SECURITY ANALYSIS AND PORTFOLIO MANAGEMENT

I-MBA 8th Semester

INTRODUCTION TO INVESTMENT ENVIRONMENT

PORTFOLIO ANALYSIS

1. **ANALYZING RISK AND RETURN OF INDIVIDUAL SECURITY AND PORTFOLIO**

2. **PORTFOLIO SELECTION:**
   a. **A.MARKOWITZ MODEL**
   b. **B.SHARPE MODEL**

3. **THE CONCEPT OF EFFICIENT FRONTIER**

MODULE-1 : INTRODUCTION TO INVESTMENT ENVIRONMENT

1. PORTFOLIO ANALYSIS : Analyzing Risk n Return:

1.1 RISK : CONCEPT, SOURCES & TYPES OF RISK

1.1.1 Risk in a Traditional Sense

Risk in holding securities is generally associated with possibility that realized returns will be less than the returns that were expected. The source of such disappointment is the failure of dividends (interest) and/or the security‟s price to materialize as expected. Forces that contribute to variations in return price or dividend(interest) constitute elements of risk. Some influences are external to the firm, cannot be controlled, and affect large numbers of securities. Other influences are internal to the firm and are controllable to a large degree. In investments, those forces that are uncontrollable, external and broad in their effect are called sources of systematic risk. Conversely, controllable internal factors somewhat peculiar to industries and/or firms are refereedto as sources of unsystematic risk.

I. Systematic Risk

Systematic risk refers to that portion of total variability in return caused by factors affecting the prices of all securities. Economic, political, and sociological changes are sources of systematic risk. Their effect is to cause prices of nearly all individual common stocks and/or all individual bonds to move together in the same manner. For example, if the

economy is moving toward a recession and corporate profits shift downward, stock prices maydecline across a broad front. Nearly all stocks listed on the New York Stock Exchange (NYSE) move in the same direction as they NYSE Index. On the average, 50 percent of the variation in a stock‟s price can be explained by variation in the market index. In other words, about one-half of the total risk in an average common stock is systematic risk.

A. Market Risk

Finding stock prices falling from time-to-time while a company‟s earnings are rising, and vice versa, is not uncommon. The price of a stock may fluctuate widely within a short span of time even though earnings remain unchanged. The causes of this phenomenon are varied, but it is mainly due to a change in investors‟ attitudes toward equities in general, or toward certain types or groups of securities in particular. Variability in return on most common stocks that are due to basic sweeping changes in investor expectations is referred to as market risk. Market risk is caused by investor reaction to tangible as well as intangible events.

Expectations of lower corporate profits in general may cause the larger body of common to fall in price. Investors are expressing their judgment that too much is being paid for earnings in the light of anticipated events. The basis for the reaction is a set of real, tangible events political, social, or economic. Intangible events are related to market psychology. Market risk is usually touched off by a reaction to real events, but the emotional instability of investors acting collectively leads to a snow balling over reaction. The initial decline in the market can cause the fear of loss to grip investors, and a kind of her instinct builds as all investors make for the exit. These reactions to reactions frequently culminate in excessive selling, pushing prices down far out of live with fundamental value. With a trigger mechanism such as the assassination of a politician, the threat of war, or an oil shortage, virtually all stocks are adversely affected. Likewise, stocks in a particular industry group can be hard hitwhen the industry goes “out of fashion.”

This discussion of market risk has emphasized adverse reactions. Certainly, buying panics also occur as reactions to real events; however, investors are not likely to think of sharp price advances as risk. Two other factors, interest rates and inflation, are an integral part of the real forces behind market risk and are part of the larger category of systematic or uncontrollable influences. Let us turn our attention to interest rates. This risk factor has its most direct effect on bond investments.

B. Interest-Rate Risk

Interest-rate risk refers to the uncertainty of future market values and of the size of future income, caused by fluctuations in the general level of interest rates. The root cause of interest-rate risk lies in the fact that, as the rate of interest paid on U.S. government securities (USGs) rises or falls, the rates of return demanded on alternative investment vehicles such as stocks and bonds issued in the private sector, rise or fall. In other words,as the cost of money changes for nearly risk-free securities (USGs), the cost of money to more risk-prone issuers (Private sector) will also change.

Investors normally regard USGs as coming closest to being risk free. The interest rates demanded on USGs are thought to approximate the “pure” rate of interest, or the cost of hiring money at no risk. Changes in rates of interest demanded on USGs will permeate the system of available securities, from corporate bonds down to the riskiest common stocks.

Interest rates on USGs shift with changes in the supply and demand for government securities. For example, a large operating deficit experienced by the U.S. government will require financing. Issuance of added amounts of USGs will increase the available supply. Potential buyers of this new supply may be induced to buy only if interest rates are somewhat higher than those currently prevailing on outstanding issues. If rates on USGs advance from, say, 9 percent to 9¼ percent, investors holding outstanding issues that yield 9 per cent will notice adecline in the price of their securities. Because the 9 percent rate is fixed by contract on these “old” USGs, a potential buyer would be able to realize the competitive 9¼ percent rate only if the current holder “market down” the price. As the rate on USGs advances, they become relatively more attractive and other securities become less attractive. Consequently, bond purchasers will buy governments instead of corporates. This will cause the price ofcorporates to fall and the rate on corporates to rise.

Rising corporate bond rates will eventually cause preferred- and common-stock prices to adjust down ward as the chain reaction is felt through out the system of security yields. Thus, a rational, highly interconnected structure of security yields exists. Shifts in the "pure" cost of money will ripple through the structure. the direct effect on increases in the level of interest rates is to cause security prices to fall across a wide span of investment vehicles. Similarly, falling interest rates precipitate prices markups on outstanding securities.

In addition to the direct, systematic effect on bonds, there are indirect effects on common stocks. First, lower or higher interest rates make the purchase of stocks on margin (using borrowed funds) more or less attractive. Higher interest rates, for example, may lead to lower prices because of a diminished demand for equities by speculators who use margin. Ebullient stock markets are at times propelled to some excesses by margin buying when interest rates are relatively low.

Secondly, many firms‟ such as public utilities finance their operations quite heavily with borrowed funds. Others, such as financial institutions, are principally in the business of lending money. As interest rates advance, firms with heavy doses of borrowed capital find that more of their income goes toward paying interest on borrowed money. This may lead to lower earnings, dividends, and share prices. Advancing interest rates can bringhigher earnings to lending institutions whose principal revenue sources is interest received on loans. For these firms, higher earnings could lead to increased dividends and stock prices.

C. Purchasing-Power Risk

Market risk and interest-rate risk can be defined in terms of uncertainties as to the amount of current dollars to be received by an investor. Purchasing-power risk is the uncertainty of the purchasing power of the amounts to be received. In more everyday terms, purchasing-power risk refers to the impact of inflation or deflation on an investment.

If we think of investment as the postponement of consumption, we can see that when a person purchases a stock, he has foregone the opportunity to buy some good or service for as long as he owns the stock. If, during the holding period, good or services rise, the investor actually loses purchasing power. Rising prices on goods and services are normally associated with what is referred to as inflation. Falling prices on goods and services are termed deflation. Both inflation and deflation are covered in the all-encompassing term purchasing power risk

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Generally, purchasing-power risk has come to be identified with inflation (rising prices); the incidence ofdeclining prices in most countries has been slight. Rational investors should include in their estimate of expected return an allowance for purchasing-power risk, in the form of an expected annual percentage change in prices. If acost-of living index begins the year at 100 and ends at 103, we say that the rate of increase (inflation) is 3 percent [(1030100)/100]. If from the second to the third year, the index changes from 103 to 109, the rate is about 5.8 percent [109-103/103]. Just as changes in interest rates have a systematic influence on the prices of all securities, both bonds and stocks, so too do anticipated purchasing-power changes manifest themselves. If annual changes inthe consumer price index of other measure of purchasing power have been averaging steadily around 3.5 percent and prices will apparently spurt ahead by 4.5 percent over the next year, required rates of return will adjust upward.

This process will affect government and corporate bonds as well as common stocks. Market, purchasing- power and interest-rate risk are the principle sources of systematic risk in securities; but we should also consider another important category of security risk an unsystematic risks.

II. Unsystematic Risk

Unsystematic risk is the portion of total risk that is unique to a firm or industry. Factors such as management capability, consumer preferences, and labor strikes cause systematic variability of returns in a firm. Unsystematic factors are largely independent of factors affecting securities markets in general. Because these factors affect one firm, they must be examined for each firm.

Unsystematic risk is the portion of total risk that is unique or peculiar to a firm or an industry, above and beyond that affecting securities markets in general. Factors such as management capability, consumer preferences, and labor strikes can cause unsystematic variability of returns for a company‟s stock. Because these factors affect one industry and/or one

firm, they must be examined separately for each company. The uncertainty surroundings the ability of the issuer to make payments on securities stems from two sources: (1) the operating environment of the business, and (2) the financing of the firm. These risks are referred to as business risk and financial risk, respectively. They are strictly a function of the operating conditions of the firm and they way in which it chooses to finance its operations. Our intention here will be directed to the broad aspects and implications of business and financial risk. In-depth treatment will be the principal goal of later chapters on analysis of the economy, the industry, and the firm.

A. Business Risk

Business risk is a function of the operating conditions faced by a firm and the variability these conditions inject into operating income and expected to increase 10 percent per year over the foreseeable future, business risk would be higher if operating earnings could grow as much as 14 percent or as little as 6 percent than if the range were from a high of 11 percent to a low of 9 percent. The degree of variation from the expected trend wouldmeasure business risk.

Business risk can be divided into two broad categories: external and internal. Internal business risk is largely associated with the efficiency with which a firm conducts its operations with in the broader operating environment imposed upon it. Each firm has its own set of internal risks, and the degree to which it is successfulin coping with them is reflected in operating efficiency.

To large extent, external business risk is the result of operating conditions imposes upon the firm by circumstances beyond its control. Each firm also faces its own set of external risks, depending upon the specific operating environmental factors with which it must deal. The external factors, from cost of money to defense- budget cuts to higher tariffs to a down swing in the business cycle, are far too numerous to list in detail, but the most pervasive external risk factor is probably the business cycle. The sales of some industries (steel, autos) tend to move in tandem with the business cycle, while the sales of others move country cyclically (housing).

Demographic considerations can also influence revenues through changes in the birth rate or the geographical distribution of the population by age, group, race, and so on. Political Policies are a part of external business risk; government policies with regard to monetary and fiscal matters can affect revenues through the effect on the cost and availability of funds. If money is more expansive, consumers who buy on credit may postpone purchases, and municipal governments may not sell bonds to finance a water-treatment plant. The impact upon retail stores, televisions manufacturers, of water-purification systems is clear.

B. Financial Risk

Financial risk is associated with the way in which a company finances its activities. We usually gauge financial risk by looking at the capital structure of a firm. The presence of borrowed money of debt in the capital structure creates fixed payment in the form of interest that must be sustained by the firm. The presence of these interest commitments fixed interest payments due to debt of fixed-dividend payments on preferred stock causes the amount of residual earnings available for common stock dividends to be more variable than if no interest payments were required. Financial risk is avoidable risk to the extent that managements have the freedom to decide to borrow or not to borrow funds. A firm with no debt financing has no financial risk.

By engaging in debt financing, the firm changes the characteristic of the earnings stream available to the common-stock holders. Specifically, the reliance on debt financing, called financial leverage, has at three important effects on common-stock holders. Debt financing (1) increases the variability of their returns, (2) affects their expectations concerning their returns, and (3) increases their risk of being ruined.

III. Assigning Risk Allowances (Premiums)

One way of quantifying risk and building a required rate of return (r), would be to express the required rate as comprising a risk less rate plus compensation for individual risk factors previously enunciated, or as:

r = i + p + b + f + m + o

Where: i = real interest rate (risk less rate), p = purchasing-power-risk allowance, b = business-risk allowance, f =financial-risk allowance, m = market-risk allowance, o = allowance for "other" risks

The first step would to determine a suitable risk less rate of interest. Unfortunately, no investment is risk- free. The return on U.S. Treasury bills or an insured savings account, which ever is relevant to an individual investor, can be used as an approximate risk less rate. Savings accounts possess purchasing-power risk and are subject to interest-rate risk of income but not principal. U.S. government bills are subject to interest-risk of principal. The risk less rate might by 8 percent.

Using the rate on U.S. government bills and assuming that interest-rate-and-risk compensation is already included in the U.S. government bill rate, the process of building required rate of return for alternative investments. To quantify the separate effects of each type of systematic and unsystematic risk is difficult because of overlapping effects and the sheer complexity involved.

Can we reduce the Risk Exposure?

Every investor wants to guard himself from the risk. This can be done by understanding the nature of the risk and careful planning. Let‟s see how we can protect ourselves as an investor from the different types of risks.

A. Market Risk Protection

a. The investor has to study the price behavior of the stock. Usually history repeats itself even though it is not in perfect form. The stock that shows a growth pattern may continue to do so for some more periods. The Indian stock market expects the growth pattern to continue for some more time in information technology stock and depressing conditions to continue in the textile related stock. Some stocks may be cyclical stocks. It is better to avoid such type of stocks. The standard deviation and beta indicate the volatility of the stock.

b. The standard deviation and beta are available for the stocks that are included in the indices. The National Stock Exchange News bulletin provides this information. Looking at the beta values, the investor can gauge the risk factor and make wise decision according to his risk tolerance.

c. Further, the investor should be prepared to hold the stock for a period of time to reap the benefits of the rising trends in the market. He should be careful in the timings of the purchase and sale of the stock. He should purchase it at the lower level and should exit at a higher level.

B. Protection against Interest Rate Risk

a. Often suggested solution for this is to hold the investment sells it in the middle due to fall in the interest rate, the capital invested would experience tolerance.

b. The investors can also buy treasury bills and bonds of short maturity. The portfolio manager can invest in the treasury bills and the money can be reinvested in the market to suit the prevailing interest rate.

c. Another suggested solution is to invest in bonds with different maturity dates. When the bonds mature in different dates, reinvestment can be done according to the changes in the investment climate. Maturity diversification can yield the best results.

C. Protection against Inflation

a. The general opinion is that the bonds or debentures with fixed return cannot solve the problem. If the bond yield is 13 to 15 % with low risk factor, they would provide hedge against the inflation.

b. Another way to avoid the risk is to have investment in short-term securities and to avoid long term investment.

The rising consumer price index may wipe off the real rate of interest in the long term.

c. Investment diversification can also solve this problem to a certain extent. The investor has to diversify his investment in real estates, precious metals, arts and antiques along with the investment in securities. One cannot assure that different types of investments would provide a perfect hedge against inflation. It can minimize the loss due to the fall in the purchasing power.

D. Protection against Business and Financial Risk

a. To guard against the business risk, the investor has to analyze the strength and weakness of the industry to which the company belongs. If weakness of the industry is too much of government interference in the way of rules and regulations, it is better to avoid it.

b. Analyzing the profitability trend of the company is essential. The calculation of standard deviation would yield the variability of the return. If there is inconsistency in the earnings, it is better to avoid it. The investor has to choose a stock of consistent track record.

c. The financial risk should be minimized by analyzing the capital structure of the company. If the debt equity ratio is higher, the investor should have a sense of caution. Along with the capital structure analysis, he should also take into account of the interest payment. In a boom period, the investor can select a highly levered company but not in a recession.

ANALYZING RISK & RETURN OF INDIVIDUAL SECURITY AND PORTFOLIO

RISK & RETURN OF INDIVIDUAL SECURITY

How does we Measure Risk?

Understanding the nature of the risk is not adequate unless the investor or analyst is capable of expressing it in some quantitative terms. Expressing the risk of a stock in quantitative terms makes it comparable with other stocks. Measurement cannot be assures of percent accuracy because risk is caused by numerous factors as discussed above. Measurement provides an approximate quantification of risk .The statistical tool often used to measure is the standard deviation.

COMPANY A			**COMPANY B**		
ri	**Pi**	**Piri**	**ri**	**Pi**	**Piri**
6	**0.10**	**0.6**	**4**	**0.1**	**0.4**
7	**0.25**	**1.75**	**6**	**0.2**	**1.2**
8	**0.30**	**2.4**	**8**	**0.4**	**3.2**
9	**0.25**	**2.25**	**10**	**0.2**	**2.0**
10	**0.10**	**1.00**	**12**	**0.1**	**1.2**
åE(r) = 8.00			**åE(r) = 8.00**		

Standard Deviation: It is a measure of the values of the variables around its mean or it is the square root ofthe sum of the squared deviations from the mean divided by the number of observances. The arithmetic mean of the returns may be same for two companies but the returns may vary widely. This can be illustrated with an example. Now let us take two companies A and B to calculate the expected returns.

Where: ri is the rate of return, P is the probability
Let‟s calculate the expected mean for both the companies.For

Company A: å ri /n = (6+7+8+9+10)/5 = 8
For Company B: å ri /n = (4+6+8+10+12)/5 = 8
You can note that the expected means for both the companies are same i.e. 8.However, the return varies from 6%-10% in Company A and 4%-12% for Company B. To find out the variation, the standard deviation technique is applied.

ANALYZING RISK & RETURN OF PORTFOLIO

Measuring Portfolio Risk

Like in case of individual securities, the risk of a portfolio could be measured in terms of its variance or standard deviation. However, the variance or standard deviation of a portfolio is not simply the weighted average of variances or standard deviation of individual securities. The portfolio variance or standard deviation is affected by the association of movement of returns of two securities. Covariance of two securities measures their co-movement.

How do we Calculate Co-variance?

There are three steps involved I the calculation of covariance between two securities; Determine the expected returns for securities, determine the deviation of possible returns from the expected return for each security, and determine the sum of the product of each deviation of returns of two securities and probability. Let us consider the data of two securities X and Y. State of economy Probability Returns?

		X	y
A	**0.1**	**-8**	**14**
B	**0.2**	**10**	**-4**
C	**0.4**	**8**	**6**
D	**0.2**	**5**	**15**
E	**0.1**	**-4**	**20**

The expected return for security X:
E (Rx) = (0.1*-0.8)+(0.2*10)+(0.4*8)+(0.2*5)+(0.1*-0.4) = 5%
The expected return for security Y:
E (Ry) = (0.1*14)+(0.2*-4)+(0.4*6)+(0.2*15)+(0.1*20) =8%

Covxy is the covariance of returns of securities X & Y, Rx and Ry are the returns of securities X & Y respectively, (Rx) and E (Ry) are the expected returns of securities X & Y respectively, Pi is the probability of occurrence of the state of economy.

Thus the covariance between the securities X & Y is:
Covxy= 0.1(-8-5) (14-8) +0.2(10-5)(-4-8)+0.4(8-5)(6-8)+0.2(5- 5)(15-8)+0.1(-4-5)(20-8)
= -7.8-12-2.4+0-10.8 = -33.0

You can note from the calculation of covariance of returns of securities X and Y that it is a measure of both the standard deviations of the securities and their associations. Thus, covariance can also be calculated as follows:
Covxy = s x *s y * Corxy
Covariance XY = Standard deviation X * Standard deviation Y* Correlation XY

Where x and y are standard deviation of returns for securities X and Y and Corxy is the correlation coefficient of securities X and Y. Correlation measures the linear relationship between to variables (in case of twosecurities).Thus, from the above formula, we can obtain the following formula for calculating the correlation coefficient of securities X & Y:

Correlation XY = Covariance XY

Standard deviation X * Standard deviation Y

Corxy = Covxy s
x * s y

The variances and standard deviation of securities x and y are as follows:
s x 2 = 0.1(-8-5)2+0.2(10-5)2+0.4(8-5)2+0.2(5-5)2+0.1(-4-5)2 =16.9+5+3.6+0+8.1 = 33.6x =
Ö33.6 = 5.8%
s y 2 = 0.1(14-8)2 +0.2(-4-8)2+0.4(6-8)2+0.2(15-8)2+0.1(20-8)2 = 3.6+28.8+1.6+9.8+14.4 = 58.2y =
Ö58.2= 7.63%
The correlation coefficient of securities X and y is as follows:
Corxy = -33 = 0.74565.8*7.63
Securities X and Y are negatively correlated. If an investor invests in the combination of these securities, he orshe can reduce the risk.

The Characteristic Regression Line (CRL)

The Characteristic Regression Line (CRL) is a simple linear regression model estimated for a particular stockagainst the market index return to measure its diversifiable and undiversifiable risks.

The model is: Ri = ai + b I Rm+ei
i =Return of the ith stock, aI = Intercept, bi = Slope of the ith stockRm=
Return of the market index, ei = the error term

The security return = Today‟s price – Yesterday‟s price * 100
Yesterday‟s price

Today‟s market return = Today‟s index – Yesterday‟s index * 100
Yesterday‟s index

Like daily returns, weekly returns can be calculated by using this week‟s and last week‟s prices instead oftoday‟s and yesterdays prices in the above mentioned formula. Monthly can also be calculated. Let‟s consider thedaily prices of the Bajaj Auto stock and the NSE index for the 5th Oct 2000 to 16th October 2000.The objectiveof this example is only to illustrate the computation of beta. Usually beta values have to be calculated from dataof a fairly long period to minimize the sampling error.

Date	**NSE index (X)**	**Bajaj Auto (Y)**	**October 9**	**849.10**	**554.60**
October 5	**904.95**	**597.8**	**October 12**	**835.80**	**545.10**
October 6	**845.75**	**570.8**	**October 13**	**816.75**	**519.15**
October 7	**874.25**	**582.95**	**October 14**	**843.55**	**560.70**
October 8	**847.95**	**559.85**	**October 15**	**835.55**	**560.95**

What is Beta? What does it imply?

Beta is the slope of the characteristic regression line. Beta describes the relationship between the stock‟s return and the index returns. In the above example, beta indicates that 1 % change in NSE index return would cause 1.19 % change in the Bajaj auto stock return. Varying beta has the following implications:

Beta = +1.0: 1% change in the market index return causes exactly 1% change in the stock return. It indicates that the stock moves in tandem with the market.

Beta = + 0.5: 1% change in the market index return causes exactly 0.5% change in the stock return. The stock is less volatile compared to the market.

Beta = +2.0: 1% change in the market index return causes exactly 2% change in the stock return. The stock is more volatile when there is a decline of 10% in the market return, the stock with a beta of 2would gives a negative return of 20%. The stocks with more than I beta value is considered to be risky.

Negative beta value indicates that the stock return moves in the opposite direction to the market return. A stock with a negative beta of –1 would provide a return of 10%, if the market return declines by 10% and vice-versa.

Note: Stocks with negative beta resist the decline in the market return. But stocks with negative returns are very rare.

Alpha

The intercept of the characteristic regression line is alpha i.e. distance between the intersection and the horizontal axis. It indicates that the stick return is independent of the market return. A positive value of alpha isthe healthy sign. Positive alpha values would yield profitable return.

Correlation

The correlation co-efficient measures the nature and extent of relationship between the stick market index return and the stock return in the particular period. The square of the correlation coefficient is the co-efficient of determination. It gives the percentage of variation in the stock‟s return explained be the variation in the market‟s return. r2 = (0.79)2 = 0.62

What does an r of 0.62 imply?

The interpretation is that 62% of variation in stock‟s return is due to the variations in NSE index return.

Recap

Risk is measured by the variability of return. It has two components, systematic and unsystematic risk

- **Systematic risk** affects the market as a whole. Tangible event like Pokaran blast and intangible event like investor‟s psychology affects the entire stock market, which is known as market risk.
- **Interest rate risk** is the variation in return caused by the changes in the market interest rate.
- **Purchasing power risk** is caused by inflation. Inflation reduces the real rate of return earned from the securities.
- **Unsystematic risk** is unique to the particular industry or company. This is classifies into business risk andfinancial risk.
- **Business risk** is caused by operating environment of the business. This may be caused by the internal factors like fluctuations in sales or personnel management or external factors like government policies, rules and regulations.
- **Financial risk** emerges from the debt component of the capital structure. A careful analysis of the past; planning and diversification of the investment can moderate the effects of the various risk factors.
- Statistically **standard deviation** and **beta estimation** help to quantify the risk.

2. PORTFOLIO SELECTION: A: MARKOWITZ MODEL

Harry M. Markowitz is credited with introducing new concepts of risk measurement and their application to the selection of Portfolios. He started with the idea of risk aversion‟ of average investors and their desire to maximize the expected return with the least risk. Markowitz model is thus a theoretical framework for analysis of risk and return and their inter-relationships. He used the statistical analysis for measurement of risk and mathematical programming for selection of assets in a portfolio in an efficient manner. His framework led to the
.concept of efficient portfolios. An efficient portfolio is expected to yield the highest return for a given level of risk or lowest risk for a given level of return.

Markowitz generated a number of portfolios within a given amount of money or wealth and given preferences .of investors for risk and return. Individuals vary widely in their risk tolerance and asset preferences. Their means, expenditures and investment requirements vary from individual to individual. Given the preferences, the portfolio selection is not a simple choice of anyone security or securities, but a right combination of securities. Markowitz emphasized that quality of a portfolio will be different from the quality of individual assets within it. Thus, the combined risk of two assets taken separately is not the same risk of two assets together. Thus, two securities of TISCO do not have the same risk as one security of TISCO and one of Reliance.

Risk and Reward are two aspects of investment considered by investors. The expected return may vary depending on the assumptions. Risk index is measured by the variance or the distribution around the mean, its range etc., which are in statistical terms called variance and covariance. The qualification of risk and the need for optimization of return with lowest risk are the contributions of Markowitz. This led to what is called the Modern Portfolio Theory, which emphasizes the trade off between risk and return. If the investor wants a higher return, hehas to take higher risk. But he prefers a high return but a low risk and hence the need for a trade off. A portfolioof assets involves the selection of securities.

A combination of assets or securities is called a portfolio. Each individual investor puts his wealth in a combination of assets depending on his wealth, income and his preferences. The traditional theory of portfolio postulates that selection of assets should be based on lowest risk, as measured by its standard deviation from the mean of expected returns. The greater the variability of returns, the greater is the risk. Thus, the investor chooses assets with the lowest variability of returns. Taking the return as the appreciation in the share price, if TELCO shares.‟) Price varies from Rs. 338 to Rs. 580 (with variability of 72%) and Colgate from Rs. 218 to Rs. 315 (with a variability of 44%) during a time period, the investor chooses the Colgate as a less risky share.

As against this Traditional Theory that standard deviation measures the variability of return and risk is indicated by the variability, and that the choice depends on the securities with lower variability, the modem Portfolio Theory emphasizes the need for maximization of returns through a combination of securities, whose total variability is lower. The risk of each security is different from that of others and by a proper combination of securities, called diversification, one can arrive at a combination wherein the risk of one is offset partly or fully bythat of the other.

In other words, the variability of each security and covariance for their returns reflected through their inter-relationships should be taken into account. Thus, as per the Modem Portfolio Theory, expected returns, the variance of these returns and covariance of the returns of the securities within the portfolio arc to be consideredfor the choice of a portfolio. A portfolio is said to be efficient, if it is expected to yield the highest return possible for the lowest risk or a given level of risk. A set of efficient portfolios can be generated by using the above process of combining various securities whose combined risk is lowest for a given level of return for the same amount of investment, that the investor is capable of. The theory of Markowitz, as stated above is based on a number of assumptions.

Assumptions of Markowitz Theory

The Modern Portfolio Theory of Markowitz is based on the following assumptions:

1. Investors are rational and behave in a manner as to maximize their. Utility with a given level of incomeor

money.

2. Investors have free access to fair and correct information on the returns and risk.
3. The markets are efficient and absorb the information quickly and perfectly.
4. Investors are risk averse and try to minimize the risk and maximize return.
5. Investors base decisions on expected returns and variance or standard deviation of these returns fromthe mean.
6. Investors prefer higher returns to lower returns for a given level of risk.

A portfolio of assets under the above assumptions for a given level of risk. Other assets or portfolio of assets offers a higher expected return with the same or lower risk or lower risk with the same or higher expected return. Diversification of securities is one method by which the above objectives can be secured. The unsystematic and company related risk can be secured. The unsystematic and company related risk can bereduced by diversification into various securities and assets whose variability is different and offsetting or put in different words which are negatively correlated or not correlated at all.

Markowitz Diversification

Markowitz postulated that diversification should not only aim at reducing the risk of a security by reducing Its variability or standard deviation, but by reducing the covariance or interactive risk of two or more securities in a portfolio. As by combination of different securities, it is theoretically possible to have a range of risk varying from zero to infinity.

Markowitz theory of portfolio diversification attaches importance to standard deviation, to reduce it to zero, if possible, covariance to have as much as possible negative interactive effect among the securities withinthe portfolio and coefficient of correlation to have - 1 (negative) so that the overall risk of the portfolio as a whole is nil or negligible. Then the securities have to be combined in a manner that standard deviation is zero, as shown in the example below. Possible combinations of securities (1) and (2):

Security (1)	Security (2)	S.D.
80	20	0.8
70	30	0.4
66	34	0.0
20	80	0.8
10	90	0.9

In the example, if 2/3rd arc invested in security (1) and 1/3rd in security S.D. 2., The coefficient of variation, namely = - is the lowest. The standard deviation of the portfolio determines the deviation of the returns and correlation coefficient of the proportion of securities in the portfolio, invested. The equation is

s2p = portfolio variance
sp = Standard deviation of portfolio
xi = Proportion of portfolio invested in security i xj = Proportion of portfolio invested in security J rij = coefficient of correlation between i and j
si = standard deviation of i sj = standard deviation of j.

N = number of securities.

Problem

Given the following example, find out the expected Risk of the portfolio SD (Standard deviation) and coefficient of correlation is r12 = 0.5 (r1 with respect to r2), r13 = 0.1 (r1 with respect to r3), r23 = -0.3 (r2 with respect to r3), then, sp = .0892 = .299 = +.30 Portfolio Risk

Parameters of Markowitz Diversification

Based on his research, Markowitz has set out guidelines for diversification on the basis of the attitude of investors towards risk and return and on a proper quantification of risk. The investments have different types of risk characteristics, some caused systematic and market related risks and the other called unsystematic or company related risks. Markowitz diversification involves a proper number of securities, not too few or not too many which have no correlation or negative correlation. The proper choice of companies, securities, or assets whose returns are not correlated and whose risks are mutually offsetting to reduce the overall risk. For building upthe efficient set of portfolio, as laid down by Markowitz.., we need to look into these important parameters.

1. Expected return.
2. Variability of returns as measured by standard deviation from the mean.
3. Covariance or variance of one asset return to other asset returns.

In general the higher the expected return, the lower is the standard deviation or variance and lower is the correlation the better will be the security for investor choice. Whatever is the risk of the individual securities in isolation, the total risk of the portfolio of all securities may be lower, if the covariance of their returns is negative or negligible.

Criteria of Dominance

Dominance refers to the superiority of One portfolio Over the other. A Set can dominate over the other, if with the same return, the risk is lower or with the same risk, the return is higher. Dominance principle involves the trade off between risk and return.

For two security portfolio, minimize the portfolio risk by the equationOp =

Wa Oa2 + Wb Ob

2+2 (Wa Wb Oa Oab)

E (Rp) = WaE (Ra) + Wb E (Rb)

R refers to returns and E (Rp) is the expected returns. Op is the standard deviation, W refers to the proportion invested in each security Oa Ob are the standard deviation of a and b securities and Oab is the covariance or interrelations of the security returns.

The above concepts arc used in the calculation of expected returns, mean standard deviation as a measure of risk and covariance as a measure of inter-relations of one security return with another.

Markowitz Model Risk is discussed here in terms of a portfolio of assets.

As referred to earlier, any investment risk is the variability of return on a stock, assets or a portfolio. It ismeasured by standard deviation of the return over the Mean for a number of observations.

Measurement of Risk (Example)

Standard deviation to be calculated: Average in Mean Observations: 10% - 5% 20% 35% - 10% = 10% will betheir Mean.

Portfolio Risk

When two or more securities or assets are combined in a portfolio their covariance or interactive risk is to be considered. Thus if the returns on two assets move together, their covariance is positive and the risk is more on such portfolio. If on the other hand, the returns move independently or in opposite directions, the covariance is negative and the risk in total will be lower.

Mathematically the covariance is defined as Where Rx is return on security x, Ry return security Y, and Rx and Ry are expected returns on them respectively and N is the number of observations. The coefficient of correlation is another measure designed to indicate the similarity or dissimilarity in the behavior of two variables. We define the coefficient of correlation of x and y as where Cov x y is the covariance between x and y and Ox is the standard deviation of x and Oy is the standard deviation of y.

Example

The coefficient of correlation between two securities is – 1.0, it is perfect negative correlation. If its is + 1.0 it is perfect positive correlation. If the coefficient is „O" then the returns are said to be independent. To sum up, correlation between two securities depend (a) on covariance between them, and (b) the standard deviation of each.

In Markowitz Model, we need to have inputs of expected return, risk measured by standard deviation ofreturns and the covariance between the returns on assets considered.

2. PORTFOLIO SELECTION: B: Sharpe Model

Markowitz Model had serious practical limitations due the rigors involved in compiling the expected returns, standard deviation, variance, covariance of each security to every other security in the portfolio. Sharpe model has simplified this process by relating the return in a security to a single Market index. Firstly, this will theoretically reflect all well traded securities in the markC"1:. Secondly, it will reduce and simplify the work involved in compiling elaborate matrices of variances as between individual securities.

If thus the market index is used as a surrogate for other individual securities in the portfolio, the relation of any individual security with the Market index can be represented in a Regression line or characteristic line. This isdrawn below, with the excess return on the security on the y-axis and excess return on the Market Portfolio on thex-axis. The equation of the characteristic line is Ri - Rf = a + bim (Rm -Rf) + ri Ri is the holding period return on security I .Rf is the risk less rate of interest, Alpha is the vertical intercept on y-axis representing the return
on the security when only unsystematic risk is considered and systematic risk is measured by Beta. ri is the residual component, not captured by the above variables.

Practical Measurement of Return

Risk less Rate = 6.5% (Bank rate) or Bank Deposit rate (8%), Risk Premium = 5 to 10% depending or the Risk or the Concept of Beta of the security.

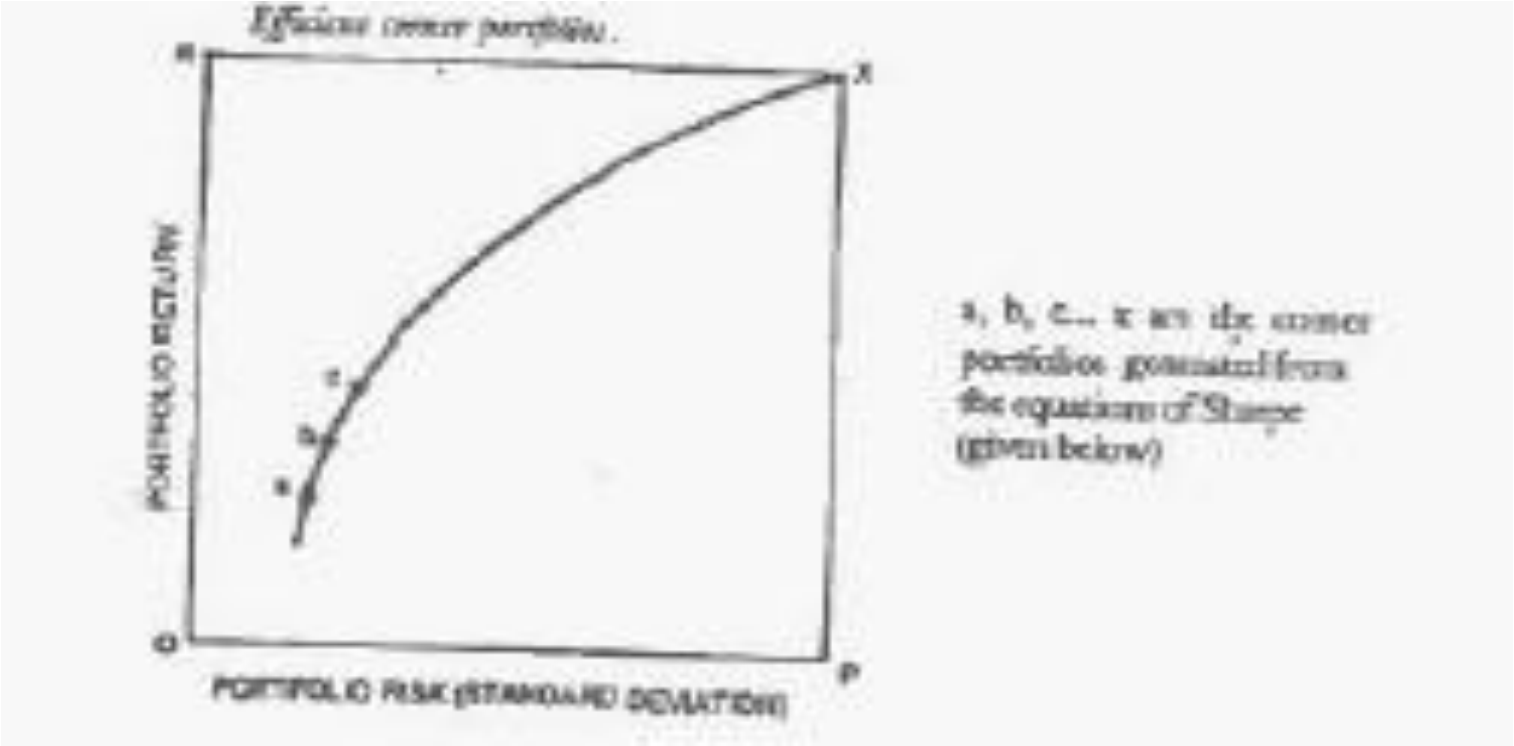
Beta is thus a measure of Systematic Risk of the market only and does not represent the unsystematic risk. Market Risk is represented by BSE National Index, in the above formula. In the regression equation given below used by Sharpe the unsystematic Risk is represented by the error term, namely, (e), while a or a is the constant slope of the regression line and Beta (b) is the measure of Systematic Risk.
Example for Regression Equation and calculation of Beta is given below:-

Y = a + bX + c is the equation.
Y = 0.91 + 0.93X, where
b = 0.93 X = Market ReturnY
= Scrip Return
a = Constant = 0.91

Examples of b, calculated

Reliance - 1.955
ACC - 0.931
Telco - 1.153
Tisco - 1.342
Colgate - 0.946
Tata Tea - 0.951

On the basis of the above estimates of the stocks Alpha, Beta and expected return and Residual variance (data derived from the above formulas), one can construct a series of efficient portfolios by using a computer programmer. This will give out the series of corner portfolios and the line connecting them is the **efficientfrontier** line, in the shape Model.



The chart below represents the corner portfolio sets, indicating the efficient portfolio. This is for calculating the expected return on portfolio where N = total number of stocks, Xi is the proportion devoted to stock, i- Ri is the Beta on stock i, I is market index return and is the same for all stocks, estimated.
For Portfolio Variance

s2 = Variation of portfolio return.
s1p2 = expected variance of Index (Market)
c12 = Variation in security's return not caused by its relationship to the index.

Optimal Portfolio of Sharpe

This optimal portfolio of sharpe is called the single Index Model. The optimal portfolio is directly related to the Beta. If Ri is expected return on stock i and Rf is Risk free Rate, then the excess return = Ri- Rf
This has to be adjusted to Bi, namely which is the equation for ranking stocks in the order of their return adjusted for risk. The method involves selecting a cut off rate for inclusion of securities in a portfolio. For this purpose, excess return to Beta ratio given above has to be calculated for each stock and rank them from highest to lowest. Then only those securities which have greater than cut off point fixed in advance can be selected. The basis for finding the cut off Rate Ci is as follows:

Basis for Cut off Rate: For a portfolio of i stocks Ci is given by cut off rate.

Example

We have to see that for the optimum Ci that is C* to be selected, the securities should have excess returnto Betas above Ci. Excess return to Beta ratio should be above Ci to be included in the portfolio, to be precise. This Ci is that point which shows the cut off point between those excess return to Beta ratios above. The calculation of C requires data, which are shown below:
Rf = Risk free Return = 5%

All securities with excess return to Beta ratio above the cut off rate C* say 3.0 in the above Table will be chosen in the Portfolio. The calculation of cut off point is also explained. In arriving at the optimal portfolio the emphasis of Sharpe Model is on Beta and on the Market Index. Sharpe‟s optimal portfolio would thus consist of those securities only which have excess return to Beta ratio above a cut off point.

By this method, selection of the portfolio has become easier due to the ranking of the securities in theorder of their excess return and applying the yardstick of a required cut off point for selection of securities. That cut off point is related to the excess return to Beta rate on the one hand and variance of the market index and variance of the stock‟s movement which is related to the unsystematic risk, namely oei2.

Optimal portfolio is set up by using the single index model of Sharpe. The desirability of any stock is directly related to its excess return to Beta ratio, namely Sharpe Index = Where RJ is expected return on the stock,RF is the risk free return, and BJ is the Beta relating the J Stock to the market return. Then rank all the stock in their order of the index value.

In Sharpe model the return On any stock depends on some constant (alpha) called Alpha plus coefficient called(Beta) times the value of stock Index (I), plus a random component.

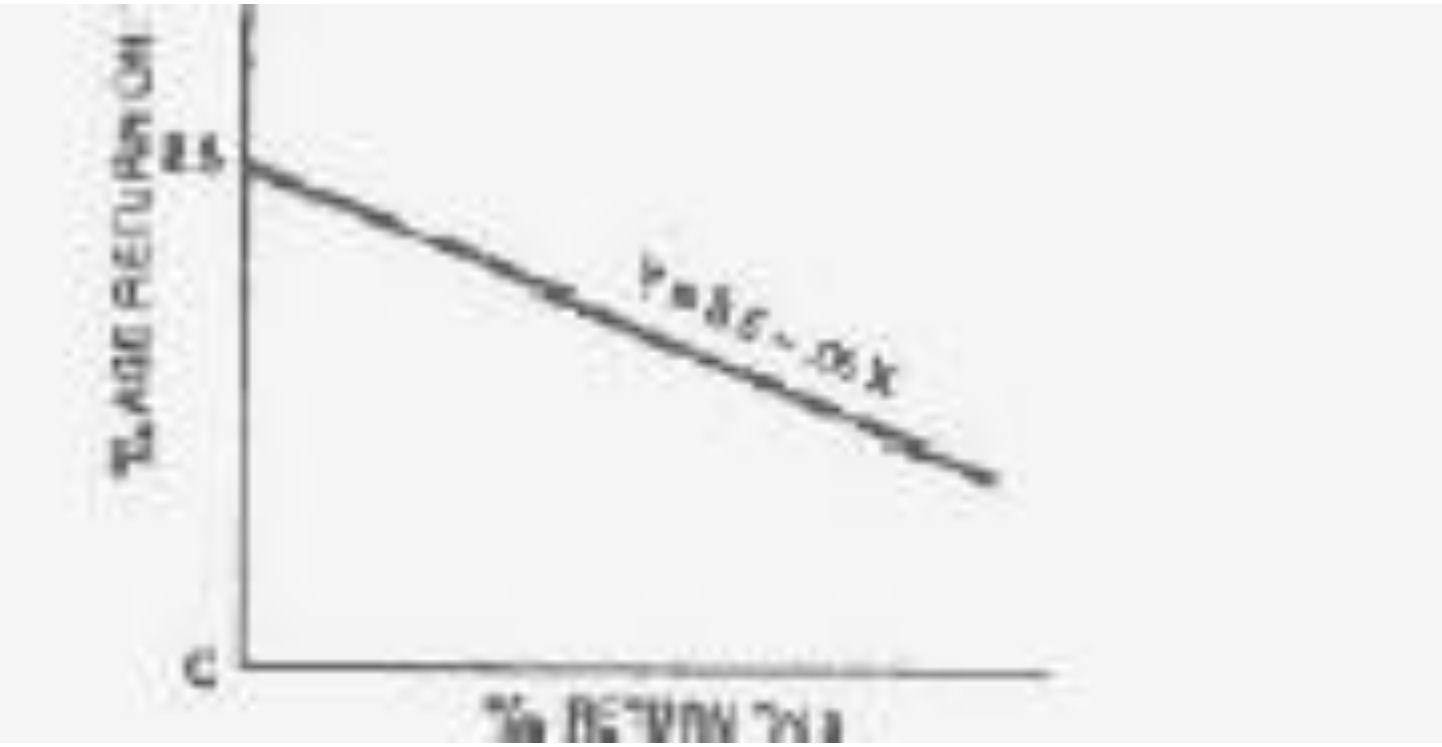
Sharpe Model Equation was set as Rj= aj + BjI + ejRj =
Expected return on security J
aj = Intercept of a straight line or alpha coefficient.
bj = Beta coefficient is the slope of straight line (Regression line)I =
Expected return on Index of the market.
ej = Error term with a mean of zero and standard deviation which is constant.

Alpha (a) is really the value of Y is the equation when the value of x is zero. The return on the stock in relation to the return on the market Index, namely, Beta is a measure of the systematic risk of the market. The error term in the above equation explains the unsystematic risk.

Alpha (a) is measured by making return on y as zero. In the following chart a is 8.5, which is the constant and Beta is .05, calculated for the data, used in the chart. If the return on the Index is ay, at 25%, then Rj = 8.5-

.05 (25) = 7.25. This means that if the market index gives a return of 25% the security in question will give a return of 7.25% only. Systematic Risk only is used by Sharpe, and it is equal to B2 x (Variance of Index) = Beta2 O2 where O2 is variance of Index. Unsystematic Risk plus the error term in his equation.

NOTE: Concept of efficient frontier is included in both Markowitz and Sharpe model.



Two Models Compared: Markowitz Model vs. Sharpe Model
Utility

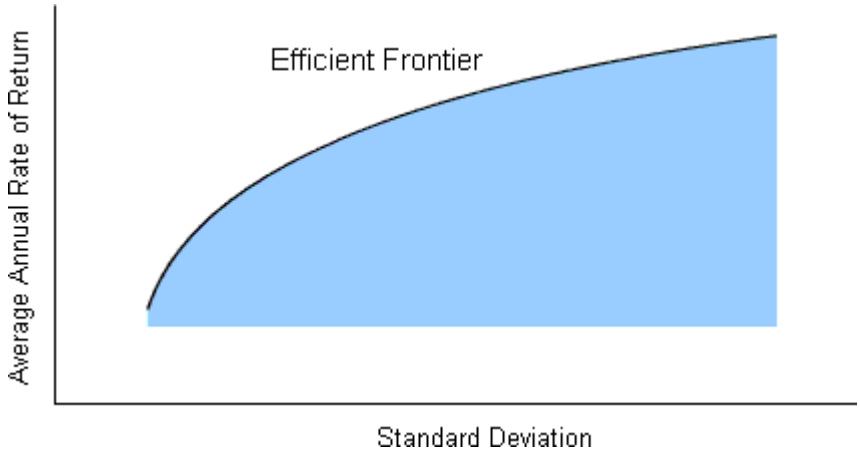
Utility of a portfolio is risk adjusted return. It is Equal to portfolio return minus risk penalty. Where Risk Penalty = It is portfolio risk relative to the investor's risk tolerance. The optimal portfolio is one on the efficient frontier that maximize utility. To generate efficient portfolios the Markowitz Model requires (a) expected return on each asset (b) Standard deviation of returns as a measure of risk of each asset, and (c) the covariance or correlation coefficients as a measure of inter relationship between the returns on assets considered.

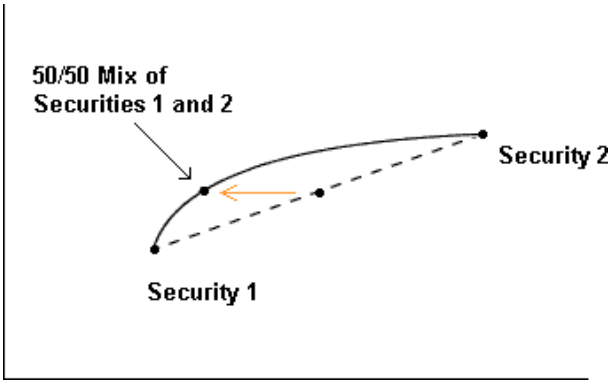
The Efficient Frontier and Portfolio Diversification

Of course the problem is that there is another effect that works in the opposite direction: if you limit yourself tolow-risk securities, you'll be limiting yourself to investments that tend to have low rates of return. So what you really want to do is include some higher growth, higher risk securities in your portfolio, but combine them in a smart way, so that some of their fluctuations cancel each other out. (In statistical terms, you're looking for a combined standard deviation that's low, relative to the standard deviations of the individual securities.) The resultshould give you a high average rate of return, with less of the harmful fluctuations.

The science of risk-efficient portfolios is associated with a couple of guys (a couple of Nobel laureates, actually)named Harry Markowitz and Bill Sharpe.

Suppose you have data for a collection of securities (like the S & P 500 stocks, for example), and you graph the return rates and standard deviations for these securities, and for all portfolios you can get by allocating among them. Markowitz showed that you get a region bounded by an upward-sloping curve, which he called the *efficientfrontier*.





It's clear that for any given value of standard deviation, you would like to choose a portfolio that gives you the greatest possible rate of return; so you always want a portfolio that lies up along the efficient frontier, rather than lower down, inthe interior of the region. This is the first important property of the efficient frontier: it's where the best portfolios are.

The second important property of the efficient frontier is thatit's *curved*, not straight. This is actually significant -- in fact, it's the key to how diversification lets you improve your reward-to-risk ratio. To see why, imagine a 50/50 allocation between just two securities. Assuming that the year-to-year performance of these two securities is not perfectly in sync -- that is, assuming that the great years and the lousy years for Security 1 don't correspond perfectly to the great years and lousy years for Security 2, but that their cycles are at least a little off -- then the standard deviation of the 50/50 allocation will be *less* than the average ofthe standard deviations of the two securities separately. Graphically, this stretches the possible allocations *to the left* of the straight line joining the two securities.

In statistical terms, this effect is due to lack of covariance. The smaller the covariance between the two securities -- - the more out of sync they are -- the smaller the standard deviation of a portfolio that combines them. Theultimate would be to find two securities with *negative* covariance (very out of sync: the best years of one happenduring the worst years of the other, and vice versa).

The Sharpe Ratio goes further: it actually helps you find the best possible proportion of these securities to use, in a portfolio that can also contain cash.

The definition of the Sharpe Ratio is:

$$S(x) = (r_x - R_f) / \text{StdDev}(x)$$

where

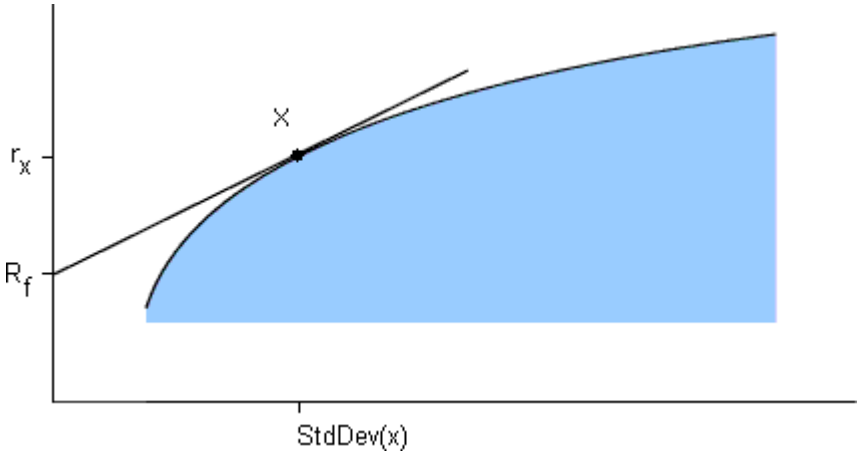
x is some investment

r_x is the average annual rate of return of x

of a "risk-free" security (i.e. cash)StdDev(x) is the standard deviation of r_x

R_f is the best available rate of return

The Sharpe Ratio is a direct measure of reward-to-risk. To see how it helps you in creating a portfolio, consider the diagram of the efficient frontier again, this time with cash drawn in.



There are three important things to notice in this diagram:

1. If you take some investment like "x" and combine it with cash, the resulting portfolio will lie somewherealong the straight line joining cash with x. (This time it's a straight line, not a curve; cash is riskless, so there's no "damping out" effect between cash and x.)
2. Since you want the rate of return to be as great as possible, you want to select the x that gives you the linewith the greatest possible slope (like we have done in the diagram).
3. The slope of this line is equal to the Sharpe Ratio of x.

Putting this all together gives you the method for finding the best possible portfolio from this collection of securities: First, find the investment with the highest possible Sharpe Ratio (this part requires a computer); Next,take whatever linear combination of this investment and cash will give you your desired value for standard deviation. The result will be the portfolio with the greatest possible rate of return.

MODULE-II

BOND PORTFOLIO MANAGEMENT
ANALYSIS & VALUATION OF BONDS
DEBT/BOND Valuation

Debt instruments promise to pay a stipulated stream of cash flows. This generally comprises periodic interest payments over the life of the instrument and principal payment at the time of maturity. A vast menu of debt instruments exists. They may be classified into two groups according to maturity, where maturity is defined as the length of time between the issue date and the redemption date. Debt instruments which have a maturity of one year or less are called money market instruments.

Debt instruments which have a maturity of more than one year are called bonds (or debentures).The debt market in India has registered an impressive growth particularly since 1993 and, not surprisingly, has been accompanied by increasing complexity in instruments, interest rates, methods of analysis, and so on. It is instructive to compare the characteristics of pre-liberalization scenario with those of the Post- liberalization scenario. Since debt instruments loom large in the world of finance, a basic understanding of certain analytical concepts and methods used in debt valuation is essential for students of finance.

Types and Features of Debt Instruments: The variety of debt instruments may be classified as follows:

Money market instruments

- **Government securities and government-guaranteed bonds**
- **Corporate debentures**

Money Market Instruments

Debt instruments which have a maturity of less than 1 year at the time of issue are called money market instruments. The important money market instruments in India area Treasury bills, certificates of deposits, and commercial paper.

Treasury Bills: Treasury bills represent short-term obligations of the Government which have maturities like 91 days, 182 days, and 364 days. They do not carry an explicit interest rate (or coupon rate). They are instead sold at a discount and redeemed at par value. Hence the implicit interest rate is a functionof the size of the discount and the period of maturity. Though the yield on Treasury bills is somewhat low, they have appeal for the following reasons:

(i) They can be transacted readily as they are issued in bearer form.
(ii) There is a very active secondary market for Treasury bills and the Discount and FinanceHouse of India is a major market maker.
(iii) Treasury bills are virtually risk free.

Certificates of Deposit: A certificate of deposit (CD) represents a negotiable receipt of funds deposited in a bank for a fixed period. It may be in a registered form or a bearer form. The latter is more popular as it can be transacted more readily in the secondary market. Like Treasury bills, CDs are sold at a discount and redeemed at par value. Hence the implicit interest rate is a function of the size of the discount and the period of maturity. CDs are a popular form of short-term investment for companies or the following reasons:

(i)Banks are normally willing to tailor the denominations and maturities to suit the needs of he investors.(ii)CDs are fairly liquid.
(iii) CDs are generally risk-free.
(iv) CDs generally offer a higher rate of interest than treasury bills or term deposits.

Commercial Paper: Commercial paper represents short-term unsecured promissory notes issued by firms that are generally considered to be financially strong. Commercial paper usually has a maturity period of 90 days to 180 days. It is sold at a discount and redeemed at par. Hence the implicit rate is a function of the size of discount and the period of maturity. Commercial paper is either directly placed with investor of sold through dealers. Commercial paper does not presently have a well developed secondary market in India. The main attraction of commercial paper is that it offers an interest rate that is typically higher than offered by Treasury bills or certificates of deposit. However, its disadvantages are that it does not have an active secondary market. Hence, it makes sense for firms that plan to hold till maturity.

Government Securities and Government-Guaranteed bonds: The largest borrowers in India are the central and state governments. The Government of India periodically sells central government securities. These are essentially medium to long-term bonds issued by the Reserve Bank of India on behalf of the Government of India. Interest payments on these bonds are typically semi-annual. State governments also sell bonds. These are also essentially medium to long-term bonds issued by the Reserve Bank of India on behalf of state governments. Interest payments on these bonds are typically semi-annual. Apart from the central and state governments, a number of governmental agencies issue bonds that are guaranteed by the central government of some state government. Interest payments on these bonds are typically semi-annual.

Corporate Debt Bonds (or debentures) are issued frequently by public sector companies, financial institutions, and private sector companies. A wide range of innovative debt securities have been created in India, particularly from early 1990s. This innovation has been stimulated by a variety of factors, the most important being the increased volatility of interest rates and changes in the tax and regulatory framework. A brief description of various types of corporate bonds is given below.

Straight Bonds: The straight bond (also called plain vanilla bond) is the most popular type of bond. It pays a fixed periodic (usually semi-annual) coupon over its life and returns the principal on the maturity date.

Zero Coupon Bonds: A zero coupon bond (or just zero) does not carry any regular interestpayment. It is issued at a steep discount over its face value and redeemed at face value on maturity. For example, the Industrial Development Bank of India (IDBI) issued deep discount bonds in 1996 which havea face value of Rs. 200,000 and a maturity period of 25 years. The bonds were issued at Rs. 5,300. These bonds carry call and put options.

Floating Rate Bonds: Straight bonds pay a fixed rate of interest. Floating rate bonds, on the other hand, pay an interest rate that is linked to a benchmark rate such as the Treasury bill interest rate. For example, in 1993 the State Bank of India came out with the first ever issue of floating interest rare bonds in India. It issued 5million (Rs 1000) face value) unsecured, redeemable, subordinated floating interest rate bonds carrying interest at 3 percent per annum over the bank‟s maximum term deposit rate.

Bonds with Embedded Options: Bonds may have options embedded in them. These options givecertain rights to investors and/or issuers. The more common types of bonds with embedded options are:

Convertible Bonds: Convertible bonds give the bond holder the right (option) to convert them intoequity shares on certain terms.

Callable Bonds: Callable bonds give the issuer the right (option) to redeem them prematurely oncertain terms.

Puttable Bonds: Puttable bonds give the investor the right to prematurely sell them back to theissuer on certain terms.

Commodity-Linked Bonds: The payoff from a commodity linked bond depends to a certain extent on the price of a certain commodity. For example, in June 1986 Standard Oil Corporation issued zero coupon notes which would mature in 1992. The payoff from each note was defined as: $1,000 + 200 [Price per barrel of oil in dollars - $25]. The second term of the payoff, however, was subject to a floor of 0.

Collateral: Collateral represents a pledge of assets in favor of the bond holders. If serves as an insurance against any possible default by the borrower.
percentage of the bond issue at stipulated points of time.

Protective Covenants: The bond indenture often contains several covenants

Sinking Fund: A sinking fund provision requires the issuing firm to retire a certain s to protect the interest of lenders. These covenants impose restrictions on management and give bondholders greater confidence that the firm will honor its commitments. For example, covenants may put limits on dividend payment, managerial compensation, and total borrowings.

3.1 : Bond Portfolio Management

Bonds have acquired greater importance and managing a portfolio of bonds has become even more complex. Bond investors may follow either a passive or an active approach.

Passive Strategy

Many investors believe that securities are fairly priced in the sense that expected returns are commensurate with risks. Such a belief supports a passive strategy implying that the investor does not actively try to outperform the market. Of course, passive strategy does not mean that the investor does nothing. Even a passive investor will have to:

a) Determine whether bonds are suitable investment avenues for him,

b) Asses risks (default risks, call risks, and so on) and reasonably diversify his holdings, and

c) Periodically monitor his bond portfolio to ensure that his holdings match his risk preferences and objectives.

The three commonly followed strategies by passive bond investors are: buy and hold strategy,indexing strategy and immunization strategy.

Buy and Hold Strategy

An investor, who follows a buy and hold strategy selects a bond portfolio and stays with it. He does not churn his bond portfolio in an attempt to improve returns and/or reduce risks. Obviously, such an investor chooses a bond portfolio that promises to meet his investment objectives and hence spends time andeffort in his initial selection.

Indexing Strategy

If the capital market is efficient, efforts to find under-priced securities or no time the market may be futile Empirical research on this issue suggests that most investors are unlikely to outperform the market. Hence, they may find and indexing strategy appealing. Such a strategy calls for building a portfolio that mirrors a well-known bond index. In the US, two well known bond indices are the Shearson Lehman Index and Salomon Brothers Index.

Immunization Strategy

Protecting a portfolio against rate risk is referred to as immunization. To understand how the immunization strategy works, interest rate risk may de decomposed into two parts:

a) The price risk arising from the inverse relation between interest rate and bond prices.

b) The reinvestment rate risk reflecting the uncertainly about components reinvestment rates. These two components of interest rate risk behave in a contrary manner. When the interest rates rise, bond prices decline but the reinvestment rates increase. On the other hand, when the interest rates fall, bond prices increases but the reinvestment rates decrease.

An investor who wishes to immunize (or protect) his bond portfolio against interest rate risk must ensure that the duration of his bond portfolio is set equal to a predetermined investment horizon for the bondportfolio.

Active Strategy

Those who employ an active approach to bond portfolio management seek to profit by

(a) Forecasting interest rate changes and/or

(b) Exploiting relative mispricings among bonds.

A. Forecasting Interest Rate Changes: Bond prices interest rates are inversely related. Hence, if an investor expects interest rates to fall, he should buy bonds, preferably bonds with longer maturity (more precisely, longer duration), for price appreciation. On the other hand, if an investor expects interest rates to rise, he should shun bonds, particularly bonds with longer maturity. While this approach may appear tempting, it must be borne in mind that interest rate forecasting is a difficult and uncertain task. Hence betting on interest rate movements is a risky proposition.

B. Exploiting Mispricings among Securities: Bond portfolio managers regularly monitor the bond market to identify temporary relative mispricings. They try to exploit such opportunities by engaging inbond swaps-purchase and sale of bond-to improve the rate of return. The most popular bond swaps are as follows:

i. Pure Yield picks up swap: A swap that involves a switch from a lower bond yield bond to a higher yield bond of almost identical quality and maturity.

ii. Substitution Swap: A swap meant to take advantage of a yield spread between two bond issues, which is more than what is warranted by the difference in quality and maturity of the issues.

iii. Tax Swap: A swap that involves selling of an existing bond, at a capital loss, using the capital loss to offset capital gains in other securities, and purchasing another bond with near identical features.

3.2: EQUILIBRIUM MODELS OF ASSET PRICING:

CAPITAL ASSET PRICING MODEL (CAPM)

The CAPM was developed to explain how risky securities are priced in market and this was attributed to experts like Sharpe and Linter. Markowitz theory being more theoretical, CAPM aims at a more practical approach to stock valuation. It is no doubt based on the mean-variance approach to risk for assessment of investment as developed by Markowitz. It explains the behavioral pattern of investors in building up portfolios.

CAPM-Assumptions

The CAPM is based on certain assumptions some of which are common to CAPM and MPT. CAPM is developed as part of MPT (Modern portfolio Theory). The assumptions are first set out below:

1. The investor aims at maximizing the utility of his wealth, rather than the wealth or rerun. The difference between them is that individual preferences are taken into account in the utility concept. While some have preference for larger risk who will have increasing marginal Utility for wealth, for others, with less preference for risk the incremental wealth will be less attractive if it is attached with more risk. Thus, the preference of investors for risk return will be taken into account in this model.
2. Investors have similar expectations of Risk and Return. Without these consensus standards, the estimates of mean and variance may lead to different forecasts with the result that the ct1icient portfolio of each will be different from that of the others. There will be innumerable efficient frontiers, each dependent on the set of preferences of individuals for risk and return. If investors do not have similar expectations there will be no homogeneity in their conception and no single efficient frontier line will apply to all. This in turn will imply that the price of an asset, which is the best estimate „of the present value of future returns will be different for different investors. This assumption is therefore unrealistic for application in the real world.
3. Investors make investment decision on a rational basis, depending on their assessment of risk and return. Risk is measured by two factors, mean and variance. In the CAPM we assume that rational investors diversify away their diversifiable risk, namely, unsystematic risk and only systematic risk remains which varies with the Beta of the security. While some use the beta only, as a measure of risk, others use both Beta and variance of returns (total Risk) as the sources of reward or expected return. As these perceptions of risk and reward vary from individual to individual, under CAPM we get a series of efficient frontier lines while in the case of MPT, there will be a single efficient frontier line as the conception of risk and return expectation is assumed to be homogeneous in the latter.
4. Investors will have free access to all available information at no cost and no loss of time. If the information is not the same for all, no common efficient frontier line can be drawn. Besides even if the information is not available at the same time different conclusions can be drawn regarding expected return and risk and no single price of the capital asset to be conceived.
5. Investors should have identical time horizons which again is highly unrealistic. Investors have different time horizons and their estimates of stock value will therefore differ, even as the estimated earnings are the same per year.

Continuous time models are sometimes used to get over the above difficulty or again one ~ approximate a single period model as a proxy to multiperiod model on the assumption that returns are the same over time and time has no relevance to expected returns and that expected returns are again independent of the past and current information. While the above assumptions are common to both CAPM and MPT, some assumptions are specific to CAPM. Thus, there is a risk free asset, which gives risk free return. Investors can borrow and lend unlimited amounts at the same price. 1rus assumption of risk free asset transforms the curved efficient frontier line to a linear one. Risk can be reduced by adding a risk free asset, or borrowing at the risk free rate. Besides, it is also necessary to assume in CAPM that total asset quantity is fixed and all assets are marketable and divisible. This assumption implies that the liquidity requirement of investors is ignored and there will no new issues, which are both unrealistic.

After the brief review of the above assumptions we can summarize the requirements for CAPM as follows:

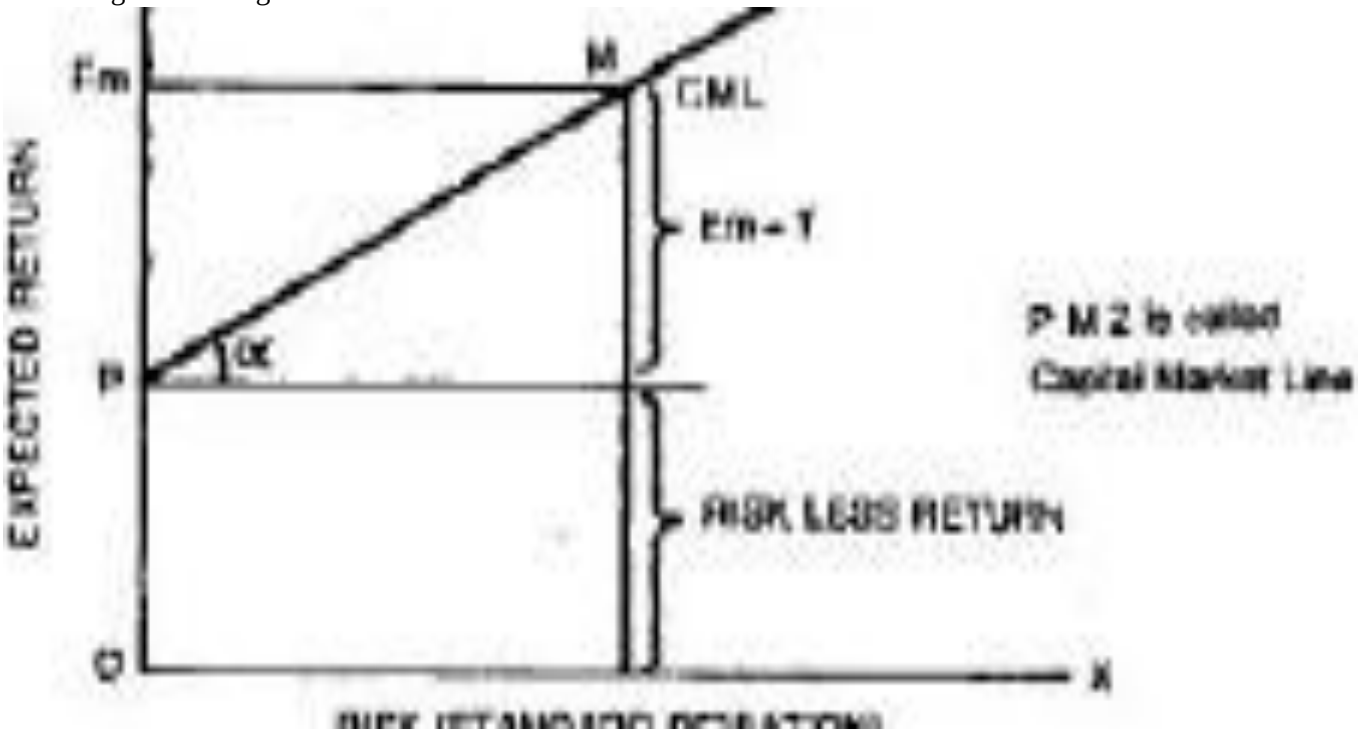
Risk is measured by variance of expected returns. There are two components of Risk - systematic (non-diversifiable) and unsystematic (diversifiable). For diversifiable risk, the investor makes a proper diversification to

reduce the risk and for the non-diversifiable portion, he uses the relevant Beta measure to adjust to his requirement or preferences. Due to the possibility of risk free asset and lending and borrowing at the free rate, the investor has two components of the portfolio - risk free assets and the risky market assets. His total return is summation from the above two components.

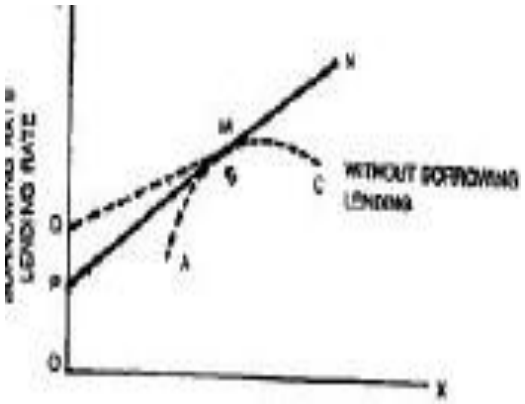
Under CAPM, the equilibrium situation arises when all frictions, like taxes, divisibility transaction costs and different risk-free borrowing and lending rates are assumed away. Equilibrium will be brought about by changes in prices due to changes in demand and supply.

CML

Figure below depicts the capital market line with risk less rate of return. Point P is the risk less interest rate. Preferred investments are plotted along the line PMZ, by combination of both risky assets and risk free asset along with the borrowing and lending.



The slope of the PMZ is the measure of the reward for Risk taking. P is the risk free return, Em - T is the measure of the risk premium - a return for the risk taking. The reward for waiting is the risk less interest rate, OP, and second reward is the return per unit of risk borne measured by the slope „a" of the PMZ line. The internal rate can be considered as price of time and the slope of capital market line as price of the risk. If the borrowing and lending rates are different, then OQ becomes theborrowing rate and OP will be the lending rate, as shown in the figure. The efficient frontier line with differential borrowing and lending rates will be as shown below:



QMN is with the borrowing rate of OQ and PMN is with the lending rate of OP and ABC is the efficiency frontier line without borrowing and lending. The curved line will become linear; if once the risk less asset of borrowing and lending at fixed risk less rate is introduced.

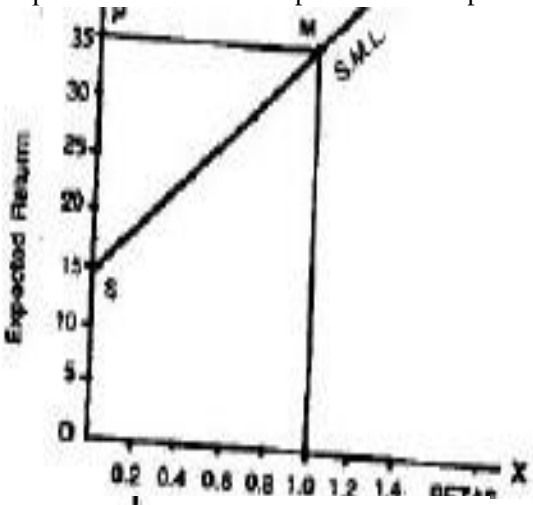
The CML as described above reflects the relationship of total risk and expected return. Total risk includes both systematic and unsystematic risks. It may also include the risk free assets to reduce the total risk. The CAPM has two components of the capital market return, which are reward for waiting or risk less return, and the reward per unit of risk borne as measured by the slope of the CML line.

The investors will have their choice of efficient portfolio somewhere along the line of CML, as all efficient portfolios would be on it. Those which are less efficient will be below the line PMN, in the chart above. The risk free rate can be thought the price of time and the slope of the capital market line as the Priceof Risk.

Security Market Line (SML)

Unlike the CML, which considers the total risk as a measure of variability of returns, SML takes intoaccount only the systematic risk, which is market related and is not possible to reduce or eliminate by diversification. Beta is the measure of risk of a security relative to the whole market, and is used in the SML. Since the unsystematic risk is already taken care of by diversification in the construction of an efficient portfolio, it is desirable to develop an alternative to CML which will use Beta as the independent variable and can be adopted for use in portfolio management and in purchase of individual securities. Such aline is called Security Market Line, which depicts a linear relationship between expected return and the systematic risk.

The SML curve drawn below shows a positive slope, indicating that the return and risk are positivelyrelated. The higher the risk the higher is the return. The Beta of Market portfolio, as represented by the BSE or NSE index is always one. But the company scrip can have Betas higher than 1 or lower than 1. Those with Betas less than 1 are defensive securities and those with Betas above 1 are called aggressive scrip"s. The graph below shows these types of scrip"s and the relationship of Beta to expected return.



SML is Security Market Line, OS is the risk-free return,OP is the return of the market, whose Beta is 1; those below Beta 1 are defensive and others are aggressive scrip"s in the market. SML can be represented symbolically by an equationas

Ri = Rf + Bi (Rm - Rf)

Ri is the return on the security, i,Rf

is Risk-free return

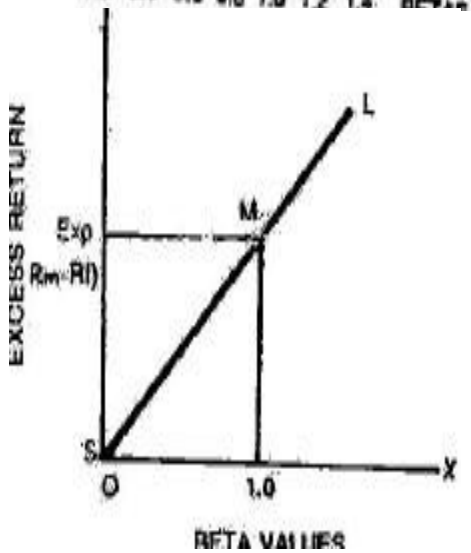
Rm is Market return.

Bi is Beta of Scrip i related to Market Risk

If Rf = 10, Rm = 20 Bi = 1.5, which is more risky than the market average, then

Ri = 10 + 1.5 (20 - 10)

= 10 + 15 = 25.0% which is higher than the market return



Suppose the Bi is less risky than the market at 0.75 thenRi = 10 + 0.75 (20 - 10) = 10 + 7.5 = 17.5%, which is lower than the market return. From the above equation, we can estimate the expected return on a security. It is represented as something like apremium or discount on the market return and can be compared. It can be a return on a security as distinguished from a portfolio. If the security is correctly priced it will have Ri = Rf = 0 and SML curve goes through the origin (see chart below) Ri-- Rf measures the excess return which varies with the risk taken. Within the chart it is seen that Rm - P, f" excess return if market Beta = 1. The security market line implies that the individual assets and port-folio should be on SML, If they are correctly priced. Beta values should then correctly represent the contribution to the risk of the security to the portfolio. All assets lying above the SML are undervalued and those below the SML are overvalued. If we buy undervalued securities, the returns will

be more and vice versa. It will thus be seen that SML curve assumes a critical importance in portfolio selection and individual investmentdecision.

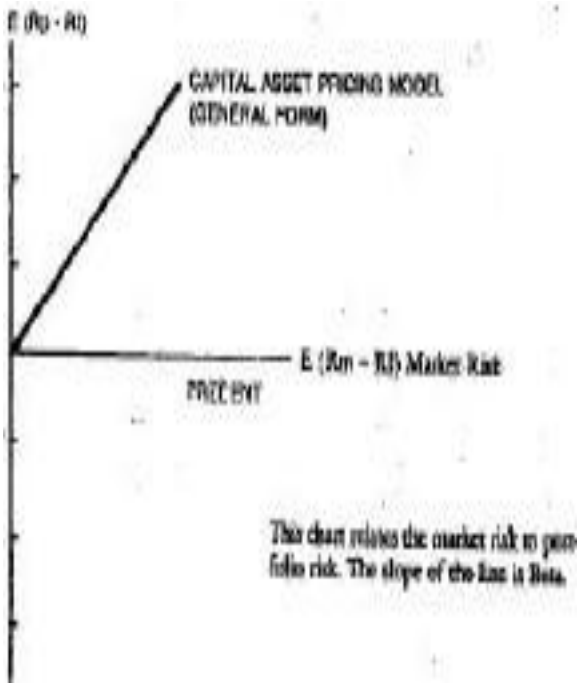
CAPM Analysis

The expected return of a portfolio in equilibrium is equal to risk free rate Rf, plus risk premium which is related to its Beta. Thus, Rp - Rf = risk premium and this is equal to BPM (Rm - Rf) where Rp is expected rate of return and Rf the risk free return.

These symbols are the same as explained above. This leads us to the market model, which relates the expected excess return of the portfolio to the excess return of the market. This is an explanation of the risk premium which gives excess returns.

The chart below presents the relation of E [(Rm)- (Rf)], to the

E (RP-Rf) Viz., in words, excess returns on a portfolio‟s excess risk over the market risk. This chart presents CAPM in a general form with expected excess market risk related to expect excess return.



Market Model

Risk Premium form is the one shown above and the equation for this is Beta relates the portfolio premium to market risk premium. If Beta is 1, they are the same. Market Model can be presented in the form of a regression equation. Taking the above equation for Risk premium of the portfolio, let us introduce a new concept of risk adjusted excess return which is generated by the expertise of the portfolio Manager, represented by the aop. This can be graphically represented as the y-axis intercept for the regression line. aop can be zero, positive or negative, depending on the performance of the portfolio. When this model is presented in the Risk premium form, the equation is

Rp - Rf = ap - Rf (1 - bpm) + bpm (Rm - Rf) + rp

apo = ap – Rf (1- bpm)

As the risk of the portfolio remains unaffected, Bpm of the characteristic line remains unchanged but ap changes to apo as follows:

apo = ap - Rf (1 - Bpm)

apo is risk adjusted excess return, ap is return on portfolio when the market return is zero. In other words, ap represents the excess return of the portfolio, when the market return is equal to risk less and rp is the error or the residual. ap0 can be the same as ap when Rf (1- Bpm) is zero which happens when Bpm is 1 ; then the excess market return disappears. The above equation now becomes;

Rp- Rf = ap + Bpm (Rm- Rf) +rp; putting it differently.

If error term is dropped then the equation becomes

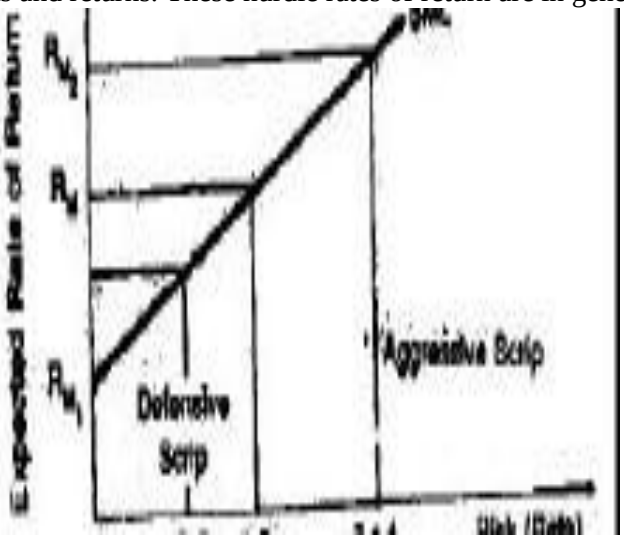
Rp = Rf = aP + bpm (Rm – Rf)

The above equation states that if the risk adjusted excess return on a portfolio is positive apo >o, then the portfolio returns are greater than what is normally expected, indicated superior return. If apo is positive the portfolio Manager has shown his expertise in beating the market by showing higher than the market return.

We have seen that the slope of SML curve is Beta. If we have a perfectly diversified portfolio in the CAPM, the error term disappears. If at the same time expected risk adjusted excess return ao of the portfolio is zero which is assured under Market Efficiency Theory, then the slope of the characteristic line is Beta of the portfolio. Thus, under condition of perfect markets, the slope of the Regression line is Beta and excess returns disappear
(ap0 = 0).

Uses and Limitations

In real world, investors get higher return for higher risk and they are more concerned with company related risks than with the market related risks, except in the case of trained investment analysts. Companies are found to use CAPM to determine the cost of equity for the firm, to estimate the required return for divisions or lines of business and to determine the hurdle rates for corporate investments and to evaluate theperformance of investment Division in terms of costs and returns. These hurdle rates of return are in general



the required rates of return and the corporate assess the past performance of the costs and related returns for each of the Division. In the case of public utilities, the CAPM can be used to estimate the costs and rates to be charged to cover the costs. The CAPM is used to regulate the public utilities from the point of view of costs. Historical return and Betas are used to select the proper risk in investments in the portfolio. CAPM is used to select securities, construct portfolios and evaluate the performance of the portfolio. It is thus a useful tool for investment analysis and portfolio management.

The limitations of the theory are also pointed out by many critics. This theory is unrealistic for any average investor, who goes by the fundamental factors influencing the company, its earning, and dividend and bonus record. Empirical tests of the Model have not proved very useful. The model is built ex-ante factors while in reality the expectationsof the future vary from person to person. Data and analysis is to be based on ex-post factors whileanticipations of future risk and returns are ex-ante and both may not be related. The CAPM is in fact not testable exactly as the exact composition of the market is known and is used in testing. The empirical tests conducted by Richard Roll
and others were only tests on samples whether me proxy market portfolio was efficient or not. The use of surrogatives and proxies have not proved the theory as really useful and practical. .

CAPM theory is thus a nice theoretical exposition but in actual world, it does not conform to the real world risk-return trends and empirical tests have not given unequivocal support to the theory. It is alsofound mat there - are many non-Beta factors influencing me returns. The calculation of Beta is itself of doubtful validity as me historical Betas may not reflect the future risks or returns. In the short-run in particular, projections on the basis of Betas on returns and risk have been found to be unreliable and results contrary to C"APM Theory were noticed. Thus, CAPM is a good theoretical tool but with its own limitations in practical applications.

The assumptions of CAPM are that the market is in equilibrium and the expected rate of return is equal to the required rate of return for a given level of risk. or Beta. CAPM presents a linear relationship between the required rate of return of a security and relates it to market related risk or Beta, which cannot be avoided. The equation for the CAPM Theory is Rj = Rf + Bj (RM- Rf)
Rj is expected rate of return on security ‚j" and Rf is risk free turn.
Bj is Beta coefficient - a risk measure for the non –diversifiable part of total Risk. Rm is
return on Market Portfolio and RM – Rf is the excess return for the extra risk.

Example, let"s assume that the risk free rate is 5%, and the overall stock market will produce a rate of return

of 12.5% next year. You assume that XYZ Company has a beta of 1.7. What rate of return should you get from this company in order to be rewarded for the risk you are taking? Remember investing in XYZ company (beta =1.7) is more risky than investing in the overall stock market (Beta = 1.0). So you want to get more than 12.5%, right?
Let‟s plug these inputs in the equation.

Ks = Krf + B (Km - Krf)
Ks = 5% + 1.7 (12.5% - 5%)
= 5% + 1.7 (7.5%)
By solving, we get Ks = 17.75%

So, if you invest in XYZ Company, you should get at least17.75% return from your investment. If you don‟t think that XYZ Company will produce those kinds of returns for you, then you would probably consider investing in a different stock Analysts sometimes use a more complicated value for beta, which grows with a company‟s debt level. There is also lot of controversy about whether beta, which measures past volatility, is sufficient or even relevant in predicting future risk.

B: Arbitrage Pricing Theory(APT):

Introduction

Like the capital Assets Pricing Model (CAPM), Arbitrage Pricing Theory (APT) is an equilibrium model of asset pricing but assumes that the returns are generated by factor Model. Their assumptions vis-à- vis those CAPM are set out first:

APT vs. CAPM

Investors do not look at expected and standard deviations. Based on the law of one price, if the price of an asset is different markets, arbitrage brings them to the same price. Investors prefer higher wealth/ returns to lower wealth. APT is based on the return generated by factor models. Investors look at the expected returns and accompanying risk measured by stand deviation. Investors are risk averse and risk- return analysis is necessary. Investors maximize wealth for a given level of risk.

Asset selection in the Above Model

Investment strategies of many types can also be selected under this model. If there are manysecurities to be selected, and a fixed amount to be invested, the investor can choose in a manner that he can aim at a zero non-factor risk (ei=0). This is possible by combining securities to hedge out the sensitivity of aportfolio to all but one factor.
An example will explain this. Let there are be three securities A, B and C with the following securities :

If he has Rs. 10000, he invests Rs. 300 in Security A, Rs. 700 in Security B and nil in security C, with proportions being 0.3 in A, 0.7 in B and O in C. It will be seen from the equations below that the sensitivity to factors 1, and 2 will be 1.0 and O respectively.

bp1 = (-0.40 x 0.3) + (1.60 x 0.7) + (0.67 x 0) = (-0.12) + (1.12) + (0) = + 1.0
bp2 = (1.75 x 0.3) + (-0.75 x 0.7) + (-0.25 x 0) = (0.525) + (-0.525) = 0

In the above fashion it would not be possible theoretically, although nor in practice to create “pure factor” portfolios that are sensitive to only one factor and have insignificant non-factor risk. But in practice only impure factor portfolios can be created.

Components of Expected Returns

It is convenient to break up the expected return into two parts: (i) risk free rate of return, and (ii) the rest in the following equation, rf is the risk free return and y 1 is the expected premium return per unit of sensitivity to the- factor for Portfolio. rp1 = rf + 21. Thus, the investor by splitting his funds among risk free portfolios and pure factor portfolios, it is possible for him to form a portfolio with almost any sensitivity to each factor. Although theory claims that the non-factor risk can be reduced to zero, it is not possible in real life. Therefore, in practical investment or in portfolio operations, it is better to combine the Capital Asset pricing theory and the APT Model. Most investors prefer no doubt higher levels of expected return and dislike higher levels of risk. The fact is that there is a trade off between them, which is not considered by theAPT Model.

Synthesis of CAPM and APT is therefore more realistic. Beta coefficients can be used to reflect the risk

factors and factor sensitivities can also be taken into account to arrive at the expected returns. Thus, if the returns are generated by two factor models, the Beta coefficient of a security will be related to its sensitiveness to the factors and factor Betas can be taken to reflect the different sensitivities of different factors. It will be seen that bF1 and bF2 arc constants as they do not vary from one security to another, the Beta conflict of a security is a function of its sensitiveness to the pervasive factors. Thus, by taking Betas of securities the question of sensitivity of security return to a factor is taken care of, one can synthesize the APT Model and CAP Model in the empirical work.

Empirical Testing of APT Model

The CAPM as also the practical experience tells us that other things being equal, securities with large ex-ante betas will have relatively large expected returns. It docs not mean that the actual ex-post returns will also be larger. But investment is made on expectation and hence the use of Betas, despite the fact that exact Betas may not really give an indication of actual returns in future. Beta measurement is itself subject to limitations, as they change widely, with the number of years for which data are taken, the source of data, and the methods of compilation are subject to normal statistical limitations.

Using the actual data on Stock Price Index numbers and security prices of any Stock Exchange, one can compile Betas, the method of which has been explained earlier. Empirical studies done abroad on NYSE data (by Centre for Research in Security Prices (CRSP) at the University of Chicago) showed that the historical Beta values cannot be counted upon to predict the returns precisely. They arc useful as some approximations and landmarks to go by. In months, in which there were excess positive returns, the Beta factors were generally positive in the sense that stocks with historical Betas gave excess returns over the market. 111 periods when the excess returns were negative, d1C Beta factor was generally negative, in the sense that stocks with high historical betas, tended w under perform as compared to those with lowhistorical Betas.

In detailed tests of the original and Zero-beta CAPM, portfolio classes were used to examine the relationship between average returns and historical Betas. The graph below shows the actual relationship for the period 1938 to 1968. The vertical intercept, which corresponds to the zero beta return, is 61% per month. While the average Treasury bill rate, which corresponds to the risk free rate of interest, was only 0.13% per month. Assuming that Betas arc measured relative to a Stock index, they are surrogates for true Betas, and they support the thesis of CAPM to a substantial degree.

Equation for APT Model

The expected rate of return of the stock is 10.66%

Question

Calculate the equilibrium rate of return for the following three securities.

	bi1	bi2
A	**1.2**	**1**
B	**-0.5**	**0.75**
C	**0.75**	**1.30**

Answer: Assume two factor Model as applicable which – E (r1) = 4% + 3% bi1 +5% bi2

E (rA) = 4% + 3% (1.2) + 5% (+1.0) = 12.60

E (rR) = 4% +3% (-0.5) + (5% (0.75) = 6.25%

E (rC) = 4% +3% (0.75) + 5% (1.30) = 12.75%

In the Graph below, OM is the risk free return. Actual CAPM line is shown in the graph to vary from the Zero Beta line to a substantial extent.

MODULE: III: EFFICIENT MARKET HYPOTHESIS

Financial Markets are influenced by money flows and information flows. In free and highly competitive markets, demand and supply pressures determine the prices or interest rates. In a theoretical sense, markets are said to be efficient, if there is a free flow of information and market absorbs this information fully and quickly. James Lorie has defined the efficient security market as follows: "Efficiency...means the ability of the capital market to function, so that prices of securities react rapidly to new information. Such efficiency will produce prices that are appropriate in terms of current knowledge, and investors will be less likely to make unwise investments."

In the above context, what will happen is that market making mechanism is free and unfettered? There are no pockets with holding information or interested parties making undue gains by insider information by manipulation of supply and demand forces. There will be no monopoly elements and malpractices or corruptions etc. are not prevalent. Information flow is free and costless. In the normal course, capital or money flows into areas which are most profitable this in turn depends on their efficiency and competitiveness. Money flows also from less profitable to more profitable avenues if information flow is free, fast and costless. In such market scenario, all investors will have the same information, which is immediately reflected in the stock prices and nobody can gain extra profits.

All instruments in the market will be correctly priced, as all the available information is perfectly absorbed and any investor entering the market any time will have the same advantage or returns. No excess profits are possible in this scenario. As the demand and supply forces are playing their role freely, the emerging prices are fair and move in a random manner. Prices of today are no more a function of the prices in the past as the day-to- day forces move in an independent and random manner. This concept of randomness has led to the theory of random Walk in the determination of prices. This Random Walk hypothesis is thus a special case of the Efficient Market Theory.

Assumptions

For the capital market efficiency theory to operate, the following assumptions are made:

1. Information is free and quick to flow.
2. All investors have the same access to information.
3. Transaction costs, taxes and any bottlenecks are not there and not hampering the free forces of market.
4. Investors are rational and behave in a cost effective competitive manner for optimization of returns.
5. Every investor has access to lending and borrowing at the same rate.
6. Market prices are not stick and absorb the market information quickly and the market responds to new technology, new trends, changes in tastes, habits of consumers etc., efficiently and quickly.

Weak form of EMH

Weak form of EMH is closely related to the Random Walk Hypothesis, as the past prices are already absorbed by the market and the present prices move therefore independently of the path, which is the same as the Random walk hypothesis. The present trends are thus random variables, and past data cannot be used to predict the future. All the information on the past data on price trends and volumes was already absorbed earlier. As prices have no memory of the past, yesterday prices have nothing to do with today's prices. To give an example from BSE quotation Dr. Reddy Labs has yearly low of Rs. 190 and a high of Rs. 333; its price at close on Oct. 15,1996 was Rs. 215, but it opened on Oct. 16, at Rs. 212 and closed at Rs. 210. A day later it opened again at a higher price, independent of the last closing.

It is futile exercise that the present day price can be derived by any past data, at least in short run. If that is proved empirically, then prices move in a random fashion like the walk of a Drunkard, each move independent of the other. It is anybody's guess or the result of a toss of coin of what will be the price of TISCO today or Dr. Reddy Labs tomorrow. Thus the Random Walk hypothesis states that prices move in random manner, independent of the past prices. In the real world, the weak form of market efficiency may exist, as prices do movein an independent manner which the empirical evidence has shown as the past prices are already absorbed by the market. However, it is to be conceded that market imperfections, costs of information and blocks to the free flow of information may stand in the way of free play of market forces. Speculators and groups of interested parties or even brokers may manipulate the prices through cornering of shares and reducing the flatting stock of the market.

Both the Random walk hypothesis and weak form of EMH, state almost the same thing, namely, that knowledge of the past stock price does not aid the investors to gain any improved performance. The prices move independent of the other; although they may move in a random manner they move around a trend line decided by the anticipated real earnings of the company and its fundamentals. Both EMH in weak form and the Random Walk Theory thus postulate that analyzing the past does not improve the forecasting ability of stock prices and new information and prices that result from them cannot be predicted.

Random Walk Theory

As per this theory, changes in stock prices are independent of each other. The prices of today are independent of the past trends. The present price is randomly determined and only information flow can influence prices. As information is free and independent, the resulting prices are free and independent. A word of caution is necessary here. This Random walk hypothesis was postulated by researchers on the basis of empirical work on the market price behavior. It does not therefore tantamount to the same theory as the capital market efficiency theory.

Only market efficiency promotes randomness and is therefore not a necessary condition. The fact that prices move independently has been found empirically and the analysts found an explanation for this in the efficient functioning of the markets and the market absorption of the information quickly and efficiently. The equilibrium price of a stock is determined by demand and supply forces, based on the available information. Quickly as the fresh information becomes available, a new equilibrium point is reached and the resultant price is thus independent of the part.

This Random walk hypothesis contradicts the Chartist and Technical School which believes that the present prices are the result of the past trends and that averages discount all fluctuations and that the average trends move in a predictable manner as the history of trends repeats itself. On the other hand, fundamental school postulates that the prices are a function of the intrinsic value of the stock and prices result from changes in the intrinsic value and information relating to fundamental factors influences the equilibrium prices. Random walk hypothesis is an offshoot or a phase of the capital market efficiency theorem. The market efficiency theory postulates that prices are the result of free flow of information which the market absorbs quickly and efficiently.

Assumption of Random Walk Theory

1. Market is supreme and no individual investor or group can influence it.
2. Stock prices discount all information quickly.
3. Markets are efficient and that the flow of information is free and unbiased.
4. All investors have free access to the same information and nobody has superior knowledge or expertise.
5. Market quickly adjusts itself to any deviation from equilibrium level due to the operation of free forces of demand and supply.
6. Market prices change only on information relating to the fundamentals, when the equilibrium level itself may shift.
7. These prices move in an independent fashion, within undue pressures or manipulation.
8. Nobody has better knowledge or insider information.
9. Investors behave in a rational manner and demand and supply forces are the result of rational investment decisions.
10. Institutional investors or any major fund managers have to follow the market and market cannot be influenced by them.
11. A large number of buyers & sellers and perfect market conditions of competition will prevail;

Random Walk and Efficient Market Theory

Random Walk hypothesis is considered as restatement or a form of Efficient Market Theory by some Analysts. The EM - (Efficient Market Hypothesis) is based on the flow of free and correct information and the market absorption of it. This information flow and its absorption by the market are the critical elements of this theory. There are three types of

information affecting the market, namely, past Prices and trends, other public information and inside information. If all these types are not absorbed perfectly by the market, there is a possibility of some gaining above average returns, from the investments. Based on the above three types of information, the analysis have placed the market absorption and the related theory under three heads; namely:

a. Weak Form of EMH, which absorbs only market price information,
b. Semi strong Form which absorbs price information and also all other public information and
c. Strong Form which absorbs all types of information including insider information.

Semi Strong Form of EMH

This form of EMH postulates that the market absorbs quickly and efficiently not only the price information but all publicly available information. Examples of this public information are found in the financial reports, Balance Sheets and Profit and Loss Accounts, Earnings and Dividend Reports, financial results etc. In addition to financial data, any material information affecting the financial position, such as financial structure, liquidity, solvency etc. is also found relevant and absorbed by the market in the price formation. Some data and information may be contradictory and biased information, rumors etc. would also flow in as news affecting the market.

Revision of data or changes in conditions of the company also affects the price. Studies on the time lag involved in the impact of any change of fundamentals on the company share price showed varied time lags, some being discounted even before the event is announced and some before the event took place. Such matters like earnings reports, bonus, and rights affect the market even in anticipation before the formal announcement. The studies on the semi strong form of market efficiency related to the effect of any public information released, on the share price. The tests are invariably based on pricing models, as under the CAPM or some econometric models. These studies showed that the absorption of this information on share prices was inefficient and varied from scrip to scrip, and the time period studied. The inefficiency in the market mechanism absorbing this data is found to be corrected over a time period as investors take time to analyze and conclude the effect of any public information.

Thus, the semi strong form is empirically not well supported, but in many foreign markets, the semi strongform is found to be applicable and markets quickly absorb all published information. This is possible in those markets due to strict law enforcement, but the market authorities, instantaneous display of all market information through electronic media and investor awareness of their impact and their quick absorption of the data. The revolution in informatics and communication technologies has made it possible for the application of the semistrong form of the EMH to these markets in developed countries.

Strong Form of EMH

Under this hypothesis markets are so perfect that all information including private information, insider information and unpublished data, affecting the market are absorbed in the stock prices. Any investor can then gain the same average returns, whenever he enters the market. The information of all types is flashed to all investors simultaneously and all players have the same information at the same time. This means that only superior analysis and interpretation can give better market returns. This is possible for inside traders, floor brokersand institutional investors who have highly efficient market research component. The acumen with which price movements can be forecast can only result in superior return and not otherwise. Studies made in developed markets have showed that strong form of efficient market does not exist there also. Investors have not shown consistently higher returns even with all the information available to them. It was also found that average investorcould do better by picking up securities in a random fashion.

As referred to earlier, there are three forms of the Hypothesis, namely, weak form of EMH discussed under Random Walk Theory, semi strong from and strong form. In the words of Fama, efficient market is definedas the market where there are a large number of rational profit maxi misers actively competing with each trying to predict the future market and where the current information is almost freely and equally available to all participants. Analysis of the Research studies done, so far confirm partly the weak form of EMH. But the other two forms of the Theory are found not really realistic in the Practical Market Scene.

MODULE-IV: FUNDAMENTAL ANALYSIS

Economic Analysis

Companies are a part of the industrial and business sector, which in turn is a part of the overall economy. Thus the performance of a company depends on the performance of the economy in the first place. If the economy is in recession or stagnation, ceteris paribus, the performance of companies will bebed in general, with some exceptions however. On the other hand, if the economy is booming, incomes are rising and the demand is good, then the industries and the companies in general may be prosperous, with some exception however. In the Indian economy, the matters to be considered in the first place are the behavior of the monsoon and the performance of agriculture. As agriculture is the mainstay of the 70% of the population and contributes nearly 35% of the output of the economy, it is important for the assessment and forecast of industrial performance. If the monsoon is good and agricultural income rise, the demand for industrial products and services will be good and industry prospers.

Secondly, India has a mixed economy, where the public sector plays a vital role. The Government being the biggest investor and spender, the trends in public investment and expenditure would indicate the likely performance of the Indian economy. Concomitant with this, the government budget policy, tax levies and government borrowing program along with the extent of deficit financing will have a major influence on the performance of the Indian economy, as these influence the demand and income of the people. The changes in excise and customs duties, corporate taxes, etc. are all relevant to assess the trends in the economy as they have an impact on the industry and the companies.

Thirdly, the monetary policy and trends in money supply which mainly depend on the government‟s budget policy, its borrowing from the public and credit from the banks and the RBI, have a major impact on the industrial growth through the cost and availability of credit, the profit margins of the companies etc The monetary situation along with the budgetary policy influences the movement in price level (inflation) and interest rates. The tight money position, increasing budget deficits and RBI creation of currency lead to an inflationary spiral.

Although some interest rates in the organized financial system are now freed, the bazaar rates in the unorganized market do reflect the availability of funds in the free markets. So interest rates in the free markets and the degree of inflation do have a major influence on the economy and the performance of the industries. Although a mild inflation is good for business psychology, higher degrees of inflation, particularly in two digits, will defeat all business planning, lead to cost escalations and squeeze on profit margins. These will adversely affect the performance of industry and companies.

Fourthly, the general business conditions in the form of business cycles or the level of business activity to influence the demand for industrial products and the performance of the industry. In India, there are no business cycles but outputs do fluctuate depending upon the state of the economy, performance of agriculture, availability of power and other infrastructural outputs, imported inputs and a host of other factors. These factors do influence the costs and profit margins of companies from both demand and supply sides. The business earnings and profits are affected by such changes in business conditions.

Fifthly, the economic and political stability in the form of stable and long-term economic polices anda stable political system with no uncertainty would also be necessary for a good performance of the economy in general and of companies in particular. The Government regulations being all-pervasive in India, the government policy has to be known in advance in all its aspects and there should be nouncertainty about the political system as economic and political factors are interlinked. Political uncertainties and adverse changes in government policy do adversely affect industrial growth. Government policy relating to projects, clearance for foreign collaboration and foreign investment, price and distribution

controls, and listing requirements on stock exchanges and a host of other matters like import restrictions do affect the performance of companies.

The foreign exchange position and the balance of payments situation at any time would also indicate the rigors of government policy with regard to imports, exports, foreign investment and related matters. All the above factors of the economy influence the corporate performance and the industry in general. In any investment analysis, a broad picture of these factors and a forecast of the growth of the economy and of industry would be necessary to decide when to invest and what to invest in.

Economy vs. Industry and Company At any stage in the economy, there are some industries which are growing while others are declining. The performance of companies will depend among other things upon the state of the industry as a whole and the economy. If the industry is prosperous, the companies, within the industries may also be prosperous although a few may be in a bad shape. The performance of a company is thus a function not only of the industry and of the economy, but more importantly, on its own performance. The shape price of the company is empirically found to depend up to 50% on the performance of the industry and economy.

The economic and political situation in the country has thus a bearing on the prospects of the company. There are different phases in the economy such as boom, depression, recession, etc. The performance of the economy in India is not cyclical as in the case of developed countries exhibiting business cycles, as the Indian economy depends basically on the monsoon and the growth rate of agriculture. Besides, with a huge public sector in our mixed economy, the performance of the five-year plan,yearly public investment, government expenditure and a host of other factors influence the economy, industry and company.

Thus one important factor is the fiscal policy which incorporates government expenditure and taxation, borrowing, deficit financing, etc. and which influence both the public and private sectors in the economy. The industrial growths in general and of infrastructural industries in particular influence the corporate performance. As referred to earlier at any stage in the economy there are some industries growing fast while orders are declining.

The performance of companies will depend among other things upon the state of the industry as a whole. If the industry is prosperous, the companies, within the industries may also be prosperous, if the economy is also doing well. The performance of a company is thus a function of the industry and of the economy in addition to its own performance. As referred to earlier, the share price of the company is empirically found to depend up to 50% on the performance of the industry and economy. The economic andpolitical situation in the country has thus a bearing on the prospects of the company.

The industries in different stages of growth are shown below:-

Even in industries of above average growth, there may be some companies of poor growth or no growth at all. The fundamentals of the company will explain this. The Market Price (MP) is a function of intrinsic factors to the extent of about ½ of it and the rest is accounted by the expectations, psychological and sentimental factors, as shown below. In the above context, any particular industry can be studied with a view to assess the problems, prospects, etc. of the company in the industry. The industry data are to be examined from the point of view of the product-mix, raw materials, components, pricing cost of production, etc., profit margins and related data juxtaposed with those of the company. The capacity utilization of the industry in general and of the company in question within the industry is to be compared.

The demand and supply, the market conditions and the share of the company in the market are to be studied before making a projection of its future growth, keeping the industry prospects in mind. The future profitability can be assessed from the half yearly and annual reports, press releases, AGM‟s reports, and market reports, management interviews and Industry and Commerce Association‟s publications. The share

of the company in which investment is sought is to be analyzed in terms of the fundamentals of thecompany in the background of the industry's performance.

The decision to buy has to be on the basis of whether the price of the share is proper and the future profitability is good based on a rational forecast for the future. We have to consider the quantifiable factors and qualitative factors of the company. Among the quantifiable factors we have to consider the capital efficiency and the sales turnover sands the profitability margins. The quantifiable data are based on financial statement Analysis. The qualitative factors are:

a. Management efficiency,
b. Rating of promoters,
c. Rating of collaborators,
d. Uniqueness of the product,
e. Location of government policy and patronage, etc.

The industrial position not only depends upon the economic growth but on the nature of the industry itself. Within the industry the factors which have to be taken into account are the product-mix, the various outputs, nature of the products, inputs and raw materials, installed capacity of the industry - utilization of capacity - the market nature of the inputs, their domestic availability and the problems of the industry in general. The pricing and the Government controls on prices, distribution, etc., controls on imports and tax policy, excise and customs duties etc. would influence the cost of production and the profit margins of the industry, as also the prospects of growth. In the area of market, the demand for the products produced and the prospects for exports, protection or tariff preferences, etc. influence the prospects of the industry.

In many industries, the raw materials and other inputs and their availability domestically, particularly of electricity, have a major influence on the market from the point of view of supply. Labor conditions in the industry should also be looked into and have a bearing on growth prospects. In the company analysis, the financial highlights of the companies, which are influenced by the industry and the economy, are the capacity utilization, demand, cost and profit margins. The state of the capital market and the capacity to raise capital from the market not only depend on the performance of the companies but of theeconomy and the industry as well.

The fundamentals of the company are to be analyzed in terms of its financial structure, leverage, liquidity and profitability, financial viability, etc. The information for this purpose is to be secured from the annual reports of the company, balance sheets, press reports, AGM"s reports management"s press releases and the publications of the Industry and Commerce Associations. The most important variable influencing the company"s performance is management, namely, the quality, capability, popularity and integrity of the management. Generally, the rating of the promoters and management has to be looked into through their plans, financial management, growth orientation, expansion plans, tax planning, R & D, technology, etc.

The popularity of the management is known from their track record, retention policy, distribution of dividends and bonus, etc. The honesty and integrity of the management can be seen from the shareholding pattern and the availability of floating stock and the liquidity of shares of the company. In the area of financial management, companies „financial structure, retention policy, dividend record, bonus policy and liquidity ratios, etc. are to be looked into.

The market capitalization of a share is to be compared with the book value and the intrinsic worth of the company. The share has to be examined to know whether it is properly priced and reflects its true intrinsic value. The P/E ratio and earnings per share, book value, etc. are to be looked into in this context. Only shares which are under priced are to be generally purchased, provided they have the potential for growth and capital appreciation. In the above context, any particular industry can be studied with a view to assess the problems, prospects, etc. of the company in the industry. The industry data are to be examined from the point of view of the installed capacity and its utilization, raw materials, components, pricing, costof production, etc., profit margins and related data juxtaposed with those of the company. The capacity

utilization of the industry in general and of the company in question within the industry is to be compared. the demand and supply, the market conditions and the share of the company in the market are to be studied before making a projection of its future growth, keeping the industry prospects in mind.

The future profitability can be assessed from the half-yearly and annual reports, press releases, AGM‟s reports, market reports, management interviews and Industry and Commerce Association‟s publications. The stock of the company in which investment is sought is to be analyzed in terms of the fundamentals of the company in the background of the industry‟s performance. The decision to buy has to be on the basis of whether the price of the share is proper and the future profitability is good based on a rational forecast for the future. To examine the financial highlights, we have to consider among other things,the capital efficiency and the sales turnover and the profitability margins. For this purpose, the following components may be taken into account:

GB Sales GP = GP
Equity GB Sales Equity
(Capital turnover) (Sales turnover) (Profitability)

Normally, a company uses capital efficiently by having a high turnover of equity. Similarly, the use of capital is efficient if there is a high sales turnover to gross block. The company may have only a small profit margin but if the sales turnover is high, the profits will also be high. Gross profits-to-sales ratio measures the profit margins. In this context, the growth of gross block, sales, equity, and gross profits are to be analyzed in respect of each company within the industry. On this basis, these ratios of companies within the industry are to be compared with the industry‟s overall operating performance in respect of the variables referred to earlier. The gross profit (GP) is also to be examined in relation to the market capitalization. The risk less return is 12% and a reasonable return is 15%. Depreciation, taxes, etc. may account for another 15%. A total return in the form of gross profit of not less than 30% is, therefore, to be expected from any company to start with. If a company in any industry is less profitable than that, it is not worth the purchase. Similarly, gross profit to gross block and the dividend policy, earning per share and bonus payouts are all to be examined from the point of view of the future prospects of the company in the background of industry performance and possible capital appreciation of the shares.

Industry Analysis

At any point to time, there may be industries which are on the upswing of the cycle called sunshine industries and those which are on the decline called sunset industries. In India, there are some growth industries like electronic and computers which are the key industries. The engineering, Petro-chemicals and capital goods industries are in the core sector. A few industries like diamonds, engineering, etc. are in the export sector. Jute and cotton textiles are the decadent industries. At present, Tele Communications,Computer Software, energy etc. are some examples of Sunrise Industries. As referred to earlier, performance of a company has been found to depend broadly up to 50% on the external factors of the economy and industry.

These externalities depend on the availability of inputs, like proper labour, water, power and interrelations between the economy and industry and the company. It is, in this context, that a well- diversified company performs better than a single product company, because while the demand for some products may be declining, that for others may be increasing. Similarly, the input prices and cost factors would vary from product line to product line, leading to different margins and a diversified company is a better bet for investor. The industry analysis should take into account the following factors among others as influencing the performance of the company, whose shares are to be analyzed:

1. **Product Line:** The position of the industry in the life cycle of its growth - initial stages, high growth stages and maturing stages are to be noted. It is also necessary to know the industries with a high growth potential like computers, electronics, chemicals, diamonds, etc. and whether the industry is in the priority sector or the key industry group or capital goods or consumer goods groups. The importance attached by the

government in their policy and of the Planning Commission in their assessment of these industries is to bestudied. Product may be new one or an import substitution product which has good future.

2. **Raw Material and Inputs:** Under this head, we have to look into industries depending on imports of scarce raw materials, competition from other companies and industries, and the barriers to entry of a new company, protection from foreign competition, import and export restrictions, etc. An industry which has a limited supply of materials domestically and where imports are restricted, for example, will have dim growth prospects. Labor is also an input and industries with labor problems may have difficulties of growth.

3. **Capacity Installed and Utilized:** The demand for industrial products in the economy is estimated by the Planning Commission and the government, and the units are given licensed capacity on the basis of these estimates. If the demand is rising as expected and the market is good for the products, the utilization of capacity will be higher. If, however, the quality of the product is poor, competition is high and there are other constraints to the availability of inputs and there are labor problems, then the capacity utilization will be low and profitability will be poor.

4. **Industry Characteristics:** Whether the industry is cyclical, fluctuating or stable, has to be looked into first, as the prospects for growth will depend on this to an extent. If the demand is seasonal as in the case of fertilizers, pesticides, etc., their problems may mar the growth prospects. If it is consumer product and the demand is all over India, freight charges are an important component of the cost of production. The scale of production and the width of the market would also determine the selling and advertisement costs. The nature of the industry would thus be an important factor for determining the scale of operations and profitability. The growth prospects would depend on raw materials, easy access to inputs, particularly power, transport and other infrastructural facilities.

5. **Demand and Market:** The demand for the product should be expanding and its price should not be controlled by the government, if the industry is to have good prospects of profitability. If the demand is income-elastic and price-elastic, the supplier should be able to sell the goods at a growing rate and the prospects of growth are good. It is also important that the prices of raw materials and other input costs like freight, electricity, etc. should not be controlled by the government. The demand should also be growing andthere should be export demand for the product. If the nature of the product is such as drugs, fertilizers or other consumer goods, whose price and distribution are controlled by the government, the growth prospects would be less. Thus, decontrol of cement recently has helped the cement industry to grow and expand.

6. **Government Policy with Regard to Industry:** The government policy is announced in the Industrial Policy Resolutions and subsequent announcements from time to time by the government. The policy can also be seen from the strategy as laid down in the five-year plans and importance given to the industry by the Planning Commission and the expected demand in the economy. The Plan priorities for the industry, the physical and financial targets of investment and foreign collaboration in that industry are important variables affecting its fortunes. The government has powers of control over industry in terms of output, price and distribution of the product and a number of other aspects. The government policy with regard to granting of clearances, installed capacity and reservation of the products for small industry, etc. are also factors to be considered for industrial analysis. The recent declining of the TV, VCR and consumer durableswill boost the prospects of these industries.

7. **Labour and other Industrial Problems:** The industry, whether it is capital intensive or labour-intensive,has to use labour of different categories and expertise. The productivity of labour as much as the capital efficiency would determine the progress of the industry. If there are problems of labour, strikes, lockouts and poor productivity, that industry should be unwelcome for the investors. The best example is banking, where presently labour productivity is poor.

There are some decaying industries, like jute and cotton textiles, whose shares are to be avoided by the investors unless such companies are diversified into other lines as in the case of Birla Jute. Certain industries with problems of marketing like high storage costs, high transport costs, dependence on foreign markets etc. as the in the case of fertilizers may have poor growth potential and investors have to be careful when investing in such companies.

8. **Management:** An industry with any problems may be well-managed, if the promoters and the management are efficient and capable of steering the company through difficult days. Such management like Tatas, Birlas, Ambanis etc. who have a reputation, built up their companies on strong foundations. The management has to be assessed in terms of their capabilities, popularity, honesty and integrity. In the case ofnew industries and new managements, there will be no track record and the investors have to carefully assess the project reports and the assessment of financial institutions in this regard. The capabilities of management will depend upon tax planning, innovation of technology, modernization, expansion of R & D, etc. A management with a broad vision will plan for the expansion and diversification, make tax planning, and increase the retained earnings with a consistent dividend policy so that the future expansion plans are put on a sound basis. A good management will also ensure that their shares are well distributed and liquidity of shares is assured and trading is fair and just in the market with no malpractices like cornering of shares orinsider trading.

9. **Future Prospects:** Many of the factors of operation in industry are interlinked such as capacity utilization, demand and markets, government policy, availability of inputs, infrastructure, etc. It is, therefore, necessary to have an overall picture of the industry and to study these problems and prospects. After a study of the past, the future prospects of the industry are to be assessed. For this purpose, the projected demand, input availabilities, unutilized capacities, the alternative growth strategies, methods of reducing of cost, economies of scale and the position of competitors in the market are to be probed into. A company has to be assessed in terms of its strategies to meet the challenges as they emerge and its future prospects should be assessed before an investment is made.

In fundamental analysis, intrinsic worth as reflected by BV or EPS or GPM, etc. is expected to indicate the market price. But in actual practice it is not so. Take the Tyres/Tubes Industry for example. The table below shows how the market prices of similar companies in the same industry do not bear any perceptible relationship to BV, EPS, GPM.

Tyres/Tubes Industry

Name of the Company	Book value (BV)	Market Price (MP)
Apollo	50.41	150
Govind Rubber	50.13	90
Modi Rubber	63.87	50
Dunlop Rubber	45.83	65

Name of the Company	EPS	MP
Ceat	10.17	78
JK Industry	10.24	128
Dewan Rubber	11.41	55
Apollo Tyres	11.84	150
Vikrant Tyres	11.86	40

Name of the Company	GPM	MP
Pemier Tyres	7.8	30
Falcon Tyres	7.7	15
Dewan Rubber	7.9	55
Ceat	7.1	78
MRF Tyres	6.9	625

Example of an Industry Analysis

Petro-Chemicals

Product Nature: Petro-Chemicals are derived from petroleum and natural gas. The product groups are aromatics, plastics, surfactants, etc. Raw Materials: Coal tar, intermediates, etc., calcium carbide,alcohol, etc. Market (Users): Food processing, clothing, housing, health care, automobiles, etc. Demand Scenario: The first enterprise in the public sector was Indian Petrochemicals Corp. Ltd. (IPCL) set up in 1979. Demand was poor until 1983. After the pioneering work of IPCL to promote uses the demand picked up.

As per the demand projections of the government, demand and supply gap has persisted and necessitated imports costing more than Rs. 1,000 cores per annum. Policy of Government: The government has placed petrochemical under the core sector as being vital to the national economy. The Planning Commission's study group headed by Abid Hussain has estimated the need for an investment of Rs. 22,000 cores to achieve self-sufficiency by 2000 A.D. The government has sanctioned a number of new projects which were in the pipeline such as those of Hindustan Lever, Nirma Chemicals, etc. Already RIL and TNP have set-up projects and there are others also on stream.

Problems of the Industry

1. Long delays in government clearances and project cost escalations;
2. Projects established were not of economic size in many cases;
3. High prices of main feed stock, namely, Naphtha;
4. Need for R & D and introduction of new technologies which are most cost effective; and, 5. High excise duties on Naphtha.

Competition: What is the share of the company in question in the total market demand? Soon after IPCL, ABS Plastics began production whose capacity is currently 2000 tonnes p.a. and is expected to be raised to 5000 t.p.a. The main competitors are Polychem with a 30% share in the market. There are others such as Indo-Nippon, Bansali Engineering, etc. The companies in this line with strong fundamentals are ABS Plastics, Gujarat Pertrosyl, PIL, NOCIL, Polychem, etc. Cost Comparisons: The cost per tonne of the Bansali Engineering is three times that of ABS Plastics. ABS and Polychem are leaders in cost- effectiveness. The industry is asking for protection from foreign competition. The ban on exports of petrochemicals may help some units. Process Comparisons: Mysore Petrochemicals uses Oxelene Oxidation route; Tirumalai Chemicals adopts the benzene route; Rama Petrochemicals uses the alcohol as feed stock, while competitors are using propylene.

Company Analysis

In the case of company analysis, the balance sheet data should be first analyzed for:

1. Efficient use of capital;
2. Leverage enjoyed in the use of capital;
3. Return on net worth; and
4. Return on equity.

The capital structure and the cost of different types of capital and the problems of servicing the borrowed funds are to be taken into account. For this purpose, the interest burden, tax and depreciation provision are to be examined. The cash profits and profit after depreciation should be considered in relation to equity and net worth. The sales turnover is an important indicator of the activity of the company and an assessment of gross profits in relation to sales is to be made. Sales to equity would be high to indicate a good turnover of sales for equity (or NW) employed in the business.

The profit margins, earnings per share and P/E ratios will indicate the earning potential of the company for the equity holders. A fair return on capital employed can be assumed to be 10-15% as the government and public sector bonds give a return of around 13%. A provision for tax and depreciation has to be made at around 15%. These together would account for about 30% as gross profit for a company to be eligible for investment.

The gross profits as well as net profits are to be related to the Market capitalization for each company. Besides, the performance of the company analyzed has to be compared with that of its competitors in the industry under the following heads:

1. Cost per unit;
2. Profit margins;
3. Earnings per share and P/E ratio;
4. Bonus payments;
5. Dividend distribution policy; etc.

The variables to be studied for each company and the relative ratios are set out below:

Size for the Company - The expansion and growth of the company has to be judged by the growth of sales, assets, gross block and net block. The growth of the company can also be judged by the rate of growth of any of the above variables while the size of the company has to be judged in terms of its sales, installed capacity utilization with a view to see that the company is of an economic size. The profitability of the company is to be judged by the net profits (PAT) or cash profits in relation to sales, equity or net worth, dividend distributed, etc. The following variables are also to be analyzed for a company analysis:

1. Company‟s share in industry-its capacity utilization vis-à-vis the utilization in the whole industry.
2. Modernization and expansion plans - reflected in tax planning, retention policy, bonus policy, etc.
3. Earnings per share, cash earnings per share and P/E ratios.

Need for Forecast

The disadvantage of the above type of analysis is that it is based on the past performance and that it may not be an indicator of future performance. So a forecast is necessary for the coming six months or one year for making an investment. Such a forecast can be made on the basis of some assumptions of costs, prices and demand for its products. The earnings, gross and net profits, the EPS, etc. can be worked out and an assessment can be made whether the scrip is worthwhile purchasing judged by its prospects a year hence. For making a forecast, some subjective weights may be given to management (50%), expansion and growth (25%), prospects of bonus (15%) and other subjective factors like Government patronage or changes in market conditions (10%). These give a total weight of 100%. Companies in the same industry group can be studied by using the above weights to decide on which scrips to purchase depending on their rating. These weights and consequent judgment will be subjective and the result would depend on the ability and expertiseof the analyst.

Guidelines for Investment

A company which has a high intrinsic worth is not necessarily the best stock to buy. It may have no growth prospect or it may be overpriced. Similarly, a company that performs well during any one year may not be the best to buy. On the contrary, a company which has been doing badly for some time might have turned the corner and it may be the best buy, as its shares may be under priced and it has good prospects of growth. So an analyst should not be guided by one or a few indicators but has to consider the performanceof the whole company, and over a period of time, say, 5 years. Besides, a company is to be judged in the background of the industry‟s performance, product nature, prospects of the industry, etc. A study of the industry factors constitutes the industry analysis. Next to economy‟s performance, industry‟s performance isvital for an assessment of a company‟s prospects and growth.

TECHNICAL ANALYSIS: Importance of Timing in Investment

While fundamental analysis and security evaluation explain why share prices fluctuate, how they are determined and what to buy or sell, the technical analysis will help the decision when to buy and sell. The traditional theory of capital market efficiency postulates that entry into the market at any time would lead to the same average return as that of the market. But in the real world of imperfections, there are investors who have burnt her fingers by

entering the market at the wrong time.

Investment timing is, therefore, crucial as the market is continuously jolted by waves of buying and selling and prices are moving in trends and cycles and are never stable. The Stock market is different from other markets, as there is a continuous buying and selling and bid and offer rates as under a system of auctions. The resultant prices, led by the sheer force of the market, may fluctuate either way ad may exhibit waves or trends. Entry and exit in the market will, therefore, make all the difference to the spread between buying and selling prices and the profits or losses. Timing of investment is, therefore, of vital importance fortrading in the stock market.

Basic Tenets of Technical Analysis

Technical analysis of the market is based on some basic tenets, namely, that all fundamental factors are discounted by the market and are reflected in prices. Secondly, these prices move in trends or waves which can be both upward and downward depending on the sentiment, psychology and emotions ofoperators or traders. Thirdly, the present trends are influenced by the past trends and the projection of future trends is possible by an analysis of past price trends. Analysis of historical trends confirmed the above principles and the Random Walk theory explaining the randomness of price changes has been found to be not applicable by the technical analysis in practice.

Tools of Technical Analysis

1. Daily Fluctuation or Volatility

Open, High, Low and close are quoted. Changes between Open and Close or High and Low can be taken in absolute points or in percentages to reflect the daily volatility. Such fluctuation can be worked out on weekly, monthly or yearly basis also to reflect the general volatility of the market. The use of this indicator is to caution the investor against high volatility in any scrip. But a stable uptrend or downtrend can be discerned from these changes for the investor to interpret the market. A Bar chart as given below can be used to depict the daily variations: **High High High**

Close Open Close
Close Open
Low/Open Low Low

A yearly High-Low indicates the possible levels within a range that the price may move which helps to locate entry and exit points.

2. Floating Stock and Volume of Trade

Floating stock is the total number of shares available for trading with the public and volume of trade is any part of that floating stock. The higher this proportion, the higher is the liquidity of a share which is to be purchased or sold. Volume trends are also a supporting indicator to the price trends to interpret the market.

3. Price Trends and Volume Trends

The Chartist method and Moving average method can be used to depict these trends.

4. Rate of Change of prices and Volumes or the ROC Method

This is useful like the moving average method to indicate more clearly the buy and sell signals. The Chartist method is useful to indicate the directions and the trend reversals. ROC is calculated by dividing the today's price by the price five days back or few days back. It can be expressed as percentage or positive or

negative change. Thus they can be moving around 100, in the case of percentages or zero line, in the case of positive and negative percentage changes.

5. Japanese Candlestick Method

There are three main types of Candlesticks with each day's trade being shown in the form of candlesticks. Each stick has the body of the candle and a shadow. The body shows the open and close prices while the shadow shows the high and low prices. The three main types are as follows:

- Closing price is higher than open price (White candlestick).
- Closing price is lower than the open price (Black stick).
- Open and close are at the same level (Doji candlestick).

This method will indicate any likely changes in trends in the short-run.

6. Dow Theory

There are three major trends in this theory: minor, intermediate and major trends representing daily or weekly, monthly and yearly trends in prices respectively comparing the price trends to waves, tides and ripples.

7. Elliot Wave Theory

The market is unfolded by a basic rhythm or pattern of 5 waves up to be corrected by three waves down with a total of 8 waves - a philosophy of price trends.

8. Theory of Gaps

A gap in price between any two days causing a discontinuity is called a gap. The high of one day may be lower than the low of the previous day when prices are falling. Gaps indicate the likely acceleration of the trend or reversal. Gaps are of different categories, namely:

- **Common gaps** - When prices move in a narrow range, a gap can occur in prices.
- **Break out gaps** - When price trend is likely to change, a gap can occur in either direction. This gives a break to congestion in any direction.
- **Runaway gaps** - These gaps occur continuously in a downward phase or an upward phase, accelerating or decelerating the trends.
- **Exhaustion gaps** - These occur when the rally is getting exhausted. When the runaway gap is coming to an end, there can be exhaustion gap to indicate the likely completion of the uptrend.

9. Advance Decline Line or Spread of the Market

The ratio between Advances to declines will indicate the relative strength of upward or downward phase. When the advances are increasing over declines it is an upward phase and the reverse indicates the down ward phase.

10. Relative Strength Index (RSI)

It is an oscillator used to identify the inherent strength or weakness of particular scrip. R.S.I. is calculated for one scrip while RSC or the relative strength comparative, is the ratio of two prices of two different scrips, used for comparison of two or more scrips. RSI can be calculated for any number of days say 5 or 10 etc. to indicate the strength of price trend.

3.5: Dow Theory

The Dow Theory postulates that prices of industrial securities tend to move in tune with business cycles of the boom, depression etc. in the economy. As the corporate performance depends on the industrial growth and the tone of the economy, prices of shares should broadly reflect the overall trends in the economy, which in developed countries are dependent on the business cycles and business expectation. If the business conditions are good, demand increasing, industrial performance will be good and the corporate share prices will be on the upswing.

The reverse is true in time of recession and depression in the economy. The trends in the economy are reflected in the market average prices of shares. All fundamental factors are thus discounted by the market, and get reflected in average prices. It will thus be seen that factors affecting these supply and demand conditions in the market are summed up in the average prices in the market. A study of these average market prices is what is attempted in technical analysis and its trends are in the form of peaks, troughs and cycles.

Major Trends

The trends in stock prices are divided under three heads - primary, secondary and minor. The primary trend is a long-term trend of a year or more reflecting the basic mood of the market showing upward or downward movement. The secondary or intermediate trend represents the correction to the primary trend and is of a short duration of a few weeks to a few months. The minor trends may be in either direction on a few weeks to a few months. The minor trends may be in either direction on a daily or weekly basis, but pointing to the underlying primary trend either upward or downward.

These three trends are comparable to the tides, waves and ripples of the sea respectively. If the successive waves move further inland towards the beach than the preceding ones, then the tide would reflect the upward trend through higher peaks ad troughs. On the reverse side, if the tide is moving inwards into the sea then the trend is downwards and prices tend to decline on average. Each successive minor trend and intermediate trend results in a net downward movement and support the primary market trend in the downward direction. In the Dow Theory, the major trends, namely, bullish or bearish trends have three phases.

In the first phase of bullish trend, called the accumulation phase, only select elite of investors who perceive the coming things first start buying shares.

In the second phase, the followers of trend notice a distinct uptrend and begin to participate in the buying and then the mass buying starts.

The third phase is the end of the uptrend when the first elite group who initiated the first phase should dislodge their shares for profit-taking. Then there will be a reversal of the trend. The fall in the pricesin a bull phase is a technical reaction and a rise in prices in a bear phase is a technical rally. Theconcentration in the hands of bull is called accumulation, which when sold off gets distributed and there willbe a decline in prices. So far as the volume of trade is concerned, it should expand in the direction of the major trend.

During the uptrend period, the volume would expand when prices rise and decrease when prices decline. During the down-trend, there will be a reversal of the trend and the volume will expand when pricesdrop and contract when they start rising. The only problem which is a grey area in the Dow Theory is the signal for reversal of the trend. The first symptom of a change would call for “buy or sell” decision and those who perceive the change first would gain in speculation. As the primary trend continues the gain from speculation decreases.

The fact of the matter is that it is not easy, except for the expert eyes, to detect a change in direction in the existing trend and the first leg of the new trend in the opposite direction. For knowing the reversal, point a lot of experience and expertise is necessary in this line.

Chartist Method

As referred to earlier, technical analysis is a study of the market data in terms of factors affecting supply and demand schedules, namely, prices, volume of trading etc. A study of the historical trends of market behavior shows the cycles and trends in prices which may repeat as the present is a reflection of the

past and the future of the present. This is the basis for forecasting the future trends which are used for deciding on the basis of the buy or sell signals. For forecasting, analysts use charts and diagrams to depict the past trends and project the future. But these methods are rough and ready methods and there are no fool proof methods of forecasting the stock prices.

The technical analysis only helps to improve the knowledge of the probabilities of price behavior (upswing or downswing) and help the investment process. The technical analysis does not claim 100% chance of success in predictions that are made for investment. In view of the limitations inherent in the technical analysis, this analysis is generally juxtaposed with fundamental analysis of the market and the scrips.

It was the past experience that the receipt of information and the actual price absorption of the information would not coincide and there is a time lag between them. As a result, the current price changes would give a clue to the subsequent price changes, if properly analyzed and interpreted. In the market analysis, the variables to be taken into account are the breadth of the market, volume of trading etc. Market breadth is the dispersion of the general price rise or decline, which means daily accumulation of a net number of advancing or declining issues. Breadth analysis focuses on change rather than level in prices. Breadth of price changes in terms of the number of gainers or losers among the scrips is analyzed to know the width of rise or fall in prices.

Breadth of the Market

The breadth of the market analysis is based on the nature of stock market cycles. Bull markets are viewed as long-drawn-out affairs, during which individual stocks reach peaks gradually with the number of individual peaks accelerating as the market averages rise to the turning point. Thus the turning point for a bull phase is at that point where a larger number of stocks are falling when the averages are still rising. Inthe bear market, there is a large number of stocks falling in a period of time. The end of the bear market is near when there is a selling climax and a large number of sellers rush to sell all at once. The breadth is measures by the number of scrips rising or falling to the total number. In a bull phase there will be a large number of net rises and in a bear phase, a large number of net falls.

Normally, the breadth and the market average (BSE Index) lines move in tandem. In a bull phase, if the breadth line declines to successive new lows, while the market average is going up, it means that a largernumber of scrips are declining although blue chips included in the BSE Index continue to rise, but the suggestion is that there is an approaching peak in the averages and a major downtrend is in the offing later.

Volume of Trading

The above trends of the breath of the market are to be examined along with the supporting data on volume of trading. Price trends follow the volume trends in general. Historical data analysis of price and volume movements indicates that in a normal market, the price rise is accompanied by an expanding volume. If the level of volume is declining more than in the previous rally in times of bullish trend, it warns of a potential trend reversal. Termination of a bearish phase is often accompanied by a selling climax. Following a decline in prices, a heavy volume of trade with little price change is indicative are to be studied carefully before a final decision is taken on the state of the market, whether bullish or bearish, the phase of the uptrend or downtrend and look for buy and sell signals at the start of the reversal trends.

Both the price spread and volume trends are the result of demand and supply pressures. In the short- run, or on a day-today basis, the demand and supply for each scrip is base on a host of fundamental, technical and other factors. Trading in futures, options and arbitrage activity would distort the pure demand and supply analysis. The money flow analysis of the market general adopted by the analysts is also distortedby the dynamics of insider trading, short sales, “buying on weakness” and “selling on strength”, etc.

Stand of Technical Analysis

1. Market prices are determined by a host of fundamental, technical and other factors their which are both rational and irrational. It is possible that the market prices may be overvalued or undervalued always.
2. Average market price discounts all developments and is a reflection of the sum total of all forces operating on the market.
3. History or past trends have a role in the shaping of the future and as such an analysis of the past helps the

projection for the future.

The above stand leads to a science of recording in a graphic form, the price trends. The actual history of trading on the stock market is recorded in terms of price changes, namely, oscillators, and the volume of transactions in any scrip together. Based on the past behavior, the future trends are predicted and investment suggestions are made based on such predictions of trend changes.

The timing of an investment when to buy or sell is facilitated by a study of these charts and graphs. These are no doubt subjective factors based upon the behavior and psychological aspects of human beings which influence the market. As opposed to fundamental factors, which are statistical, incorporating the financial and physical variables of corporate units and economy, the market is also influenced by the non- statistical information such as behavior aspects, emotions, etc.; for the latter factors, technical analysis assumes importance in the investment strategy. In particular the decision to buy or sell is a fundamental decision, but the decision when to buy or sell is a decision arising out of technical analysis of the market.

Principles of Technical Analysis

The principles involved in technical analysis and in particular in the Dow Theory analysis can besummarized as follows:

1. Principle of wave motion and trends leads to different types of price trends.
2. Action and reaction resulting from buying and selling pressures lead to corrections and rallies tothe major up trends and downtrends respectively.
3. Principle of congestion involving support and resistance lines results in a phase of activity, inwhich the market is undecided, hesitant and the trend undermined.

The prices move within a band of resistance and support lines, and the trends involve up and down movements in a more or less horizontal path, until the prices are driven up or down. In congestion, the continuous pressures of buyers are met equally. But when the buyers exceed the sellers, both in volume and value of deals, then the price emerges from the bottom of the range and there will be an up breakout. When the sellers predominate, there will be a down breakout in the price level, the resistance and support lines are broken in either case. When buyers are increasing purchases and the volume increases, then there is said to be accumulation. When sellers are increasing their sales and the volume rises, then there is said to be distribution. When buying exceeds selling and persists, then there is a breakout of prices from the congestion into a bull phase. On the other hand, when selling exceeds buying and continues to persist, the congestion is broken out into a bear phase.

Charts and Trend Lines

The use of charts for analysis of prices in technical analysis was referred to fitting a trend line for price changes on a daily basis is the first step in the analysis of charts. These changes may be pointing upwards or downwards or stable over a horizontal one. The movements are such that there are both peaks and troughs in these price changes - peaks showing an upward trend troughs or reactions to the uptrend, viz.,line joining the lowest points or troughs pointing up. If this line is pointing downwards, then it is a bearish phase .If the movements are downwards generally, then there will be rallies moving up the prices. These upper peaks, if they are joined, give the trend line as much as the lowest troughs. The bull phase depicts the rising peaks successively, while the bear phase shows the falling peaks successively.

These support lines and resistance lines are clearly noticed when the prices are moving in a narrow band for some time. When the price pierces the resistance line, this is the first indication of the reversal of the trend in the upward direction. So also in a bull phase when the price line falls below the support line, a reversal of the trend is indicated. Various configurations of price movements like stable pattern, M and W patterns, head and shoulders etc. are formed. It is possible that various triangles, flags, pendants, etc. can be described by the price trends. The basic analysis involves the deciphering of the trend identifying of the reversal and fixing up of buy and sell signals in these price movements. The stable price pattern is ideal for genuine investors to enter the market.

Moving Averages

The analysis of the moving averages of the prices of scrips is another method in technical analysis. Generally, 7-day, 10-day and 15-day moving averages are worked out in respect of scrips studied and depicted on a graph along

with similar moving averages of the market index like BSE Sensitive Index.There will then be two graphs to be compared and when the trends are similar, the scrip and BSE market index will show comparable average risks.

The theory of moving averages also lays down the following guidelines for identifying the buy and sell signals. Whenever the moving average price line cuts the actual price line of the scrip of the market index from the bottom, it is a signal to sell shares. Conversely, when the moving average line cuts the actualprice line from above, it is the right time to buy shares. Here the comparison can be made separately for the BSE market index moving average with its actual price index and the moving average price of any scrip with its actual price.

Advantages of Moving Averages

Since the price fluctuations are wide and frequent, reflecting the volatility of the market and the scrips, some amount of smoothing can be achieved by taking the moving averages of the prices. Generally, the closing prices of these scrips are taken for the moving averages. The usefulness of this will also depend on the number of days (7 days, 10 days, 20 days, etc.) for which these averages are worked out. These averages can be represented in a graphical form to help identification of buy and sell signals. The first indication is that when the actual scrip price crosses for short-term moving average line (or, say, 7 or 10days).

This is to be supported by other evidence of a reversal of the trend to justify the buy signal. The short-term moving average of 7 or 10 days should cross the longer-term moving average of 15 or 20days, which in turn should cross the further long-term moving averages (or, say, 60 or 120 days) to finally confirm the buy signal is to be given when the moving average line cuts the actual price line from above. Itis cuts from below, and then the signal is to sell. The signal of moving averages can also be confirmed by further analysis of other technical factors like the trend reversal shows in the chart graphs referred to above.

Criticism of Dow Theory

The Dow Theory is subject to various limitations in actual practice. Dow has developed this theoryto depict the general trend of the market but not with the intention of projecting the future trends or to diagnose the buy and sell signals in the market. These applications of the Dow Theory have come in thelight of analytical studies of financial analysts. This theory is criticized on the ground that it is too subjectiveand based on historical interpretation; it is not infallible as it depends on the interpretative ability of the analyst. The results of this theory do not also give meaningful and conclusive evidence of any action to be taken in terms of buy and sell operations. Daily actual prices are dashed lines. When the daily price line cutsthe moving average of 5 days and the line of 5 days cut the line of 20 days, from above, there are sell signals. The buy signals are when the actual prices cut the moving average lines from below.

Charts

The drawing of charts, diagrams, graphs, etc. is a method by which the technical analysis is made. These charts depict the trends in prices, rate of changes in prices, volume of trading, etc. There are various types of charts, namely, point charts, line charts, vertical bar charts, etc. All these would depict the trends in prices and breadth of trading which are both indicators of buying and selling pressures and the market behavior.

Head of Shoulders

The configurations emerging from the charts show different patterns. Of these, the most important is the "Head and Shoulders." It depicts a top and a reversal pattern in either the bull phase or the bear phase. The left shoulder is formed when the prices reach the top under a strong buying impulse and trading volume becomes less than it did during the upswing to reach the top. Then there is another high volume advance which takes the price to a higher top than in the case of the left shoulder. This is called the "Head" top and followed by another reaction on less volume which takes prices down to a bottom near to the earlier recession. The third rally which takes the prices up reaches a height of less than that of the head and results on the right shoulder, which has a comparable height as the left shoulder. This type of configuration occurs under a bull phase and the exactly reverse configuration occurs in a bear phase. This is indicative of a likely reversal of the trend.

Breaking the Neckline

IF the prices are having an uptrend movement in a bull phase and the configuration of the head and shoulders

is noticed, then the analyst has to look for a possible trend reversal indicator. This can be noticed when the third recession cuts the support line down across the bottoms of the two reactions between the left shoulder, head, and the right shoulder (called the neckline) and the actual price line should go below the neckline by about 3 to 5 points of the market price.

There are a number of other patterns which are to be looked into by analysts, if they are doing an in- depth analysis. These patterns are useful to identify the primary of secondary trends. Some signs of reversal can be seen in the "rounding turns" and triangles and gaps. However, some gaps are attributed to ex- dividend, ex-bonus, etc. or due to symptoms of consolidation and acceleration or exhaustion and reassessment or it may be a break away gap of the market. Some insight into the future movement of prices can be had by a close study of the pattern that prices are making. Thus forecasting is a practical use to whichthe charts in general and these configurations in particular can be put to.

The bull market indicators are as follows. The bear market has been in progress for a long tie. The peaks of advancing points are still sloping upwards. The number of advancing points is substantially higher than the number of declining points. Then if the stock establishes certain levels of accumulation and consolidation over a number of days or weeks and if the volume of trading slows down, and then it is certain that distribution is taking place and it will meet with the resistance level soon. So, as a rule, it is safe to buy at the top or three points below or around the old bottom.

The bear market indications may be set out as follows. A bull market has been in progress for a long time. The recovery is occurring on low volume and the number of advancing points is only slightly higher than the number of declining points. The line connecting the peaks of declining point is sloping upwards but the price line may cross the support level soon due to exhaustion of the market pressure. It is better to sell at the previous high to peak or 3 points around that high.

Resistance and Support Lines

The points and figure charts should clearly indicate the bull or bear phases. But some configuration does not clearly indicate the definite signals such as in the case of a symmetrical triangle. While the ascending triangle and descending triangle indicates the upward and downward phases respectively. Consolidation refers to tie interval in which the price of a share does not break through in either direction.

Then the price movements are in a narrow band with both the resistance and support lines movinghorizontally.

Speculative Trading and Technical Analysis

Timing of purchase and sale is very important particularly for speculative trading. The basic rule isto follow the daily chart of highs/lows or tops/bottoms. When the long-term trend is bullish and price trendis pointing up, the advance line must make higher tops and higher bottoms. One can enter the market any time so long as the uptrend is continuing as indicated by the higher tops and bottoms. The best buy point is when the prices decline by 50% of the higher ever peak achieved or at a level of 50% between the extreme low and extreme high.

The best points to sell are when prices rise to the old top levels or near to those levels or when the prices start advancing after being below the 50% point between the extreme high and extreme low. There is no sanctity of these levels, as they are set by experience and observation. Experience and analysis are the best guides in these matters.

Before taking the buy and sell decisions, one has to observe the rules of the game:

i. Put stop loss order at, say, 10% of one‟s capital at any time. This will protect the extent of lossespossible in speculation.

ii. Draw the daily, weekly, monthly charts separately and observe the highs and lows and the mid-points and turning points carefully.

The buy and sell signals can be located at 3 points below the highs or 3 points above the lows, etc.

Oscillators (Rate of Change or ROC)

Oscillators refer tot eh velocity of price changes reflecting the market momentum which is measured by the rate of change or prices. This rate of change may be over the short period of 5 to 10 days or a longer period of 3 to 6

months. These oscillators may also be based upon the daily market prices when the volatility of the market spread is measured on a daily basis. Most oscillators would move in the same direction, either positive or negative, depending on the trends of the market. A positive reading reflects on overbought market and negative reading reflects oversold market. These oscillators in the form of velocity of price changes are plotted around a zero line to reflect both positive and negative values of the graph. The shape of the oscillator will depend on the period for which it is calculated say 5, 10, or 20 days. If the oscillator is for a longer period, it will become a smoother curve and if it is compiled on a daily basis, it willbe widely fluctuating.

Usefulness of the oscillator graph depends on a proper reading of the graph. As a general rule, if the oscillator reaches the extreme lower end, it is suggested to buy and if it is at the upper end, then the suggestion is to sell. The crossing of the zero line may also be understood as the first indication of buy and sell signals. The crossing of the zero line is an important indicator of the price trends and its direction. The market is said to be overbought when the oscillator is at the upper extreme and is oversold when the oscillator is in the lower extreme. These points provide the signals of buy and sell to the investor. Generally,the peaks and troughs in the actual price chart also reflect the peaks and troughs of the oscillator graph. A study of oscillators is thus useful to confirm the conclusions arrived by the basic trend analysis and the useof charts.

Predicting the individual stock movement:

With the help of technical indicators, analysis of individual shares is done to identify buying and selling signals. These signals are generated with the help of such technique which are foolproof and much in advance of the actual movement. Following are used for this:

(a) moving average analysis
(b) oscillators
(i) moving average convergence and divergence

1. rate of change
2. relative strength index

ii. chart patterns

(a) Moving average analysis:

Moving average is simply the rolling average of past prices. To calculate the moving averages, daily or weekly prices are taken for a period and every time an average is calculated by dropping the oldest and adding a new value. This average is plotted on a graph along with the prices on the basis of which such average is calculated. A study of the movement of these prices and averages help in generating buying and selling signals. A short-term moving average is used to predict near future movement whereas along-term moving average is used to take the decision about the longer time period.

Buying signals

- Whenever price line is above the moving average line, it moves towards the average line but fails to penetrate it, instead, starts rising upward, supported by an upward movement of the average line, it isa buy signal.
- When the price line is below the moving average line, it penetrates towards the upside and continues to move upward, supported by an upward movement of the average line, it is a buy signal.
- When the price line is above the moving average line and is moving upward continuously, supported by similar movement of the average line, it is also a buy signal.

Selling signals

- Whenever price line is below the moving average line, it moves towards the average line but fails to penetrate it, instead, starts declining, supported by a downward movement of the average line, it is a sell signal.
- When the price line is above the moving average line, it penetrates towards downside and continues to move downward, supported by a downward movement of the average line, it is a sell signal.
- When the price line is below the moving average line and is moving downward continuously, supported by similar movement of the average line, it is also a sell signal.

Moving average is the most common and simple tool to identify market movements. For different purposes, different averages are used. Like, for long term prediction 200 days moving average is used, for medium- term 70

days moving average, and for short-term 21 days or 10 days averages are used. These predictions are based on the fundamentals of Dow John Theory.

(b) Oscillators

By oscillators we mean a movement of certain item again on the same path with the same frequency,like that of a pendulum in a wall-clock. On this basis certain oscillators have been developed to predict the trends about individual stock. These oscillators are fine tools to predict the future movements before such movement takes place, and thus leave sufficient time gap to take decision on the basis of these. Prominent oscillators are as follows:

I. moving average convergence and divergence(MACD)
II. rate of change(ROC)
III. relative strength index(RSI)

(I) MACD is used to predict movements in the market. An analyst is generally in dilemma whether to use long term moving average or short term moving average, the solution for such dilemma is to use MACD. MACD is the difference between long term moving average and short term moving average. This difference helps in identifying, whether prices in the recent past have moved upward or downward as compared to longer period movement. With the help of MACD line various signals can be generated.

MACD= short term moving average- long term moving average

Simple buy and sell signals can be generated with the help of MACD, when MACD is in a positive zone it indicates buying as share prices are likely to move upward in the future. On the contrary, when MACD is in negative zone it indicates downward movement of the market in the near future and one should sell the shares.

Advance signals with the help of MACD: signals can also be generated by calculating „Moving average of MACD" generally 7 or 10 period moving average of MACD values is calculated . The following signals are generated with the help of this:

Buying signals:

- Whenever MACD line is above the moving average line of MACD, it moves towards the average line but fails to penetrate it, and instead starts rising upward, supported by an upward movement of the average line, it is a buying signal.
- When MACD line is below the moving average line of MACD, and penetrates towards the upside and continues to move upward, supported by an upward movement of the average line, it is a buying signal.
- When MACD line is above the moving average line of MACD and moving upward continuously, supported by a similar movement of the average line, it is also a buying signal.

Selling signals:

- When, MACD line is below the moving average line of MACD, it moves towards the average line but fails to penetrate it, instead, starts declining, supported by a downward movement of the average line, it is a sell signal.
- When, MACD line is above the moving average line of MACD, it penetrates towards the downside and continues to move downward, supported by a downward movement of the average line, it is a sell signal.
- When, MACD line is below the moving average line of MACD and moving downward continuously, supported by a similar movement of the average line, it is also a sell signal.

(II) ROC:

In calculating ROC current days, market price is divided by the price which prevailed a few days ago for a share. The value achieved so is identified as „Rate Of Change" indicating whether the prices at present are moving upward or downward as compared to the prices prevailed a few days ago. ROC is an indicator which helps in identifying „over bought" and „over sold" market. With the help of this buying and selling signals are generated much before the market makes a movement. Generally 10days" values ROC is calculated on a rolling basis, that is the eleventh day"s price is divided by the first day"s price and twelfth day"s price is divided by the second day"s price and so on.

Generating signals with the help of ROC: With the help of ROC market can be identified as „over bought" or „over sold". This identification helps in generating buying and selling signals. ROC values are plotted on a graph and this moves above and below a central value, that is, one „1". Here ROC value „1" is the Benchmark value.

Buying signals:

- When ROC is more than one (ROC>1) and moving upward continuously, it indicates the market is likely to move Upward.
- When ROC is less than one (ROC<1) and moving upward continuously, it indicates the market has come out of the red and in the near future it is expected to have a Upward movement.
- When ROC is moving downside but the pace of decline has decreased, it indicates that market is likely to reach over sold level and after it will start rising. Opportunists who can take a risk buy at this level.

Selling signals:

- When ROC line is increasing but the pace of increase has declined, it indicates that market is aboutto reach over bought zone, after which it is likely to decline. One should take precaution or a risk averse investor can sell at this moment.
- When ROC line has made a peak it is the identification of over bought market, and market is likelyto move towards downward direction, one should sell.
- When ROC is more than one (ROC>1) but declining, it indicates that market will enter intodeclining zone, and one should sell at this level.

(III) RSI: Relative Strength Index

RSI is one of the powerful oscillators which indicate market movement much before such movement takes place. Under RSI gains and losses of the prices over the immediate previous days" price fora certain period is calculated. With the help of the Formulae RSI value is calculated and plotted on the graphto identify over bought and over sold market. Market always moves downward after an over bought situation and it moves upward after an over sold situation.

When RSI is at or above 70 level and moving upward it indicates that market is likely to reach the peak due to over bought position. On the contrary to this when RSI value is at or below 30 level, it indicates an over sold situation and market is likely to bottom out. In between 50 level of RSI is used to generate confirm and safe signals. Market always moves downward after an over bought situation and moves upward after an over sold situation.

Calculation of RSI: **RS= Average of n days advances / Average of n days declines**

RSI= 100-100/ (1+RS)

Value 50 is the bench mark
Value 70 is used to identify over bought market
Value 30 is used to identify over sold market

Generating signals with the help of RSI: With the help of RSI, market can be identified as over bought or oversold. This helps in generating buying and selling signals. RSI value is plotted on a graph and this oscillates above or below a central value that is the fifty"50" mark.

Buying signals:

- When RSI is more than fifty and moving upward continuously, it is a buying signal.
- When RSI line is less than fifty and moving upward continuously, it indicates that market has come out of the red and in the near future it is expected to have a Upward movement.

- When RSI is moving downside below the fifty marks but the pace of decline has decreased, it indicates that market is likely to reach over sold level and after it will start rising. Opportunists who can take a risk buy at this level.

Selling signals:

- When RSI line is increasing above fifty marks but the pace of increase has declined, it indicates that market is about to reach over bought zone, after which it is likely to decline. One should take precaution or a risk averse investor can sell at this moment.

- When RSI line has made a peak at around 70 level it is the identification of over bought market, and market is likely to move downward direction, one should sell.
- When RSI is more then fifty but declining, it indicates that market will enter in the south zone, i.e. declining zone and one should sell at this level.

(C) Chart patterns:

When prices of individual shares are plotted on a line chart, these indicate several patterns, like head and shoulder movement, inverse head and shoulder, flag, and triangles, etc. These patterns are used to generate signals about the expected movement of the market. Under technical analysis it is believed that prices show a particular pattern again and again and due to this tendency chart patterns get generated. These chart pattern can be used to predict about the near future price movement, but these are not as strong as oscillators and Moving Average.

These chart patterns can be generated for the index value as well for the prices of individual shares, thesehelp in identifying the following:

- **Support level**
- **Resistance level**

Support level: It is the lower price level at which demand for the shares gains momentum, as a result of which declining prices take an upward turn at this level. It is expected that prices will not fall below this level and hope of gaining something from the rising prices creates a demand.

Resistant level: It is the upper price level at which the supply for the shares gains momentum, as a result of which rising prices take a downward turn at this level. It is expected that prices will not rise above this level and the fear of likely loss due to decline in the share prices generates the supply.

Type of chart patterns

- **Head and shoulders**
- **Inverse head and shoulders**
- **Triangle**
- **Flag**

Head and shoulders: This reflects resistance and support level in an upward moving market, to identify expected movement in the market. Either index or prices of individual shares can be used for these. In this neck line is considered as the ultimate support level, whereas shoulder lines are the intervening resistance levels and head line is the final resistance level. With the help of such identification buy and sell signals can be generated. One should buy at the neck line and sell at the shoulder and head levels. This pattern is observed in an upward moving market, it is believed, if, one cycle of head and shoulders has been created and market has again started moving upward then again a set of head and shoulders will be generated. It is based on the principle that history repeats itself.

Inverse head and shoulders: This reflects resistance and support level in a downward moving market, to identify expected movement in the market. Either index or prices of individual shares can be used for these. In this neck line is considered as the ultimate resistance level, whereas shoulder lines are the intervening support levels and head line is the final support level. With the help of such identification buy and sell signals can be generated. One should buy at

the support level and sell at the resistance level. This pattern is observed in a downward moving market, It is believed, if, one cycle of inverse head and shoulders has been created and market has again started moving downward then again a set of inverse head and shoulders will be generated. It is based on the principle that history repeats itself.

Triangle: These are the price patterns which show the movement of shifting resistance and support level. Whenever in a declining market resistance line tends to shift towards support level at a faster rate, it will form a triangle indicating a further decline in the near future. Similarly in an upward moving market support line tends to shift towards the resistance line at a faster rate, it indicates an improvement in the market in the near future and market is likely to advance in the future.

When ever support and resistance lines are shifting towards each other at a normal pace at equal distance it indicates a horizontal trend in the market and market may be side way.

Flag: A flag is identified as a narrow movement of the market either after an uptrend or a downtrend. This means market has taken a pause after the previous trend and after a short while market is likely to continue in the same direction as previously. With the help of this uptrend and downtrend can be identified. If a flag has been created after an uptrend, it indicates an uptrend in the future; however this needs to be confirmed with the help of traded volume. If traded volumes are very high at support level as compared to resistance level it confirms the uptrend. If a flag has created after a downtrend, it indicates a downtrend in the future; this also needed to be confirmed with the help of traded volume. If traded volumes are higher at the resistance level as compared to the support level, this confirms downtrend in the future.

Confirmation through Traded Volume:

Buying and selling signals generated with the help of different tools like Dow John Theory, Moving Average, Oscillators-MACD, ROC, RSI, and Chart Patterns need to be confirmed with the help of traded volume.