$\sigma_P^2 = \sum_{i=1}^{n} \sum_{j=1}^{n} x_i x_i \sigma_{ij}$$

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.

The double summation $\sum_{i=1}^{n} \sum_{j=1}^{n}$

Indicates that n^2 numbers of values are to be summed up. These values are obtained by substituting the values of xi, xj and σij for each possible pair of securities.

The method of calculation can be illustrated through an example.

A convenient way to obtain the result is to set up the data required for calculation in the form of a variance-covariance matrix. Let us consider a portfolio with three securities

A, B and C. The proportions of investment in each of these securities are 0.20, 0.30 and 0.50 respectively. The variance of each security and the covariance of each possible pair of securities may be set up as a matrix as follows:

Variance-Covariance Matrix

Weight ➔		0.2	0.3	0.5
↓		A	B	C
0.2	A	52	63	36
0.3	B	63	38	74
0.5	C	36	74	45

The entries along the diagonal of the matrix represent the variances of securities A, B and C. The other entries in the matrix represent the covariance of the respective pairs of securities such as A and B, A and C, B and C.

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. For example, the first cell in the first row of the matrix represents A and A; the second cell in the first row represents securities A and B, 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. 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.

The variance of the illustrative portfolio given above can now be calculated.

σ_P^2 = (0.2 x 0.2 x 52) + (0.2 x 0.3 x 63) + (0.2 x 0.5 x 36)

+ (0.3 x 0.2 x 63) + (0.3 x 0.3 x 38) + (0.3 x 0.5 x 74)

+ (0.5 x 0.2 x 36) + (0.5 x 0.3 x 74) ÷ (0.5 x 0.5 x 45)

= 53.71.

The portfolio standard deviation is:

$\sigma_P = \sqrt{53.71} = 7.3287$

We have seen earlier that covariance between two securities may be expressed as the product of correlation coefficient between the two securities and standard deviations of the two securities.

Thus,

$\sigma_{ij} = r_{ij}\sigma_i\sigma_j$

Where

σ_{ij} = Covariance between security i and security j.

r_{ij} = Correlation coefficient between security i and security j.

σ_i = Standard deviation of security i.

σ_j = Standard deviation of security j.

Hence, the formula for computing portfolio variance may also be stated in the following form:

$$\sigma_p^2 = \sum_{i=1}^{n} \sum_{j=1}^{n} x_i \, x_j \, r_{ij} \, \sigma_i \, \sigma_j$$

To illustrate the use of this formula let us calculate the portfolio variance and standard deviation for a portfolio with the following characteristics.

Security	x_i	σ_i	Correlation coefficients
P	0.35	7	P and Q = 0.7
Q	0.25	16	P and R = 0.3
R	0.40	9	Q and R = 0.4

It may be noted that correlation coefficient between P and P, Q and Q, R and R is 1. The variance-covariance matrix may be set up as follows:

Weight ⟶		0.35 P	0.25 Q	0.40 R
0.35	P	1x7x7	0.7x7x16	0.3x7x9
0.25	Q	0.7x16x7	1x16x16	0.4x16x9
0.40	R	0.3x9x7	0.4x9x16	1x9x9

The portfolio variance can now be calculated using this variance-covariance matrix as shown below:

$\sigma_p^2 = (0.35\text{x}0.35\text{x}1\text{x}7\text{x}7) + (0.35\text{x}0.25\text{x}0.7\text{x}7\text{x}16)$

$+(0.35 \text{x} 0.40 \text{x} 0.3 \text{x} 7 \text{x} 9) + (0.25 \text{x} 0.35 \text{x} 0.7 \text{x} 16 \text{x} 7)$

$+ (0.25 \text{x} 0.25 \text{x} 1 \text{x} 16 \text{x} 16) + (0.25 \text{x} 0.40 \text{x} 0.4 \text{x} 16 \text{x} 9)$

$+ (0.40 \text{x} 0.35 \text{x} 0.3 \text{x} 9 \text{x} 7) + (0.40 \text{x} 0.25 \text{x} 0.4 \text{x} 9 \text{x} 16)$

$+ (0.40 \text{x} 0.40 \text{x} 1 \text{x} 9 \text{x} 9)$

$= 65.4945$

The portfolio standard deviation is:

$\sigma_p = .\sqrt{65.4945} = 8.09$

A portfolio is a combination of assets. From a given set of n securities, any number of portfolios can be created. The 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. Thus, new portfolios can be created either by changing the securities in the portfolio or by changing the proportion of investment in the existing securities.

Each portfolio is characterized by its expected return and risk. Determining the expected return and risk (variance or standard deviation) of each portfolio that can be created from a set of selected securities is the first step in portfolio management and is called portfolio analysis.

Example: 6

Calculate the expected return and variance of a portfolio comprising two securities, assuming that the portfolio weights are 0.75 for security 1 and 0.25 for security 2. The expected return for security 1 is 18 per cent and its standard deviation is 12 per cent, while the expected return and standard deviation for security 2 are 22 per cent and 20 per cent respectively. The correlation between the two securities is 0.6

Solution

Calculation of expected return of portfolio:

$$\overline{r}_p = \sum_{i=1}^{n} x_i \overline{r}_i$$

$= (0.75 \text{ x } 18) + (0.25 \text{ x } 22)$

$= 13.5 + 55 = 19$ per cent.

Calculation of portfolio variance:

$\sigma_p^2 = x_1^2 \sigma_1^2 + x_2^2 \sigma_2^2 + 2 x_1 x_2 (r_{12} \sigma_1 \sigma_2)$

$= (0.75)^2 (12)^2 + (0.25)^2 (20)^2 + 2(0.75)(0.25)(0.6 \text{ x } 12 \text{ x } 20)$

$= 81 + 25 + 54 = 160$ per cent.

Example: 7

Consider two securities, P and Q, with expected returns of 15 per cent and 24 per cent respectively, and standard deviation of 35 per cent and 52 per cent respectively. Calculate the standard deviation of a portfolio weighted equally between the two securities in their correlation is – 0.9.

Solution

$$\sigma_p^2 = x_1^2\ \sigma_1^2 + x_2^2\ \sigma_2^2 + 2x_1x_2\ (r_{12}\ \sigma_1\ \sigma_2)$$
$$= (0.5)^2\ (35)^2 + (0.5)^2\ (52)^2 + 2(0.5)\ (0.5)\ (\text{-}0.9 \times 35 \times 52)$$
$$\sigma = \sqrt{163.25} = 12.78 \text{ per cent.}$$

Example:8

The historical rates of return of two securities over the past ten years are given. Calculate the covariance and the correlation of the two securities.

Years	1	2	3	4	5	6	7	8	9	10
Security 1 (return per cent)	12	18	7	14	16	15	18	20	16	22
Security 2 (return per cent)	20	22	24	18	15	20	24	25	22	20

Solution

Year	R1	Deviation $(R_1 - \overline{R}_1)$	R2	Deviation $(R_2 - \overline{R}_2)$	Product of deviations
1	12	-2.8	20	-1	2.8
2	8	-6.8	22	1	-6.8
3	7	-7.8	24	3	-23.4
4	14	-0.8	18	-3	2.4
5	16	1.2	15	-6	-7.2
6	15	0.2	20	-1	-0.2
7	18	3.2	24	3	9.6
8	20	5.2	25	4	20.8
9	16	1.2	22	1	1.2
10	22	7.2	20	-1	-7.2
	$\overline{R}_1 = 148/10 = 14.8$		$\overline{R}_2 = 210/10 = 21$		-8.00

Covariance = -8/ 10 = -0.8

For calculation of correlation, the standard deviation of the two securities are also required.

Calculation of Standard Deviation

Year	R_1	$R_1{}^2$	R_2	$R2^2$
1	12	144	20	400
2	8	64	22	484
3	7	49	24	576
4	14	196	18	324
5	16	256	15	225
6	15	225	20	400
7	18	324	24	576
8	20	400	25	625
9	16	256	22	484
10	22	484	20	400
	148	**2398**	**210**	**4494**

Standard deviation of security 1:

$$\sigma_1 = \sqrt{\frac{N \sum R_1{}^2 - (\sum R_1)^2}{N^2}}$$

$$= \sqrt{\frac{(10 \times 2398) - (148)^2}{10 \times 10}}$$

$$= \sqrt{\frac{23980 - 21904}{100}}$$

$$= \sqrt{20.76}$$

$$= 4.56$$

Standard deviation of security 2:

$$\sigma_1 = \sqrt{\frac{N \sum R_2{}^2 - (\sum R_2)^2}{N^2}}$$

$$= \sqrt{\frac{(10 \times 4494) - (210)^2}{10 \times 10}}$$

$$= \sqrt{\frac{44940 - 44100}{100}}$$

$$= \sqrt{840}$$

$$= 28.98$$

Correlation:

$$r_{12} = \frac{Cov_{12}}{\sigma_1 \, \sigma_2}$$

$$= \frac{-0.8}{4.56 \times 28.98}$$

$$= \frac{-0.8}{132.15}$$

$$= -0.0061$$

Example: 9

A portfolio is constituted with four securities having the following characteristics:

Security	Return (per cent)	Proportion of investment
P	17.5	0.15
Q	24.8	0.25
R	15.7	0.45
S	21.3	0.15

Calculate the expected return of the portfolio.

Solution

Expected return of the portfolio is calculated with the following formula:

$$\overline{r_p} = \sum_{i=1}^{n} x_i \overline{r_i}$$

$= (0.15 \times 17.5) + (0.25 \times 24.8) + (0.45 \times 15.7) + (0.15 \times 21.3)$

$= 2.625 + 6.200 + 7.065 + 3.195$

$= 19.085$ per cent

Example: 10

Given the following variance – covariance matrix for three securities, as well as the percentage of the portfolio that each security comprises, calculate the portfolio's standard deviation.

Security	A	B	C
A	425	-190	120
B	-190	320	205
C	120	205	175
	$W_A = 0.35$	$W_B = 0.25$	$W_C = 0.40$

Solution

The formula for the calculation of portfolio variance of a portfolio with more than two securities is as follows:

$$\sigma_p^2 = \sum_{i=1}^{n} \sum_{j=1}^{n} x_i \, x_j \, \sigma_{ij}$$

Variance – Covariance Matrix

Weight	Security	0.35 A	0.25 B	0.40 C
0.35	A	425	-190	120
0.25	B	-190	320	205
0.40	C	120	205	175

σ_p^2 = (0.35 x 0.35 x 425) + (0.35 x 0.25 x -190) + (0.35 x 0.4 x 120)

  + (0.25 x 0.35 x -190) + (0.25 x 0.25 x 320) + (0.25 x 0.4 x 205)

  + (0.4 x 0.35 x 120) + (0.4 x 0.25 x 205) + (0.4 x 0.4 x 175)

  = 52.06 − 16.63 + 16.8 − 16.63 + 20 + 20.5 + 16.8 + 20.5 + 28

  = 141.40

The portfolio standard deviation is

$$\sigma_p = \sqrt{141.40} = 11.89$$

QUESTIONS

1. What is portfolio management? Explain the status of portfolio management in India?

2. How do you arrive the optimum portfolio?

3. Describe the major constraints in portfolio revision.

4. Distinguish between active revision strategy and passive revision strategy.

5. What are formula plans? Explain the constant rupee value plan with examples.

6. What is random walk theory?

7. Explain the weak from of the efficient market hypothesis. Describe the empirical tests used for testing the weak form efficiency.

8. What is the implication of semi – strong form market efficiency for fundamental analysis?

9. Explain the concept and process of portfolio analysis.

10. Explain the significance of covariance in the estimation of the risk of a portfolio.

11. Discuss the impact of covariance or correlation between securities in a portfolio on the portfolio risk.

12. Use the following data to calculate the variance and standard deviation for a portfolio containing stocks 1 and 2

$r_{1,2} = 0.65$ $\qquad\qquad$ $\sigma_1 = 13$ $\qquad\qquad$ $\sigma_1 = 27$

$W_1 = 0.70$ $\qquad\qquad$ $W_2 = 0.30$

13. Given the following historical data for stocks X and Y, calculate covariance and correlation coefficient of the two stocks.

Year	Annual returns (per cent)	
	X	**Y**
1	6.2	-8.5
2	3.6	-10.7
3	4.5	12.5
4	2.8	-5.6
5	1.3	9.4

14. Calculate the expected return of a portfolio with four securities having the following characteristics.

Security	Return (per cent)	Proportion of investment
W	18.50	0.20
X	23.75	0.10
Y	12.30	0.25
Z	16.85	0.45

15. Calculate the expected return of a portfolio composed of the following securities:

Security	Expected return (per cent)	Proportion (per cent)
1	10	20
2	15	20
3	20	60

What would be the expected return if the proportion of each security in the portfolio were 25, 25 and 50 per cent respectively?