A

Seminar report

On

PORTFOLIO MANAGEMENT

Submitted in partial fulfillment of the requirement for the award of degree
Of MBA

SUBMITTED TO:
www.studymafia.org

SUBMITTED BY:
www.studymafia.org

Acknowledgement

I would like to thank respected Mr…….. and Mr. ……..for giving me such a wonderful opportunity to expand my knowledge for my own branch and giving me guidelines to present a seminar report. It helped me a lot to realize of what we study for.

Secondly, I would like to thank my parents who patiently helped me as i went through my work and helped to modify and eliminate some of the irrelevant or un-necessary stuffs.

Thirdly, I would like to thank my friends who helped me to make my work more organized and well-stacked till the end.

Next, I would thank Microsoft for developing such a wonderful tool like MS Word. It helped my work a lot to remain error-free.

Last but clearly not the least, I would thank The Almighty for giving me strength to complete my report on time.

Preface

I have made this report file on the topic; **Portfolio Management;** I have tried my best to elucidate all the relevant detail to the topic to be included in the report. While in the beginning I have tried to give a general view about this topic.

My efforts and wholehearted co-corporation of each and everyone has ended on a successful note. I express my sincere gratitude to ……..who assisting me throughout the preparation of this topic. I thank him for providing me the reinforcement, confidence and most importantly the track for the topic whenever I needed it.

CONTENTS

PORT FOLIO MANAGEMENT

MEANING:

A portfolio is a collection of assets. The assets may be physical or financial like Shares, Bonds, Debentures, Preference Shares, etc. The individual investor or a fund manager would not like to put all his money in the sares of one company, that would amount to great risk. He would therefore, follow the age old maxim that one should not put all the egges into one basket. By doing so, he can achieve objective to maximize portfolio return and at the same time minimizing the portfolio risk by diversification.

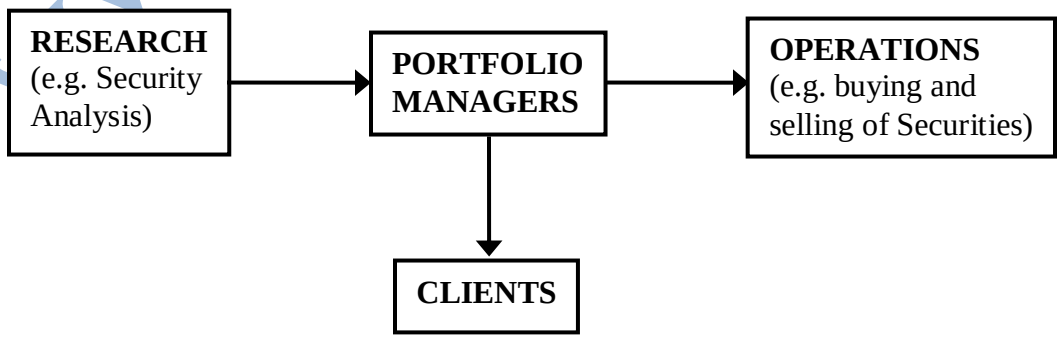
- Portfolio management is the management of various financial assets which comprise the portfolio.
- Portfolio management is a decision – support system that is designed with a view to meet the multi-faced needs of investors.
- According to Securities and Exchange Board of India Portfolio Manager is defined as: "portfolio means the total holdings of securities belonging to any person".
- ***PORTFOLIO MANAGER*** means any person who pursuant to a contract or arrangement with a client, advises or directs or undertakes on behalf of the client (whether as a discretionary portfolio manager or otherwise) the management or administration of a portfolio of securities or the funds of the client.
- ***DISCRETIONARY PORTFOLIO MANAGER*** means a portfolio manager who exercises or may, under a contract relating to portfolio management exercises any degree of discretion as to the investments or management of the portfolio of securities or the funds of the client.

FUNCTIONS OF PORTFOLIO MANAGEMENT:

- To frame the investment strategy and select an investment mix to achieve the desired investment objectives
- To provide a balanced portfolio which not only can hedge against the inflation but can also optimize returns with the associated degree of risk
- To make timely buying and selling of securities
- To maximize the after-tax return by investing in various tax saving investment instruments.

STRUCTURE / PROCESS OF TYPICAL PORTFOLIO MANAGEMENT

In the small firm, the portfolio manager performs the job of security analyst. In the case of medium and large sized organizations, job function of portfolio manager and security analyst are separate.



CHARACTERISTICS OF PORTFOLIO MANAGEMENT:

Individuals will benefit immensely by taking portfolio management services for the following reasons:

- Whatever may be the status of the capital market, over the long period capital markets have given an excellent return when compared to other forms of investment. The return from bank deposits, units, etc., is much less than from the stock market.

- The Indian Stock Markets are very complicated. Though there are thousands of companies that are listed only a few hundred which have the necessary liquidity. Even among these, only some have the growth prospects which are conducive for investment. It is impossible for any individual wishing to invest and sit down and analyze all these intricacies of the market unless he does nothing else.

- Even if an investor is able to understand the intricacies of the market and separate chaff from the grain the trading practices in India are so complicated that it is really a difficult task for an investor to trade in all the major exchanges of India, look after his deliveries and payments. This is further complicated by the volatile nature of our markets which demands constant reshuffing of portfolios.

TYPES OF PORTFOLIO MANAGEMENT:

1. DISCRETIONARY PORTFOLIO MANAGEMENT SERVICE (DPMS):

In this type of service, the client parts with his money in favour of the manager, who in return, handles all the paper work, makes all the decisions and gives a good return on the investment and charges fees. In the Discretionary Portfolio Management Service, to maximise the yield, almost all portfolio managers park the funds in the money market securities such as overnight market, 18 days treasury bills and 90 days commercial bills. Normally, the return of such investment varies from 14 to 18 percent, depending on the call money rates prevailing at the time of investment.

2. **NON-DISCRETIONARY PORTFOLIO MANAGEMENT SERVICE (NDPMS):**

The manager functions as a counsellor, but the investor is free to accept or reject the manager‘s advice; the paper work is also undertaken by manager for a service charge. The manager concentrates on stock market instruments with a portfolio tailor-made to the risk taking ability of the investor.

IMPORTANCE OF PORTFOLIO MANAGEMENT*:*

- Emergence of institutional investing on behalf of individuals. A number of financial institutions, mutual funds and other agencies are undertaking the task of investing money of small investors, on their behalf.

- Growth in the number and size of investigable funds – a large part of household savings is being directed towards financial assets.

- Increased market volatility – risk and return parameters of financial assets are continuously changing because of frequent changes in government's industrial and fiscal policies, economic uncertainty and instability.

- Greater use of computers for processing mass of data.

- Professionalization of the field and increasing use of analytical methods (e.g. quantitative techniques) in the investment decision – making

- Larger direct and indirect costs of errors or shortfalls in meeting portfolio objectives – increased competition and greater scrutiny by investors.

STEPS IN PORTFOLIO MANAGEMENT:

- Specification and qualification of investor objectives, constraints, and preferences in the form of an investment policy statement.

- Determination and qualification of capital market expectations for the economy, market sectors, industries and individual securities.

- Allocation of assets and determination of appropriate portfolio strategies for each asset class and selection of individual securities.

- Performance measurement and evaluation to ensure attainment of investor objectives.

- Monitoring portfolio factors and responding to changes in investor objectives, constrains and / or capital market expectations.

Rebalancing the portfolio when necessary by repeating the asset allocation, portfolio strategy and security selection.

CRITERIA FOR PORTFOLIO DECISIONS:

- In portfolio management emphasis is put on identifying the collective importance of all investors holdings. The emphasis shifts from individual assets selection to a more balanced emphasis on diversification and risk-return interrelationships of individual assets within the portfolio. Individual securities are important only to the extent they affect the aggregate portfolio. In short, all decisions should focus on the impact which the decision will have on the aggregate portfolio of all the assets held.

- Portfolio strategy should be moulded to the unique needs and characteristics of the portfolio‘s owner.
- Diversification across securities will reduce a portfolio‘s risk. If the risk and return are lower than the desired level, leverages (borrowing) can be used to achieve the desired level.

- Larger portfolio returns come only with larger portfolio risk. The most important decision to make is the amount of risk which is acceptable.

- The risk associated with a security type depends on when the investment will be liquidated. Risk is reduced by selecting securities with a payoff close to when the portfolio is to be liquidated.

Competition for abnormal returns is extensive, so one has to be careful in evaluating the risk and return from securities. Imbalances do not last long and one has to act fast to profit from exceptional opportunities.

QUALITIES OF PORTFOLIO MANAGER:

1. **SOUND GENERAL KNOWLEDGE:** Portfolio management is an exciting and challenging job. He has to work in an extremely uncertain and confliction environment. In the stock market every new piece of information affects the value of the securities of different industries in a different way. He must be able to judge and predict the effects of the information he gets. He must have sharp memory, alertness, fast intuition and self-confidence to arrive at quick decisions.

2. **ANALYTICAL ABILITY:** He must have his own theory to arrive at the instrinsic value of the security. An analysis of the security‘s values, company, etc. is s continuous job of the portfolio manager. A good analyst makes a good financial consultant. The analyst can know the strengths, weaknesses, opportunities of the economy, industry and the company.

3. **MARKETING SKILLS:** He must be good salesman. He has to convince the clients about the particular security. He has to compete with the stock brokers in the stock market. In this context, the marketing skills help him a lot.

4. **EXPERIENCE:** In the cyclical behaviour of the stock market history is often repeated, therefore the experience of the different phases helps to make

rational decisions. The experience of the different types of securities, clients, market trends, etc., makes a perfect professional manager.

PORTFOLIO BUILDING:

Portfolio decisions for an individual investor are influenced by a wide variety of factors. Individuals differ greatly in their circumstances and therefore, a financial programme well suited to one individual may be inappropriate for another. Ideally, an individual‘s portfolio should be tailor-made to fit one‘s individual needs.

Investor‘s Characteristics:

An analysis of an individual‘s investment situation requires a study of personal characteristics such as age, health conditions, personal habits, family responsibilities, business or professional situation, and tax status, all of which affect the investor‘s willingness to assume risk.

Stage in the Life Cycle:

One of the most important factors affecting the individual‘s investment objective is his stage in the life cycle. A young person may put greater emphasis on growth and lesser emphasis on liquidity. He can afford to wait for realization of capital gains as his time horizon is large.

Family responsibilities:

The investor‘s marital status and his responsibilities towards other members of the family can have a large impact on his investment needs and goals.

Investor‘s experience:

The success of portfolio depends upon the investor‘s knowledge and experience in financial matters. If an investor has an aptitude for financial affairs, he may wish to be more aggressive in his investments.

Attitude towards Risk:

A person‘s psychological make-up and financial position dictate his ability to assume the risk. Different kinds of securities have diffferent kinds of risks. The higher the risk, the greater the opportunity for higher gain or loss.

Liquidity Needs:

Liquidity needs vary considerably among individual investors. Investors with regular income from other sources may not worry much about instantaneous liquidity, but individuals who depend heavily upon investment for meeting their general or specific needs, must plan portfolio to match their liquidity needs. Liquidity can be obtained in two ways:

1. by allocating an appropriate percentage of the portfolio to bank deposits, and
2. by requiring that bonds and equities purchased be highly marketable.

Tax considerations:

Since different individuals, depending upon their incomes, are subjected to different marginal rates of taxes, tax considerations become most important factor

in individual‘s portfolio strategy. There are differing tax treatments for investment in various kinds of assets.

Time Horizon:

In investment planning, time horizon become an important consideration. It is highly variable from individual to individual. Individuals in their young age have long time horizon for planning, they can smooth out and absorb the ups and downs of risky combination. Individuals who are old have smaller time horizon, they generally tend to avoid volatile portfolios.

Individual‘s Financial Objectives:

In the initial stages, the primary objective of an individual could be to accumulate wealth via regular monthly savings and have an investment programme to achieve long term capital gains.

Safety of Principal:

The protection of the rupee value of the investment is of prime importance to most investors. The original investment can be recovered only if the security can be readily sold in the market without much loss of value.

Assurance of Income:

`Different investors have different current income needs. If an individual is dependent of its investment income for current consumption then income received now in the form of dividend and interest payments become primary objective.

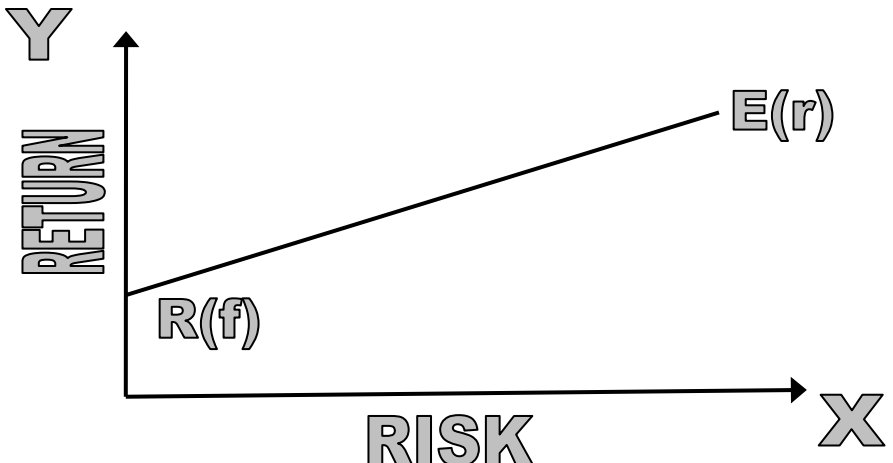
Investment Risk:

All investment decisions revolve around the trade-off between risk and return. All rational investors want a substantial return from their investment. An ability to understand, measure and properly manage investment risk is fundamental to any intelligent investor or a speculator. Frequently, the risk associated with security investment is ignored and only the rewards are emphasized. An investor who does not fully appreciate the risks in security investments will find it difficult to obtain continuing positive results.

RISK AND EXPECTED RETURN:

There is a positive relationship between the amount of risk and the amount of expected return i.e., the greater the risk, the larger the expected return and larger the chances of substantial loss. One of the most difficult problems for an investor is to estimate the highest level of risk he is able to assume.

- Risk is measured along the horizontal axis and increases from the left to right.



- Expected rate of return is measured on the vertical axis and rises from bottom to top.

- The line from 0 to R (f) is called the rate of return or risk less investments commonly associated with the yield on government securities.

- The diagonal line form R (f) to E(r) illustrates the concept of expected rate of return increasing as level of risk increases.

TYPES OF RISKS:

Risk consists of two components. They are

1. Systematic Risk
2. Un-systematic Risk

1. Systematic Risk:

Systematic risk is caused by factors external to the particular company and uncontrollable by the company. The systematic risk affects the market as a whole. Factors affect the systematic risk are

- economic conditions
- political conditions
- sociological changes

The systematic risk is unavoidable. Systematic risk is further sub-divided into three types. They are

a) Market Risk
b) Interest Rate Risk
c) Purchasing Power Risk

a). Market Risk:

One would notice that when the stock market surges up, most stocks post higher price. On the other hand, when the market falls sharply, most common stocks will drop. It is not uncommon to find stock prices falling from time to time while a company‘s earnings are rising and vice-versa. The price of stock may fluctuate widely within a short time even though earnings remain unchanged or relatively stable.

***b).* Interest Rate Risk:**

Interest rate risk is the risk of loss of principal brought about the changes in the interest rate paid on new securities currently being issued.

***c).* Purchasing Power Risk:**

The typical investor seeks an investment, which will give him current income and / or capital appreciation in addition to his original investment.

2. <u>Un-systematic Risk</u>:

Un-systematic risk is unique and peculiar to a firm or an industry. The nature and mode of raising finance and paying back the loans, involve the risk element. Financial leverage of the companies that is debt-equity portion of the companies differs from each other. All these factors Factors affect the un-systematic risk and contribute a portion in the total variability of the return.

- Managerial inefficiently
- Technological change in the production process
- Availability of raw materials
- Changes in the consumer preference
- Labour problems

The nature and magnitude of the above mentioned factors differ from industry to industry and company to company. They have to be analyzed separately for each industry and firm. Un-systematic risk can be broadly classified into:

a) Business Risk
b) Financial Risk

a. Business Risk:

Business risk is that portion of the unsystematic risk caused by the operating environment of the business. Business risk arises from the inability of a firm to maintain its competitive edge and growth or stability of the earnings. The volatibility in stock prices due to factors intrinsic to the company itself is known as Business risk. Business risk is concerned with the difference between revenue and earnings before interest and tax. Business risk can be divided into.

i). Internal Business Risk

Internal business risk is associated with the operational efficiency of the firm. The operational efficiency differs from company to company. The efficiency

of operation is reflected on the company‘s achievement of its pre-set goals and the fulfillment of the promises to its investors.

ii). External Business Risk

External business risk is the result of operating conditions imposed on the firm by circumstances beyond its control. The external environments in which it operates exert some pressure on the firm. The external factors are social and regulatory factors, monetary and fiscal policies of the government, business cycle and the general economic environment within which a firm or an industry operates.

b. Financial Risk:

It refers to the variability of the income to the equity capital due to the debt capital. Financial risk in a company is associated with the capital structure of the company. Capital structure of the company consists of equity funds and borrowed funds.

PORTFOLIO ANALYSIS:

Various groups of securities when held together behave in a different manner and give interest payments and dividends also, which are different to the analysis of individual securities. A combination of securities held together will

give a beneficial result if they are grouped in a manner to secure higher return after taking into consideration the risk element.

There are two approaches in construction of the portfolio of securities. They are

- Traditional approach
- Modern approach

TRADITIONAL APPROACH:

Traditional approach was based on the fact that risk could be measured on each individual security through the process of finding out the standard deviation and that security should be chosen where the deviation was the lowest. Traditional approach believes that the market is inefficient and the fundamental analyst can take advantage fo the situation. Traditional approach is a comprehensive financial plan for the individual. It takes into account the individual needs such as housing, life insurance and pension plans. Traditional approach basically deals with two major decisions. They are

a) Determining the objectives of the portfolio

Selection of securities to be included in the portfolio

MODERN APPROACH:

Modern approach theory was brought out by Markowitz and Sharpe. It is the combination of securities to get the most efficient portfolio. Combination of securities can be made in many ways. Markowitz developed the theory of diversification through scientific reasoning and method. Modern portfolio theory

believes in the maximization of return through a combination of securities. The modern approach discusses the relationship between different securities and then draws inter-relationships of risks between them. Markowitz gives more attention to the process of selecting the portfolio. It does not deal with the individual needs.

MARKOWITZ MODEL:

Markowitz model is a theoretical framework for analysis of risk and return and their relationships. He used statistical analysis for the measurement of risk and mathematical programming for selection of assets in a portfolio in an efficient manner. Markowitz apporach determines for the investor the efficient set of portfolio through three important variables i.e.

- Return
- Standard deviation
- Co-efficient of correlation

Markowitz model is also called as an "Full Covariance Model". Through this model the investor can find out the efficient set of portfolio by finding out the trade off between risk and return, between the limits of zero and infinity. According to this theory, the effects of one security purchase over the effects of the other security purchase are taken into consideration and then the results are evaluated. Most people agree that holding two stocks is less risky than holding one stock. For example, holding stocks from textile, banking and electronic companies is better than investing all the money on the textile company's stock.

Markowitz had given up the single stock portfolio and introduced diversification. The single stock portfolio would be preferable if the investor is perfectly certain that his expectation of highest return would turn out to be real. In the world of

uncertainity, most of the risk adverse investors would like to join Markowitz rather than keeping a single stock, because diversification reduces the risk.

ASSUMPTIONS:

- All investors would like to earn the maximum rate of return that they can achieve from their investments.
- All investors have the same expected single period investment horizon.
- All investors before making any investments have a common goal. This is the avoidance of risk because Investors are risk-averse.
- Investors base their investment decisions on the expected return and standard deviation of returns from a possible investment.
- Perfect markets are assumed (e.g. no taxes and no transation costs)
- The investor assumes that greater or larger the return that he achieves on his investments, the higher the risk factor surrounds him. On the contrary when risks are low the rerturn can also be expected to be low.
- The investor can reduce his risk if he adds investments to his portfolio.
- An investor should be able to get higher return for each level of risk "by determining the efficient set of securities".

- An individual seller or buyer cannot affect the price of a stock. This assumption is the basic assumption of the perfectly competitive market.
- Investors make their decisions only on the basis of the expected returns, standard deviation and covariances of all pairs of securities.
- Investors are assumed to have homogenous expectations during the decision-making period

- The investor can lend or borrow any amount of funds at the riskless rate of interest. The riskless rate of interest is the rate of interest offered for the treasury bills or Government securities.
- Investors are risk-averse, so when given a choice between two otherwise identical portfolios, they will choose the one with the lower standard deviation.
- Individual assets are infinitely divisible, meaning that an investor can buy a fraction of a share if he or she so desires.
- There is a risk free rate at which an investor may either lend (i.e. invest) money or borrow money.
- There is no transaction cost i.e. no cost involved in buying and selling of stocks.

There is no personal income tax. Hence, the investor is indifferent to the form of return either capital gain or dividend.

THE EFFECT OF COMBINING TWO SECURITIES:

It is believed that holding two securities is less risky than by having only one investment in a person‘s portfolio. When two stocks are taken on a portfolio and if they have negative correlation then risk can be completely reduced because the gain on one can offset the loss on the other. This can be shown with the help of following example:

INTER- ACTIVE RISK THROUGH COVARIANCE:

Covariance of the securities will help in finding out the inter-active risk. When the covariance will be positive then the rates of return of securities move

together either upwards or downwards. Alternatively it can also be said that the inter-active risk is positive. Secondly, covariance will be zero on two investments if the rates of return are independent.

Holding two securities may reduce the portfolio risk too. The portfolio risk can be calculated with the help of the following formula:

CAPITAL ASSET PRICING MODEL (CAPM):

Markowitz, William Sharpe, John Lintner and Jan Mossin provided the basic structure of Capital Asset Pricing Model. It is a model of linear general equilibrium return. In the CAPM theory, the required rate return of an asset is having a linear relationship with asset‘s beta value i.e. undiversifiable or systematic risk (i.e. market related risk) because non market risk can be eliminated by diversification and systematci risk measured by beta. Therefore, the relationship between an assets return and its systematic risk can be expressd by the CAPM, which is also called the Security Market Line.

$$\mathbf{R_p = R_f X_f + R_m(1 - X_f)}$$

$\mathbf{R_p}$ = Portfolio return

$\mathbf{X_f}$ = The proportion of funds invested in risk free assets

$\mathbf{1 - X_f}$ = The proportion of funds invested in risky assets

$\mathbf{R_f}$ = Risk free rate of return

$\mathbf{R_m}$ = Return on risky assets

Formula can be used to calculate the expected returns for different situtions, like mixing riskless assets with risky assets, investing only in the risky asset and mixing the borrowing with risky assets.

THE CONCEPT:

According to CAPM, all investors hold only the market portfolio and risk less securities. The market portfolio is a portfolio comprised of all stocks in the market. Each asset is held in proportion to its market value to the total value of all risky assets.

For example, if Satyam Industry share represents 15% of all risky assets, then the market portfolio of the individual investor contains 15% of Satyam Industry shares. At this stage, the investor has the ability to borrow or lend any amount of money at the risk less rate of interest.

Eg.: assume that borrowing and lending rate to be 12.5% and the return from the risky assets to be 20%. There is a trade off between the expected return and risk. If an investor invests in risk free assets and risky assets, his risk may be less than what he invests in the risky asset alone. But if he borrows to invest in risky assets, his risk would increase more than he invests his own money in the risky assets. When he borrows to invest, we call it financial leverage. If he invests 50% in risk free assets and 50% in risky assets, his expected return of the portfolio would be

$$\mathbf{R_p = R_f X_f + R_m(1 - X_f)}$$

$$= (12.5 \times 0.5) + 20\ (1-0.5)$$

$$= 6.25 + 10 \qquad = 16.25\%$$

if there is a zero investment in risk free asset and 100% in risky asset, the return is

$$\mathbf{R_p = R_f X_f + R_m(1 - X_f)}$$

$$= 0 + 20\%$$

$$= 20\%$$

if -0.5 in risk free asset and 1.5 in risky asset, the return is

$$\mathbf{R_p = R_f X_f + R_m(1 - X_f)}$$

$$= (12.5 \times -0.5) + 20\ (1.5)$$

$$= -6.25 + 30$$

$$= 23.75\%$$

EVALUATION OF PORTFOLIO:

Portfolio manager evaluates his portfolio performance and identifies the sources of strengths and weakness. The evaluation of the portfolio provides a feed back about the performance to evolve better management strategy. Even though evaluation of portfolio performance is considered to be the last stage of investment process, it is a continuous process. There are number of situations in which an evaluation becomes necessary and important.

i. ***Self Valuation:*** An individual may want to evaluate how well he has done. This is a part of the process of refining his skills and improving his performance over a period of time.

ii. ***Evaluation of Managers:*** A mutual fund or similar organization might want to evaluate its managers. A mutual fund may have several managers each running a separate fund or sub-fund. It is often necessary to compare the performance of these managers.

iii. ***Evaluation of Mutual Funds:*** An investor may want to evaluate the various mutual funds operating in the country to decide which, if any, of these should be chosen for investment. A similar need arises in the case of individuals or organisations who engage external agencies for portfolio advisory services.

Evaluation of Groups: Academics or researchers may want to evaluate the performance of a whole group of investors and compare it with another group of investors who use different techniques or who have different skills or access to different information.

NEED FOR EVALUATION OF PORTFOLIO:

- We can try to evaluate every transaction. Whenever a security is brought or sold, we can attempt to assess whether the decision was correct and profitable.

- We can try to evaluate the performance of a specific security in the portfolio to determine whether it has been worthwhile to include it in our portfolio.
- We can try to evaluate the performance of portfolio as a whole during the period without examining the performance of individual securities within the portfolio.

NEED & IMPORTANCE:

Portfolio management has emerged as a separate academic discipline in India. Portfolio theory that deals with the rational investment decision-making process has now become an integral part of financial literature.

Investing in securities such as shares, debentures & bonds is profitable well as exciting. It is indeed rewarding but involves a great deal of risk & need artistic skill. Investing in financial securities is now considered to be one of the most risky avenues of investment. It is rare to find investors investing their entire savings in a single security. Instead, they tend to invest in a group of securities. Such group of securities is called as PORTFOLIO. Creation of portfolio helps to reduce risk without sacrificing returns. Portfolio management deals with the analysis of individual securities as well as with the theory & practice of optimally combining securities into portfolios.

The modern theory is of the view that by diversification, risk can be reduced. The investor can make diversification either by having a large number of shares of companies in different regions, in different industries or those producing different types of product lines. Modern theory believes in the perspective of combinations of securities under constraints of risk and return.

PORTFOLIO REVISION:

The portfolio which is once selected has to be continuously reviewed over a period of time and then revised depending on the objectives of the investor. The care taken in construction of portfolio should be extended to the review and

revision of the portfolio. Fluctuations that occur in the equity prices cause substantial gain or loss to the investors.

The investor should have competence and skill in the revision of the portfolio. The portfolio management process needs frequent changes in the composition of stocks and bonds. In securities, the type of securities to be held should be revised according to the portfolio policy.

An investor purchases stock according to his objectives and return risk framework. The prices of stock that he purchases fluctuate, each stock having its own cycle of fluctuations. These price fluctuations may be related to economic activity in a country or due to other changed circumstances in the market.

If an investor is able to forecast these changes by developing a framework for the future through careful analysis of the behavior and movement of stock prices is in a position to make higher profit than if he was to simply buy securities and hold them through the process of diversification. Mechanical methods are adopted to earn better profit through proper timing. The investor uses formula plans to help him in making decisions for the future by exploiting the fluctuations in prices.

FORMULA PLANS:

The formula plans provide the basic rules and regulations for the purchase and sale of securities. The amount to be spent on the different types of securities is fixed. The amount may be fixed either in constant or variable ratio. This depends on the investor‘s attitude towards risk and return. The commonly used formula plans are

i. Average Rupee Plan
ii. Constant Rupee Plan
iii. Constant Ratio Plan
iv. Variable Ratio Plan

ADVANTAGES:

- Basic rules and regulations for the purchase and sale of securities are provided.
- The rules and regulations are rigid and help to overcome human emotion.
- The investor can earn higher profits by adopting the plans.
- A course of action is formulated according to the investor‘s objectives.
- It controls the buying and selling of securities by the investor.
- It is useful for taking decisions on the timing of investments.

DISADVANTAGES:

- The formula plan does not help the selection of the security. The selection of the security has to be done either on the basis of the fundamental or technical analysis.
- It is strict and not flexible with the inherent problem of adjustment.

- The formula plans should be applied for long periods, otherwise the transaction cost may be high.

Even if the investor adopts the formula plan, he needs forecasting. Market forecasting helps him to identify the best stocks.

ANALYSIS & INTERPRETION

CALCULATION OF AVERAGE RETURN OF COMPANIES:

Average Return = (R)/N

ITC LTD:

ear	Opening share price (P0)	Closing share price (P1)	(P1-P0)	(P1-P0)/ P0*100
2002-2003	696.70	628.25	-68.45	-9.82
2003-2004	628.25	1043.10	414.85	66.03
2004-2005	1043.10	1342.05	298.95	28.66
2005-2006	1342.05	2932	1589.95	118.47
2006-2007	195.15	151.15	-44	-22.55
TOTAL RETURN				**180.79**

Average Return = 180.79/5 = 36.16

DR REDDY LABORATORIES LTD:

Year	Opening share price (P0)	Closing share price (P1)	(P1-P0)	(P1-P0)/ P0*100
2002-2003	1090.95	916.30	-174.65	-16.00
2003-2004	916.30	974.35	58.2	6.33
2004-2005	974.35	739.15	23.52	-24.14
2005-2006	739.15	1,421.40	682.25	92.30
2006-2007	1,421.40	1456.55	35.15	2.47
TOTAL RETURN				**60.96**

Average Return = 60.96/5 = 12.19

ACC:

Year	Opening share price (P0)	Closing share price (P1)	(P1-P0)	(P1-P0)/ P0*100
2002-2003	153.40	138.50	-14.19	-9.7
2003-2004	138.50	254.65	116.15	83.86
2004-2005	254.65	360.55	105.9	41.58
2005-2006	360.55	782.20	421.61	116.95
2006-2007	782.20	735.25	-46.95	-6.00
TOTAL RETURN				**226.8**

Average Return = 226.8/5 = 45.36

BHARAT HEAVY ELECTRICALS LTD:

Year	Opening share price (P0)	Closing share price (P1)	(P1-P0)	(P1-P0)/ P0*100
2002-2003	169.00	223.15	54.15	32.04
2003-2004	223.15	604.35	38.12	170.83
2004-2005	604.35	766.40	162.05	26.81
2005-2006	766.40	2241.95	1475.55	192.53
2006-2007	2241.95	2261.35	19.4	0.87
TOTAL RETURN				**423.08**

Average Return = 423.08/5 = 84.62

HEROHONDA AUTOMOBILES LIMITED:

Year	Opening share price (P0)	Closing share price (P1)	(P1-P0)	(P1-P0)/ P0*100
2002-2003	338.55	188.20	-150.35	-44.40
2003-2004	188.20	490.60	302.40	160.68
2004-2005	490.60	548.00	57.40	11.70
2005-2006	548.00	890.45	342.45	62.50
2006-2007	890.45	688.75	-20.17	-22.65
TOTAL RETURN				**167.82**

Average Return = 167.82/5 = 33.56

WIPRO:

Year	Opening share price (P0)	Closing share price (P1)	(P1-P0)	(P1-P0)/ P0*100
2002-2003	1,700.60	1233.45	-467.15	-27.47
2003-2004	1,233.45	1361.20	127.75	10.36
2004-2005	1,361.20	2,012	650.8	47.87
2005-2006	670.95	559.7	-111.25	-16.58
2006-2007	559.70	559.40	-0.3	-0.05
TOTAL RETURN				**14.13**

Average Return = 14.13/5 = 2.83

CALCULATION OF STANDARD DEVIATION:

Standard Deviation = $\sqrt{\text{Variance}}$

Variance = $1/n\ (R-R)^2$

ITC LTD:

Year	Return (R)	Avg. Return ($\bar{R}$)	($R-\bar{R}$)	$(R-\bar{R})^2$
2002-2003	-9.82	36.16	-45.98	2114.16
2003-2004	66.03	36.16	29.87	892.22
2003-2004	28.66	36.16	-7.5	56.25
2004-2005	118.47	36.16	82.31	6775
2005-2006	-22.55	36.16	-58.71	3447
TOTAL				**13284**

Variance = $1/n\ (R-R)^2$ = 1/5 (13284) = 2656.8

Standard Deviation = $\sqrt{\text{Variance}}$ = $\sqrt{2656.8}$ = 51.54

DR. REDDY:

Year	Return (R)	Avg. Return ($\bar{R}$)	($R-\bar{R}$)	$(R-\bar{R})^2$
2002-2003	-16.00	12.19	-28.19	795
2003-2004	6.33	12.19	-5.86	34
2004-2005	-24.14	12.19	-36.33	1320
2005-2006	92.30	12.19	80.11	6418
2006-2007	2,47	12.19	-9.72	94
TOTAL				**8,661**

Variance = 1/n-1 $(R-R)^2$ = 1/5 (8,661) = 1732.2

Standard Deviation = $\sqrt{\text{Variance}}$ = $\sqrt{1732.2}$ = 41.62

ACC:

Year	Return (R)	Avg. Return ($\bar{R}$)	($R-\bar{R}$)	$(R-\bar{R})^2$
2002-2003	-9.7	45.36	-55.06	3032
2003-2004	83.86	45.36	38.5	1482
2004-2005	41.58	45.36	-3.78	13.69
2005-2006	116.95	45.36	71.59	5125
2006-2007	-6.00	45.36	-51.36	2638
TOTAL				**12,291**

Variance = 1/n-1 $(R-R)^2$ = 1/5 (12,291) = 2458

Standard Deviation = $\sqrt{\text{Variance}}$ = $\sqrt{2458}$ = 49.58

WIPRO:

Year	Return (R)	Avg. Return ($\bar{R}$)	($R-\bar{R}$)	$(R-\bar{R})^2$
2002-2003	-27.47	2.83	-30.29	917
2003-2004	10.36	2.83	7.53	57
2004-2005	47.87	2.83	45.04	2029
2005-2006	-16.58	2.83	-19.41	377
2006-2007	-0.05	2.83	-2.88	8
TOTAL				**3388**

Variance = 1/n-1 $(R-R)^2$ = 1/5 (3388) = 847

Standard Deviation = $\sqrt{\text{Variance}}$ = $\sqrt{847}$

=33.09

BHEL:

Year	Return (R)	Avg. Return ($\bar{R}$)	($R-\bar{R}$)	$(R-\bar{R})^2$
2002-2003	32.04	84.62	-52.58	2765
2003-2004	170.83	84.62	86.21	7432
2004-2005	26.81	84.62	-57.81	3342
2005-2006	192.53	84.62	107.91	11645
2006-2007	0.87	84.62	-83.75	7014
TOTAL				**32,198**

Variance = 1/n-1 $(R-R)^2$ = 1/5 (32198) = 6440

Standard Deviation = $\sqrt{\text{Variance}}$ = $\sqrt{6440}$ = 80.25

HERO HONDA:

Year	Return (R)	Avg. Return ($\overline{R}$)	($R-\overline{R}$)	$(R-\overline{R})^2$
2002-2003	-44.40	33.56	-77.97	6079
2002-2003	160.68	33.56	127.12	16160
2004-2005	11.70	33.56	-21.86	478
2005-2006	62.50	33.56	28.94	838
2006-2007	-22.65	33.65	-56.21	3160
TOTAL				**26,715**

Variance = 1/n-1 $(R-R)^2$ = 1/5 (26,715) = 5343

Standard Deviation = Variance = $\sqrt{5343}$ = 73.09

CALCULATION OF CORRELATION:

Covariance (COV ab) = 1/n ($\overline{R}A-RA$)($\overline{R}B-RB$)
Correlation Coefficient = COV ab/αa*α b

i. ACC (RA) & ITC (RB)

YEAR	($RA-\overline{RA}$)	($RB-\overline{RB}$)	($RA-\overline{RA}$) ($RB-\overline{RB}$)
2002-2003	-55.06	-45.98	2532
2003-2004	38.5	29.87	1149.99
2004-2005	-3.78	-7.5	28.35
2005-2006	71.59	82.31	5892.57
2006-2007	-51.36	-58.71	3015
		TOTAL	**12617.9**

Covariance (COV ab) = 1/5 (12617.9) = 2523.58

Correlation Coefficient = COV ab/αa*α b
αa = 49.57 ; αb = 51.54
= 2523.58/(49.57)(51.54) = 0.98

ii) *ACC (RA) & WIPRO (RB)*

YEAR	(RA-$\overline{RA}$)	(RB-$\overline{RB}$)	(RA-$\overline{RA}$) (RB-$\overline{RB}$)
2002-2003	-52.58	-77.97	4099.66
2003-2004	86.21	127.12	10959.01
2004-2005	-57.81	-21.86	1263.72
2005-2006	107.91	28.94	3122.91
2006-2007	-83.75	-56.21	4707.58
TOTAL			**24152.88**

Covariance (COV ab) = 1/5 (24152.88) = 4830.57

Correlation Coefficient = COV ab/αa*α b

αa = 26 ; αb = 41.62

= 4830.57/(80.25)(73.09) = 0.82

iii. WIPRO (RA) & DR REDDY (RB)

YEAR	(RA-$\overline{RA}$)	(RB-$\overline{RB}$)	(RA-$\overline{RA}$) (RB-$\overline{RB}$)
2002-2003	-30.29	-28.19	853.87
2003-2004	7.53	-5.86	-44.12
2004-2005	44.98	-36.33	-1634.12
2005-2006	-19.41	80.11	-1554.93
2006-2007	-2.88	-9.72	27.99
TOTAL			**-2351.31**

Covariance (COV ab) = 1/5 (-2351.31) = 470.26

Correlation Coefficient = COV ab/αa*α b

αa = 26.00 ; αb = 41.62

= -470.26/(26.00)(41.62) = -0.43

v. ***ITC (RA) & BHEL (RB)***

YEAR	(RA-$\overline{RA}$)	(RB-$\overline{RB}$)	(RA-$\overline{RA}$) (RB-$\overline{RB}$)
2002-2003	-45.98	-52.58	2417.63
2003-2004	-29.87	86.21	-2575.09
2004-2005	-7,5	-57.81	-433.58
2005-2006	82.31	107.91	8882.07
2006-2007	-58.71	-83.75	4916.96
TOTAL			**14075.15**

Covariance (COV ab) = 1/5 (14075.15) = 2815.03

Correlation Coefficient = COV ab/αa*α b

αa = 51.54 ; αb = 80.25

= 2815.03/(51.54)(80.25) = 0.68

v. ***ACC (RA) & BHEL (RB)***

YEAR	(RA-$\overline{RA}$)	(RB-$\overline{RB}$)	(RA-$\overline{RA}$) (RB-$\overline{RB}$)
2002-2003	-55.06	-52.58	2895.05
2003-2004	38.5	86.21	3319.08
2004-2005	-3.7	-57.81	213.89
2005-2006	71.59	107.91	7725.27
2006-2007	-51.3	-83.75	4296.37
TOTAL			**18449.66**

Covariance (COV ab) = 1/5 (18449.66) = 3689.93

Correlation Coefficient = COV ab/αa*α b

$\alpha a = 49.57$; $\alpha b = 80.25$

$= 18449.66/(49.57)(80.25) = 0.92$

2. *Correlation between ACC & other Companies:*

i. ACC (RA) & HEROHONDA (RB)

YEAR	$(RA-\overline{RA})$	$(RB-\overline{RB})$	$(RA-\overline{RA})(RB-\overline{RB})$
2002-2003	-55.06	-77.97	4293.02
2003-2004	38.5	127.12	4894.12
2004-2005	-3.78	-21.86	82.63
2005-2006	71.59	28.94	2071.81
2006-2007	-51.36	-56.21	2886.95
TOTAL			**14228.53**

Covariance (COV ab) = 1/5 (14228.53) = 2845.70

Correlation Coefficient = COV ab/$\alpha a * \alpha$ b

$\alpha a = 49.58$; $\alpha b = 73.04$

$= 2845.70/(49.57)(26.00) = 0.78$

ii. ACC (RA) & WIPRO (RB)

YEAR	$(RA-\overline{RA})$	$(RB-\overline{RB})$	$(RA-\overline{RA})(RB-\overline{RB})$
2002-2003	-55.06	-30.29	1667.77
2003-2004	38.5	7.53	289.90
2004-2005	-3.78	44.98	-170.02
2005-2006	71.59	-19.41	-1389.56
2006-2007	-51.36	-2.88	147.91
TOTAL			**546**

Covariance (COV ab) = 1/5 (546) = 109.2

Correlation Coefficient = COV ab/αa*α b

αa = 49.57; αb = 26.00

= 109.2/(49.57)(26.00) = 0.08

iii. ACC (RA) & DR REDDY (RB)

YEAR	(RA-$\overline{RA}$)	(RB-$\overline{RB}$)	(RA-$\overline{RA}$) (RB-$\overline{RB}$)
2002-2003	-55.06	-28.19	552.14
2003-2004	38.5	-5.86	-225.61
2004-2005	-3.78	-36.33	137.33
2005-2006	71.59	80.11	5735.07
2006-2007	-51.36	-9.72	499.21
TOTAL			**7698.14**

Covariance (COV ab) = 1/5 (7698.14) = 1539.63

Correlation Coefficient = COV ab/αa*α b

αa = 49.57 ; αb = 41.62

= 1539.63/(49.57)(41.62) = 0.74

iv. ITC (RA) & HERO HONDA (RB)

YEAR	(RA-$\overline{RA}$)	(RB-$\overline{RB}$)	(RA-$\overline{RA}$) (RB-$\overline{RB}$)
2002-2003	-45.98	-77.97	3585.06
2003-2004	29.87	127.12	3797.07
2004-2005	-7.5	-21.86	163.95
2005-2006	82.31	28.94	2382.05
2006-2007	-58.71	-56.21	3300.08
TOTAL			**13228.21**

Covariance (COV ab) = 1/5 (13228.21) = 2645.64

Correlation Coefficient = COV ab/αa*α b

αa = 51.54 ; αb = 73.09

= 2645.64/(51.54)(73.09) = 0.70

3. Correlation Between DR REDDY & Other Companies

i. ITC(RA) & WIPRO:

YEAR	(RA-$\overline{RA}$)	(RB-$\overline{RB}$)	(RA-$\overline{RA}$) (RB-$\overline{RB}$)
2002-2003	-16.024	-10.89	174.50
2002-2003	-26.574	-46.94	1,247.38
2003-2004	-3.684	-8.7	32.05
2004-2005	-34.724	-26.98	936.85
2005-2006	81.006	93.53	7,576.49
TOTAL			**9,967.28**

Covariance (COV ab) = 1/5-1 (9967.28) = 2491.82

Correlation Coefficient = COV ab/αa*α b

αa = 46.75 ; αb = 54.48
= 2491.82/(46.75)(54.48) = 0.978

ii. DR. REDDY (RA) & &ITC (RB)

YEAR	(RA-$\overline{RA}$)	(RB-$\overline{RB}$)	(RA-$\overline{RA}$) (RB-$\overline{RB}$)
2002-2003	-28.19	-45.98	1296.17
2003-2004	-5.86	29.87	-175.03
2004-2005	-36.33	-7.5	272.47
2005-2006	80.11	82.31	6593.85
2006-2007	-9.72	-58.71	570.66
TOTAL			**8558.12**

Covariance (COV ab) = 1/5 (8558.12) = 1711.62

Correlation Coefficient = COV ab/αa*α b

YEAR	(RA-$\overline{RA}$)	(RB-$\overline{RB}$)	(RA-$\overline{RA}$) (RB-$\overline{RB}$)
2002-2003	-28.19	-77.97	2197.97
2003-2004	-5.86	127.12	744.92
2004-2005	-36.33	-21.86	794.17
2005-2006	80.11	28.94	2318.38
2006-2007	-9.72	-56.21	546.36
TOTAL			**6601.8**

αa = 41.62 ; αb = 51.54
= 1711.62/(41.62)(51.54) = 0.79

iv. ***DR REDDY (RA) &HEROHONDA(RB)***

Covariance (COV ab) = 1/5 (6601.8) = 1320.36

Correlation Coefficient = COV ab/αa*α b
αa = 41.62 ; αb = 73.09
= 1320.36/(41.62)(73.09)
= 0.43

YEAR	(RA-$\overline{RA}$)	(RB-$\overline{RB}$)	(RA-$\overline{RA}$) (RB-$\overline{RB}$)
2002-2003	-77.97	-30.29	2361.71
2003-2004	127.12	7.53	957.21
2004-2005	-21.86	45.04	-984.57
2005-2006	28.94	-19.41	-561.72
2006-2007	-56.21	-2.88	161.88
TOTAL			**1934.51**

4. Correlation Between HLL & Other Companies

i. HEROHONDA (RA) & WIPRO(RB)

YEAR	(RA-$\overline{RA}$)	(RB-$\overline{RB}$)	(RA-$\overline{RA}$) (RB-$\overline{RB}$)
2002-2003	-28.19	-52.58	1482.23
2003-2004	-5.86	86.21	-505.19
2004-2005	-36.33	-57.81	2100.24
2005-2006	80.11	107.91	8644.67
2006-2007	-9.72	-83.75	814.05
TOTAL			**12536**

Covariance (COV ab) = 1/5 (1934.51) = 386.90
Correlation

Coefficient = COV ab/αa*α b

αa = 73.09; αb = 26.00

= 386.90/(73.09)(26.00) = 0.20

ii. <u>DR REDDY (RA) & BHEL(RB)</u>

Covariance (COV ab) = 1/5 (12536) = 386.90

Correlation Coefficient = COV ab/αa*α b

αa = 41.62; αb = 80.25

= 2507.2/(41.62)(80.25) = 0.93

5. <u>CORRELATION BETWEEN BHEL(RA) & WIPRO(RB)</u>

YEAR	$(RA-\overline{RA})$	$(RB-\overline{RB})$	$(RA-\overline{RA})(RB-\overline{RB})$
2002-2003	-52.58	-30.29	1592.65
2003-2004	86.21	7.53	649.16
2004-2005	-57.81	45.04	-2603.76
2005-2006	107.91	-19.41	-2094.53
2006-2007	-83.75	-2.88	241.2
TOTAL			**-2215.28**

Covariance (COV ab) = 1/5 (-2215.28) = -443.05

Correlation Coefficient = COV ab/αa*α b

αa = 80.25; αb = 26.00

= -443.05/(80.25)(26.00) = -0.21

CALCULATION OF PORTFOLIO WEIGHTS:

FORMULA :

$$Wa = \frac{\sigma b\,[\sigma b-(nab*\sigma a)]}{\sigma a^2 + \sigma b^2 - 2nab*\sigma a*\sigma b}$$

Wb = 1 – Wa

CALCULATION OF WEIGHTS OF ITC & OTHER COMPANIES:

i. ITC(a) & WIPRO (b)

σa = 51.54

σb = 26.00

nab = -0.02

$$Wa = \frac{26.00\,[26.00-(-0.02*51.54)]}{(51.54)^2 + (26.00)^2 - 2(-0.02)*(51.54)*(26.00)}$$

$$Wa = \frac{690}{3386}$$

Wa =0.20

Wb = 1 – Wa

Wb = 1-0.20 = 0.8

ii. <u>HEROHONDA(a) & WIPRO(b)</u>

σa = 73.09
σb = 26.00
nab = 0.20

$$Wa = \frac{26.00\,[26.00-(0.20*73.09)]}{(73.09)^2 + (26.00)^2 - 2(0.20)*(73.09)*(26.00)}$$

$$Wa = \frac{296}{5258}$$

Wa =0.05

Wb = 1 – Wa

Wb = 1-0.05 = 0.95

<u>CALCULATION OF WEIGHTS OF BHEL & WIPRO:</u>

σa = 80.25
σb = 26.00
nab = -0.21

$$Wa = \frac{26.00\,[26.00-(-0.21*80.25)]}{(80.25)^2 + (26.00)^2 - 2(-0.21)*(80.25)*(26.00)}$$

$$Wa = \frac{1114}{7992}$$

Wa =0.14

Wb = 1 – Wa

Wb = 1-0.14 = 0.86

CALCULATION OF WEIGHTS OF WIPRO & OTHE COMPANIES:

i. ACC (a) & ITC (b):

σa = 49.57
σb = 51.54
nab = 0.98

$$Wa = \frac{51.54\,[51.54-(0.98*49.57)]}{(49.57)^2 + (51.54)^2 - 2(0.98)*(49.57)*(51.54)}$$

$$Wa = \frac{152}{106}$$

Wa =1.43

Wb = 1 – Wa

Wb = 1-1.43 = - 0.43

ii. BHEL (a) & HEROHONDA (b)

σa = 80.25
σb = 73.09
nab = 0.82

$$Wa = \frac{73.09\,[73.09-(0.82*80.25)]}{(80.25)^2 + (73.09)^2 - 2(0.82)*(80.25)*(73.09)}$$

Wa = 533

2163

Wa =0.24

Wb = 1 – Wa

Wb = 1-0.24 = 0.76

iii. <u>WIPRO (a) & DR REDYY (b)</u>

σa = 26.00
σb = 41.62
nab = -0.43

$$Wa = \frac{41.62\ [41.62-(-0.43*26.00)]}{(26.00)^2 + (41.62)^2 - 2(-0.43)*(41.62)*(26.00)}$$

$$Wa = \frac{2198}{1477}$$

Wa =1.49

Wb = 1 – Wa

Wb = 1-1.49 = -0.49

iv. <u>ITC (a) & BHEL (b)</u>

σa = 51.54
σb = 80.25
nab = 0.68

$$Wa = \frac{80.25\ [80.25-(0.68*51.54)]}{(51.54)^2 + (80.25)^2 - 2(0.68)*(51.54)*(80.25)}$$

$$Wa = \frac{3628}{3471}$$

Wa =1.04

Wb = 1 – Wa

Wb = 1-1.04 =0.04

v. ACC (a) & BHEL (b)

σa = 49.57
σb = 80.25
nab = 0.92

$$Wa = \frac{80.25\,[80.25-(0.92*49.57)]}{(49.57)^2 + (80.25)^2 - 2(0.92)*(49.57)*(80.25)}$$

$$Wa = \frac{2781}{1577}$$

Wa =1.76

Wb = 1 – Wa

Wb = 1-1.76 = -0.76

CALCULATION OF WEIGHTS OF ACC & OTHER COMPANIES:

iii. ACC (a) & HEROHONDA (b)

σa = 49.57
σb = 73.09
nab = 0.78

$$Wa = \frac{73.09\,[73.09-(0.78*49.57)]}{(49.57)^2 + (73.09)^2 - 2(0.78)*(49.57)*(73.09)}$$

$$Wa = \frac{2516}{2148}$$

Wa =1.17

Wb = 1 – Wa

Wb = 1-1.17 = -0.17

iv. ACC(a) & WIPRO (b)

σa = 49.57
σb = 26.00
nab = 0.08

$$Wa = \frac{26.00\,[26.00-(0.08*49.57)]}{(49.57)^2 + (26.00)^2 - 2(0.08)*(49.57)*(26.00)}$$

$$Wa = \frac{573}{2927}$$

Wa =0.19

Wb = 1 – Wa

Wb = 1-0.19 = 0.81

v. ACC (a) & DR REDDY (b)

σa = 49.57
σb = 41.62
nab = 0.74

$$Wa = \frac{41.62\,[41.62-(0.74*49.57)]}{(49.57)^2 + (41.62)^2 - 2(0.74)*(49.57)*(41.62)}$$

$$Wa = \frac{206}{1136}$$

Wa =0.18

Wb = 1 – Wa

Wb = 1-0.18 = 0.82

vi. ITC(a) & HERO HONDA (b)

σa = 51.54
σb = 73.09
nab = 0.70

$$Wa = \frac{73.09\,[73.09-(0.70*51.54)]}{(51.54)^2 + (73.09)^2 - 2(0.70)*(51.54)*(73.09)}$$

$$Wa = \frac{2706}{2724}$$

Wa =0.99

Wb = 1 – Wa

Wb = 1-0.99 = 0.01

CALCULATION OF WEIGHTS OF DRREDDY & OTHER COMPANIES:

vii. DRREDDY (a) & ITC (b)

σa = 41.62
σb = 51.54
nab = 0.79

$$Wa = \frac{51.54\,[51.54-(0.79*41.62)]}{(41.62)^2 + (51.54)^2 - 2(0.79)*(41.62)*(51.54)}$$

$$Wa = \frac{962}{999}$$

Wa =0.96
Wb = 1 – Wa
Wb = 1-0.96 = 0.04

viii. DRREDDY (a) & HEROHONDA (b)

σa = 41.62
σb = 73.09
nab = 0.43

$$Wa = \frac{73.09\,[73.09-(0.43*41.62)]}{(41.62)^2 + (73.09)^2 - 2(0.43)*(41.62)*(73.09)}$$

$$Wa = \frac{4034}{4458}$$

Wa =0.90

Wb = 1 – Wa

Wb = 1-0.90 = 0.10

ix. DRREDDY (a) & BHEL (b)

σa = 41.62
σb = 80.25
nab = 0.75

$$Wa = \frac{80.25\,[80.25-(0.75*41.62)]}{(41.62)^2 + (80.25)^2 - 2(0.75)*(41.62)*(80.25)}$$

$$Wa = \frac{3935}{3162}$$

Wa =1.24

Wb = 1 – Wa

Wb = 1-1.24 = -0.24

CALCULATION OF PORTFOLIO RISK:

$$R_P = \sigma a^2 * Wa^2 + \sigma b^2 * Wb^2 + 2nab * \sigma a * \sigma b * Wa * Wb$$

CALCULATION OF PORTFOLIO RISK OF WIPRO & OTHER COMPANIES:

i. <u>Wipro (a) & ITC (b):</u>

σa = 33.09
σb = 56.09
= 2/3
= 1/3
Nab = 0.98

$$R_P = \sqrt{(2/3)^2(49.57)^2+(1/3)^2(0.51.54)^2+2(49.57)(51.54)*(0.98)*(2/3)*(1/3)}$$

$$= \sqrt{2505} = 50.04$$

ii. <u>BHEL (a) & HEROHONDA (b)</u>:

σa = 80.25
σb = 73.09
= 2/3
= 1/3
nab = 0.82

$$R_P = \sqrt{(2/3)^2(80.25)^2+(1/3)^2(73.09)^2+2(80.25)(73.09)*(0.82)*(2/3)*(1/3)}$$

$$= \sqrt{5613} = 74.91$$

iii. <u>WIPRO (a) & DR REDDY (b)</u>:

σa = 41.62
σb = 26.00
= 2/3
= 1/3

nab = 0.43

$$R_P = \sqrt{(2/3)^2(41.62)^2+(1/3)^2(26.00)^2+2(41.62)(26.00)*(0.43)*(2/3)*(1/3)}$$

$$= \sqrt{647} = 25.43$$

iv. <u>ITC (a) & BHEL (b)</u>:

σa = 51.54
σb = 80.25
= 1/3
= 2/3
nab = 0.68

$$R_P = \sqrt{(1/3)^2(51.54)^2+(2/3)^2(80.25)^2+2(51.54)(80.25)*(0.68)*(2/3)*(1/3)}$$

$$= \sqrt{4434} = 66.58$$

v. <u>ACC (a) & BHEL (b)</u>:

σa = 49.57
σb = 80.25
= 2/3
=1/3
nab = 0.92

$$R_P = \sqrt{(2/3)^2(49.57)^2+(1/3)^2(80.25)^2+2(49.57)(80.25)*(0.92)*(2/3)*(1/3)}$$

$$= \sqrt{4786} = 69.18$$

I. CALCULATION OF PORTFOLIO RISK OF ACC & OTHER COMPANIES

vi. ACC(a) & HEROHONDA(b):

σa = 49.57
σb = 73.09
= 2/3
= 1/3
nab = 0.78

$$R_P = \sqrt{(2/3)^2(49.57)^2+(1/3)^2(73.09)^2+2(49.57)(73.09)*(0.78)*(2/3)*(1/3)}$$

$$= \sqrt{2944} = 54.25$$

vii. ACC (a) & WIPRO (b):

σa = 49.57
σb = 26.00
= 2/3
= 1/3
nab = 0.08

$$R_P = \sqrt{(2/3)^2(49.57)^2+(1/3)^2(26.00)^2+2(49.57)(26.00)*(0.08)*(2/3)*(1/3)}$$

$$= \sqrt{1226} = 35.01$$

viii. ACC (a) & DR REDDY (b):

σa = 49.57
σb = 41.62
= 2/3
= 1/3
nab = 0.74

$$R_P = \sqrt{(2/3)^2(49.57)^2+(1/3)^2(41.62)^2+2(49.57)(41.62)*(0.74)*(2/3)*(1/3)}$$

$= \sqrt{1972} = 44.40$

ix. ITC (a) & HEROHONDA (b):

σa = 51.54
σb = 73.09
= 2/3
= 1/3
nab = 0.70

$$R_P = \sqrt{(2/3)^2(51.54)^2+(1/3)^2(73.09)^2+2(51.54)(73.09)*(0.70)*(2/3)*(1/3)}$$

$= \sqrt{2949} = 54.30$

II. CALCULATION OF PORTFOLIO RISK OF DR REDDY & OTHER COMPANIES

x. DRREDDY (a) & ITC (b):

σa = 41.62
σb = 51.54
= 1/3
= 2/3
nab = 0.79

$$R_P = \sqrt{(1/3)^2(41.62)^2+(2/3)^2(51.54)^2+2(41.62)(51.54)*(0.79)*(2/3)*(1/3)}$$

$= \sqrt{2135} = 46.2$

xi. DRREDDY (a) & HEROHONDA (b):

σa = 41.62
σb = 73.09

= 1/3
= 2/3
nab = 0.43

$$R_P = \sqrt{(1/3)^2(41.62)^2+(2/3)^2(73.09)^2+2(41.62)(73.09)*(0.43)*(2/3)*(1/3)}$$

$$= \sqrt{3172} = 56.32$$

xii. DRREDDY (a) & BHEL (b):

σa = 41.62
σb = 80.25
= 1/3
= 2/3
nab = 0.878

$$R_P = \sqrt{(1/3)^2(41.62)^2+(2/3)^2(80.25)^2+2(41.62)(80.25)*(0.75)*(2/3)*(1/3)}$$

$$= \sqrt{4197} = 64.78$$

III. CALCULATION OF PORTFOLIO RISK OF ITC & OTHER COMPANIES

xiii. ITC (a) & WIPRO (b):

σa = 51.54
σb = 26.00
= 2/3
= 1/3
nab = -0.02

$$R_P = \sqrt{(2/3)^2(51.54)^2+(1/3)^2(26.00)^2+2(51.54)(26.00)*(26.00)*(2/3)*(1/3)}$$

$$= \sqrt{1281} = 35.79$$

xiv. HEROHONDA (a) & WIPRO (b):

σa = 73.09
σb = 26.00
= 2/3
= 1/3
nab = 0.20

$$R_P = \sqrt{(2/3)^2(73.09)^2+(1/3)^2(26.00)^2+2(73.09)(26.00)*(0.20)*(0.67)*(0.33)}$$

$$=\sqrt{2646} = 51.44$$

IV. CALCULATION OF PORTFOLIO RISK OF BHEL (a) &WIPRO (b)

σa = 80.25
σb = 26.00
=2/3
=1/3
nab = -0.21

$$R_P = \sqrt{(2/3)^2(80.25)^2+(1/3)^2(26.00)^2+2(80.25)(26.00)*(-0.21)*(2/3)*(1/3)}$$

$$=\sqrt{2778} = 52$$

CONCLUSION

For any investment the factors to be considered are the return on the investment and the risk associated with that investment.

Diversification in the investment into different assets can reduce the risk. There fore by following modern portfolio theorem, risk can be reduced for a required return

Reference

.

- www.google.com
- www.wikipedia.com
- www.studymafia.org
- www.pptplanet.com