

CHAPTER - I

INTRODUCTION

1.1 Background of the Study

Investment Decisions are undertaken with the goal of earning some expected rate of return. Investor seeks to minimize inefficient deviation from this expected rate of return. Diversification is essential to the creation of an investment because it can reduce the variability of returns around the expected returns.

Return is the income received in investment. People invest their belongings with an expectation of getting some reward for leaving its liquidity; they only invest in those opportunities where they can get higher return. Hence, investor wants favorable return to be yield by its stock, and go for those, which yield more.

Risk is the facts of life, which is a product of uncertainty and its magnitude depends upon the degree of variability in uncertain cash flows. Risk in fact is an indication of chance of losing investment values. Different people interpret risks in different ways. To some, it is simply a lack of definite outcome, which can be any unknown event, which may be unfavorable. It is a chance of happening some unfavorable event or danger of losing some material value.

Like blood is necessary for human beings, finance is for business organizations and industries. Each and every business organization should base their decision making in financial management. Financial management is mainly concerned with the acquisition and utilization of funds. For this, financial market plays vital role in utilizing financial resource for expanding productive sectors in the

country. It mobilizes unproductive and unutilized financial resources towards productive sectors and helps in expanding economic growth of a country.

Investment in capital markets collect necessary funds and divert the collected funds towards the productive sectors. Due to this, industrialization is possible. Capital market is a significant mechanism for the development of national economy. It reinvigorates and boosts up the economic activities by mobilizing especially domestic financial resources. It provides best investment opportunities by transferring the funds from surplus savings to need based sectors through the transaction of financial instruments.

Financial instruments are traded in securities market. Stock market is the largest financial market all over the world where stocks of various business organizations are traded. It has the greatest role in the development of financial system. Capital market consists of i) Primary Market and ii) Secondary Market.

To know which of the investments are secure and how the investment options are evaluated, all the participants of the investment process should know about investment process and implications of risk and return there in.

Firstly, for investment purpose, investors should set their policy in terms of both risk and return and they should also have to know how quantity risks. In real risky and non risky doesn't provide any concrete data to compare various financial assets and to reach to an ideal decision.

Secondly, to analyze the risk and return of securities, various available tools and techniques must be applied. To design optimal portfolio and to check its performance, investors need risk and return methodology. So, whole process of investment can't be imagined with out this concept.

1.2 History of Capital Market in Nepal

The history of capital market in Nepal dates back to the era of Rana Prime Minister Juddha Samsher Whne Gunjaman Singh, the first secretary at the Nepalese Embassy in England returned back to kathmandu and set up the "Industrial Council".¹ The council drafted the Company Act and Nepal Bank Act for the first time in 1936. The First public floatation of shares in securities market was initiated by Biratnager Jute Mills Ltd. in 1937. There were very few companies in Nepal issuing shares to the general public until another Company Act came into operation in 1951.

During the Panchayat regime (1961-1990), the economy was based on central planning and most of the industries were opened in the public sector. Various control measures were adopted providing with difficult rules and regulations required registering companies and thus private sector was eventually discouraged. There were only two financial institutions, Nepal Industrial Development Corporation and Agriculture Development Bank, in existence to finance industrial and agricultural projects along with the two domestic commercial banks. The Government approach during this period was to expand banking services to remote villages of the nation in order to encourage agriculture production, small scale industry and service sector in the economy. Corporate industries involving huge capital investment were opened in public sector. Since there was no industrial development, revenue was collected in meager amount and that too was based broadly on imports. Resources were collected from the private sector by issuing Government Bonds. No industrial environment was created in the country to set up corporate undertakings in the private sector Private sector productive saving were transferred to the more inefficient government sector by issuing government securities. As such, deficit financing through public borrowing was one of the major fiscal instruments used by the Government.

¹ Nepal Rastra Bank, Research Depart. Economic Review Occasional paper, April 2001, number 13

In the absence of developed securities market in Nepal, the government was the sole issuing authority of development bonds and National Saving Certificates. Therefore the securities generally floated in the market were mainly the Government securities. Nepal Rastra Bank as the central bank is responsible to mobilize resources, on behalf of the government, to finance development activities and manage public debt under the Public Debt. Act. Accordingly Nepal Rastra Bank has been managing the issue of short term treasury bills and various types of development bonds to collect public debt for the Government from time to time. Ninety-one day Treasury Bills of Rs. 7 million were issued for the first time during June/July 1962. The Government floated 6% Development Bond of Rs 13.1 million with a maturity period of five years for the first time on February 12, 1964. In 1965, 3% compensation Bonds with a maturity period of 10 years were issued for the acquisition of Birta Land and 1% Compensation Bonds with a maturity of 20 years issued for the acquisition of private forests. Non-interest bearing Prize Bonds of Rs. 861 thousand were also issued to individuals in 1969. Nepal Rastra Bank makes arrangement for the issue, register, purchase and sale, transfer of ownership and redemption of government bonds and debentures. Therefore, Government securities are fully traded under the management and supervision of Nepal Rastra Bank. Altogether 36 public enterprises were established through subscription of shares under the companies Act during 1960 -1975. The Government had dominant control as to the capital investment and management in most of those companies. Many companies were later on either liquidated or sold to private parties. Some of the prominent companies are still in operation under public sector while a few of them are in the process of privatization. Most of the companies were incorporated either under the full ownership of the government or under joint investment with the private sector. The role of private sector expect in the operation of few small scale industries was almost nil during that period.

The government converted the Securities Exchange Center (SEC) into Nepal Stock Exchange Ltd. (NEPSE) in 1993 under the provision of securities Exchange Act. 1983. When the SEC came into existence, it started managing new issues of shares and debentures according to the Guidelines for new Issues and Sales Management, 1986.

After the formation of SEBO and conversion of SEC into NEPSE, brokers and market makers operate on the trading floor as per the Securities Exchange Act, Rules and Byelaws of NEPSE. NEPSE began its trading operation as a secondary market on 13 January 1994 through its licensed members. Currently it has 27 member brokers and 2 market makers operation o its trading floor. Altogether 110 companies have listed their shares to make them eligible for trading in the secondary market.

1.3 Portfolio Management

Portfolio management is concerned with efficient management of portfolio investment in financial assets, including shares and debentures of companies. The management may be by professionals, by others or by individuals themselves. A portfolio is a combination of investment assets. The portfolio is the holding of securities and investment in financial assets i.e. bond, stock. Individual securities have risk-return characteristics of their own. Portfolios may or may not take on the aggregate characteristics of their individual part. Portfolio analysis thus takes the ingredients of effects of combining securities and considers the blending or interactive effects of combining securities.

"Portfolio management is the art of handling a pool of funds so that it not only preserves its original worth but also over time appreciates in value and yields and adequate returns consistent with the level of risk assumed."²

² BC Feorge & et all, Investment Analysis and portfolio Management. 3rd ed.(USA: Richard D. Irwin, 1999). p. 591

The objective of portfolio management is to analyze different individual assets and delineate efficient portfolios. Specifically, portfolio management will have the following objectives.

There are two types of objectives of portfolio

Primary Objectives	Secondary Objectives
Maximization of Profit Minimization of Risk	Regular Return Stable Income Appreciation of Capital Ever Liquidity Easy Marketability Safety of Investment Tax Benefits

1.4 Portfolio Risk and Return

Investment is made with the goal of earning some expected rate of return. Investors seek to minimize inefficient deviations from this expected rate to return. To minimize inefficient deviations, diversification is essential to the creation of an efficient investment as it can reduce the variability of returns around the expected return.

Diversification means dividing available assets across a number of different securities. The key to diversification is the correlation across the securities.

The portfolio is seeing the efficient investment with two kind of statistic expected return statistic and risk statistic. The objectives of the portfolio is always is to develop a portfolio that has the maximum return at whatever level of risk the investor deems appropriate. Portfolio theory was originally proposed by Harry M. Markowitz. Professor of Finance Harry Markowitz began a revolution by suggestion that the value of a security to an investor might best

be evaluated by its mean return, its standard deviation (risk) and its correlation to other securities in the portfolio.

Diversification is important for every investor. In fact, it is so important that Harry Markowitz won the Nobel Prize of 1990 largely for his work on diversification.

The essence of portfolio theory can be simply stated. The two characteristics of interest are the expected return from the portfolio and the risk. Regarding the risk of the portfolio, the whole (the risk characteristics of the portfolio) is unequal to the sum of the parts (the risk characteristics of the individual assets).

Expected Portfolio Return

The expected portfolio return is the weighted average expected return of assets included in the portfolio, where the weights are the proportion of investment initially made in each asset included in the portfolio.

The expected return of a portfolio $E(R_p)$, is calculated as:

$$\text{Expected Portfolio Return} = E(R_p) = \sum_{j=1}^n X_j E(R_j)$$

Portfolio Risk

Total portfolio risk is measured by the variance of the portfolio's rate of return distribution. The portfolio risk depends on the risk of the individual securities and the covariance between the return of the individual securities. The risk (variance of returns) from a portfolio made up assets is defined as:

$$\text{Portfolio Risk} = (\text{Var})(R_p) = \sum_{i=1}^n \sum_{j=1}^n X_i X_j \sigma_{ij}$$

Where,

X_i = proportion of investment in security i

X_j = proportion of investment in security j

ρ_{ij} = correlation coefficient between I and j securities

σ_i = standard deviation of security i

σ_j = standard deviation of security j

1.5 Focus of the Study

In our society people are interest to invest on stock market but they don't realize that investment is always associated with risk also. Therefore an investor must consider risk too before making an investment decision. Nepalese investors don't seem to be investing their funds in stocks of different places i.e. portfolio creation is not found in Nepalese context. In this regard portfolio management is crucial for the minimization of risk associated to the return of their investment.

Hence, the study is mainly focused on the risk and return of the portfolios consisting of the securities of different listed commercial banks in NEPSE. It provides the consolidated basic data and information about the NEPSE and commercial banks under study. Similarly it makes on reflect the picture of NEPSE in terms of private banking sector. Lastly it would be great help to guide the investors.

1.6 Statement of the Problem

Traditional investment analysis emphasizes the projection of price and dividends. That is, the potential price of a firm's common stock and the future dividend stream are forecast, and then discounted back to the present. The intrinsic value is then compared with the security's current market price. If the

current market price is below the intrinsic value, a purchase is recommended. Conversely, if the current market price is above this intrinsic value, a sale is recommended.

Although modern security analysis is deeply rooted in the fundamental concepts just outlined, the emphasis has shifted. The more modern approach to common stock analysis emphasizes risk and return estimates rather than mere price and dividend estimates. The risk and return estimates are dependent on the share price and the accompanying dividend stream.

People assume that there is more risk in stock investment than its real risk. So it is necessary to analyze in the field is a must. Unavailability of clear and simple technique to analyze risk associated with return is also constraint.

Theory depicts that the stock price in market is guided by intrinsic value, which is calculated by and of company's required rate of return and growth. In an efficient market condition, stock price is equal to the intrinsic value since the buyer and the seller are fully aware of the facts and figures of the company.

Therefore, one can say that market price and financial performance are positively correlated but conditions here are totally different from that. Whatever the theory depicted is not applicable in our context, where most of the investors do not know to interpret the information and so they can make an irrational decision, regarding transaction of the stock. Therefore stock price in Nepal is determined more by other factors than the financial performance of the concerned people. People feel more risk in stock investment than real risk. Investors will be helped to build their confidence, to create optimal portfolio, to find easy tools and techniques to analyze risk and return of individual stock and portfolio, to increase stock investment and stock market efficiency.

The study is directed to resolve the following issues.

- a. How the investment decisions are to be taken?
- b. Does the risk and return of common stock investment of different companies vary significantly?
- c. To what extent there is systematic risk in relation to total risk?
- d. Would portfolio construction between different companies be Profitable?
- e. What is the current portfolio situation in Nepal?

1.7 Objectives of the Study

Nepalese investors are facing various aforementioned problems in setting their investment policies, evaluating financial assets, constructing portfolio and revising and analyzing their portfolio performance. The key objectives of the study revolve around the subject of finding out risk minimizing tools and techniques in relation to certain financial as well as other constraints. The main and basic objective of this study is to estimate an optimal portfolio among CS investment of different companies. However, the objectives are as below:

- i) To evaluate common stock of different companies in terms of risk and return.
- ii) To analyze an optimal portfolio among Common Stock investment of different companies.
- iii) To indicate whether the shares of different companies in Nepal are overpriced or under priced by analyzing the risk and return characteristics of the individual shares
- iv) To evaluate the systematic and unsystematic risk associated with security under study.
- v) To analyze the current portfolio situation of companies in Nepal.

1.8 Significance of the Study

Due to lack of knowledge, investors are investing in shares following trail and error approach, so it is necessary to establish clear picture about the return from investing in securities. Not only risk and return the variability in return is also to be addressed. These factors i.e. risk and return are the most important factors influencing investment decisions and process.

Because most of public investors i.e. existing and potential are not well known about the real financial strengths and weakness of the public companies in which they are investing or going to invest their funds.

This study is focused in the risk and returns analysis of individual companies and estimated on optimal portfolio among Common stock investment of listed companies.

Therefore, to provide basic and necessary information about investment and investment process, the current study is forwarded. This current study will help to take an appropriate decision about how to set investment policies and how to analyze and evaluate the investment worthwhile over the different time period. The focus of the study is on the analysis of risk return and portfolio, which will enable all the related investors to guide the investment related activities.

Benefits of the study will receive by security businesspersons, issue manager, brokers, marketing managers and general investors.

1.9 Limitation of the Study

This research work is not able to study the whole Nepalese capital market in detail due to various reasons. The study concentrates only on the selected different companies that are listed in NEPSE. Therefore, this study is not free from the limitations. The major limitations of the study are as follows:

- a. The overall study is based on the secondary data. So the incorrectness of the key source might affect the accuracy of the outcome of the study.
- b. Data of FY 2002/03 to 2006/07 are used for the study.
- c. Mainly the study is concentrated on risk, return and portfolio estimation of selected companies.
- d. Among the different financial assets, only common stock is taken for the purpose of the study.
- e. There is time constraint as it is only a study to fulfill partial requirement of MBS Degree.

1.10 Organization of the Study

The study will be organized in five different chapters, which are as follows:

Chapter 1 – Introduction: It includes general Introduction, Statement of the Problems, Objectives of the study, Importance of the study, and Limitation of the study and Organization of the study.

Chapter 2 - Review of Literature: This chapter is devoted for the brief review of literature available. Review from books, journals, thesis and conceptual / theoretical review are included.

Chapter 3 - Research methodology: This includes the research methodology employed to achieve the objectives of the study. Under this, research design, population and sample, sources of data, data collection technique, data analysis tools and limitation of the methodology.

Chapter 4 - Data presentation, analysis and interpretation: In this section, data collection from the various relevant sources is presented and analyzed using various statistical and financial methods. Additionally this will also include the major findings of the study.

Chapter 5 - Summary, conclusion and recommendations: This chapter is for major findings, summary, conclusions and recommendations based on the above analysis. Bibliography and appendices are incorporated at the end of the study.

CHAPTER - II

REVIEW OF LITERATURE

This chapter deals with the theoretical aspect of the topic risk return and portfolio analysis in comprehensive, detail and descriptive manner. For this purpose journals, articles and some research reports related with this topic have been reviewed because of the limitation of the material related to this topic, almost all books related with this topic published in other countries are reviewed. Being in its infancy, stock market of Nepal may not provide sufficient and adequate information related with this research, some independent studies carried out by well known financial experts are taken in to consideration.

2.1 Theoretical Review

Before getting into the core subject matter, it is necessary to have general knowledge of risk, return and portfolio. Major focus is on the investment of common stock and its impact on individual risk, return, and portfolio.

2.1.1 Investment

An investment involves sacrifice of current rupees for future rupees. The sacrifice takes place in the present and is certain. The reward comes later and is uncertain. Investment generally involves real assets or financial assets. Real assets are tangible, material things such as building, automobiles, machinery, factories and text books. Financial assets are piece of paper representing an indirect claim to real assets held by someone else. These pieces of paper represent debt or equity commitments in the form of IOUS (written documents providing evidence of debt) or stock certificates.

Real Assets are generally less liquid than financial assets. Returns on real assets are frequently moved difficult to measure accurately. But our principal

concern is with financial assets. Investment is an exchange of financial claim stocks and bonds etc. Investment is the employment of funds with an aim of achieving additional income or growth in value. It involves the commitment of resources that have been saved or put away from current consumption in the hope that some benefits will occur in the future. Investment involves long term commitment and waiting for a reward. Investment may be defined as the purchase by an individual or institutional investor for financial or real assets that produces a return proportional to the risk assumed over some future investment period.

Investment process

Investment process describes how an investor should go about making decision with regard to what marketable securities to invest in, how extensive the investment should be, and when the investment should be made. The formal investment process includes³

-) Set Investment policy
-) Perform Security Analysis
-) Construct a Portfolio
-) Revise the Portfolio
-) Evaluate the Performance of the Portfolio

2.1.2 Common Stock

Common equity in a corporation or partnership or proprietorship interests in a unincorporated firm constitute the first source of funds to a new business and the base

of support for borrowing by existing firms.⁴ There are different instruments that include a capital structure such as common stock, preference stock, debt and so

³ Willian F. Sharpe et al, Investments. (New Delhi: Prentice Hall of India, 2002), pp. 11-14

⁴ J. Fred Weston & Thomas E. Copeland, "*Managerial Finance*", 9th Ed. (p. 931), New York: The Dryden Press.

on. The most important one is common share or equity share or ordinary share. Common stock represents the ownership position in a corporation. Common stock is the first security of a corporation to be issued and in case of bankruptcy, the last to retired. They have the lowest priority claim on earning and assets of all securities issue. Common stockholders have the power to elect the board of directors. Common stocks are generally fully pain and non-assessable i.e. the common stockholders may lose their initial investment, not more which means stockholders have limited liability to the share that they hold. In case of liquidity or bankruptcy, common stockholders are in the principal entitled only to assets remaining after all prior claimants have been satisfied. As expressed above, common stock is the most risky security, so, must be in its expected return as well. When investors buy common stock, they receive certificate of ownership as a part of there being part owners of the company. The certificate states the number of shares purchased and their par value.”⁵

“Common stock has one important investment characteristic and one important speculative market price tends increase irregularly but persistently over the decades as their net worth builds through the reinvestment of undistributed earning. However, most of the time common stocks are subject to irrational and excessive price function in both directions, as the consequence of the ingrained tendency of most people to speculative or gamble, i.e. to give way to hope fear and greed.”⁶

“Of all the other forms of securities, common stock appears to be the most romantic, while fixed income investment avenue may be more important to most of the investors, equity shares seems to capture their interest the most. The potential reward and penalties associated with the equity make them an

⁵ V. K. Bhalla (2000), “*Financial Management*”, 5th Ed. (p. 196), New Delhi: Prentice Hall of India.

⁶ J. Fred Western and Eugene F. Fama (1999), “*Managerial Finance*”, (pp. 93-94), Hold Saunders Internation Editions.

interesting even exciting proportion, no wonder, equity investment is a favorite topic for conversation in parties and get together.”⁷

Common stock holders of a corporation are its residual owners, their claim to income and assets comes after creditors and preferred stock holders have been paid in full. As a result, a stockholders return on investment is less certain than the return to lenders or to preferred stockholders. On the other hand, the shares of a common stock can be authorized either with or without par value. The par value of a stock is merely a stated figure in the corporate charter and is of little economic significance. A company should not issue stock at a price less than par value because stockholders who bought stock for less than par value would be liable to creditors for the difference between the below par price they paid and the par value.⁸

2.1.3 Return on Common Stock

Holding period Return

The investment return is defined as the after-tax increase in the value of the initial investment. The increase in value can come from two sources: a direct cash payment to the investor or an increase in the market value of the investment relative to the original purchase price. The rate of return over the holding period, or holding period return (HPR) is computed as:

$$\text{HPR} = \frac{\text{Ending price}-\text{Beginning Price}+ \text{Cash Receipts}}{\text{Beginning Price}}$$

Annualized Holding Period Return

HPRs are reported as an annual equivalent. One possible measure of annualized HR might be the average of several HPRs such as;

⁷ Chandra Prasanna (1995), "*The Investment Game*", 6th Ed. (p. 16), New Delhi: Tata McGraw- Hill Publishing Company Ltd.

⁸ James C. Van Horne (1997), "*Financial Management and Policy*", 7th Ed. (p. 560), New Delhi: Prentice Hall of India.

$$\frac{r}{t-1} (\text{HPR}_t)$$

$$n$$

However, the simple arithmetic averaging ignores the compounding effect that results if the first period's return is reinvested. In addition, the result of an arithmetic average return can be distorted if there are large differences in the rate of returns across time periods. Large differences in the periodic rates of return over longer investment horizons will cause the arithmetic rate of return to be misleading.

The geometric mean rate of return doesn't suffer from this law. The geometric mean rate to return, HPR_g , is defined as the rate of return that would make the initial investment equal to the ending investment value. Annualized rate to return is calculated as:

$$\text{Annual Rate of Return}(R) = (1 + \text{HPR})^{1/n} - 1$$

Expected Rate of Return

The expected rate of return is based upon the expected cash receipts (e.g. dividends or interest) over the holding period and expected ending or selling price. The expected rate of return is an ex-ante or unknown future return.

The investor has forecast possible outcomes, each based upon a possible state of the economy. Each economic state will result in a different expected rate of return. Subjective probabilities are assigned to each outcome. The overall expected rate of return, $E(\text{HPR})$ can be calculated as a weighted average of the three forecasts:

$$E(\mathbf{R}) = \sum_{j=1}^n P_j \times R_j$$

Required Rate of Return

When setting the required rate of return on an investment, an investor must consider the real rate of return, expected inflation, and risk. Because consumption is foregone today, the investor is entitled to a rate of return that compensates for this deferred consumption. Since the investor expects to receive an increase in the real goods purchased later, and assuming for the moment, zero inflation and risk, the required rate could equal the real rate of return, in which case it would represent the pure time value of money. The capital markets determine this rate based upon the supply of money to be invested relative to the demand for borrowed money.⁹

The required rate of return is the minimum rate of return that an investor expects from his or her investment in risky assets. It is determined by CAPM /SML

The required rate of return is determined by using CAPM /SML

$$\text{Required Rate of Return (k)} = R_f + (R_f - R_m)$$

2.1.4 Risk on Common Stock

If one is going to invest in common stock, he/she is also going to face some risk for future return. High return on common stock involves high risk and vice-versa.

“The risk is defined in Webster’s Dictionary as ‘a hazard: A peril: exposure to loss or injury; thus for most, risk refers to the chance that some unfavorable event will occur. If you invest in speculative stocks (or, really, any stock), you are taking a risk in the hope of making an appreciable return.”¹⁰

⁹ John M cheney & Deward A.Moses. Fundamentals of Investments, Fifth edition (New York west publishing company, 1995) p.

¹⁰ J. Fred Weston & Eugene F. Brigham (1995), “*Managerial Finance*” 7th Ed. (pp. 182-183), New York: The Dryden Press.

“Risk, defined more generally, is a probability the occurrence of unfavorable outcome. But risk has different meaning in different contexts. In our context two measures developed from the probability distribution have been used as initial measures of return and risk. They are the mean and standard deviation of the probability distribution.”¹¹

Some of sources of uncertainty that contribute to risk of investment are cited below:¹²

- **Interest rate risk**

Interest rate risk is potential variability of return caused by changes in the market interest rate. If market interest rates rise, then, investments’ values and market price will fall and vice versa. The variability of return that results is interest rate risk. This interest rate risk affects the prices of bonds, stock, etc.

- **Purchasing power risk**

Purchasing power risk is the variability of return an investor suffers because of inflation. When inflation takes place, financial assets such as cash, stocks, bonds, etc. may lose their ability to command the same amount of real goods and services they did in the past. The real rate of return on financial assets may not adequately compensate the holder of financial assets for inflation.

- **Bull-Bear market risk**

When a security index rises fairly consistently from a low point for a period of time, this upward trend is called a bull market. The bull market ends when the market index reaches a peak and starts a downward trend. The period during which the market declines to the next trough is called a bear market.

¹¹ Ibid. Weston and Brigham, p. 183

¹² Jack Clark Francis, "*Investment: Analysis & Management*", 7th Ed. (p. 3), New York: McGraw- Hill Inc.

- **Management risk**

Though many top executives earn princely salaries, occupy luxurious offices, and wield enormous power within their organizations, they are mortal and capable of making a mistake or a poor decision. Furthermore, errors made by business managers can harm those who invested in their firms. Hence, it also is capable of poring risk to investment.

- **Default risk**

Default risk is the portion of an investments total risk that results from changes in the financial integrity of the investment. For instance, when a company that issues securities moves further away from bankruptcy or closer to it, these changes in the firms financial integrity will be reflected in the market price of its securities. The variability of return that investors experience as a result of changes in the creditworthiness of a firm in which they invested is their default risk.

- **Liquidity risk**

Liquidity risk is the portion of an asset's total variability of return that results from price discounts given or sales commission paid in order to sell the asset without delay. Perfectly liquid assets are highly marketable and suffer no liquidation costs. Illiquid assets are not readily marketable- either price discounts must be given or sales commission must be paid, or both of these costs must be incurred by the seller.

- **Callability risk**

Some bonds and preference stocks are issued with a provision that allows the issuer to call them in for repurchase. The portion of a security's total variability of return that derives from the possibility that the issue may be called is the callability risk.

- **Convertibility risk**

Convertibility risk is that portion of the total variability of return from a convertible bond or a convertible preferred stock.

- **Political risk**

The portion of an asset's total variability of return caused by changes in the political environment that affect the asset's market value.

- **Industry risk**

An industry is a group of companies that compete with each other to market a homogenous product. Industry risk is that portion of an investment's total variability of return caused by events that affect the products and firms that make up an industry

2.1.4.1 The Range

The range is one of the traditional methods of measuring risk, which simply communicates the difference between the best possible returns and the worst possible return; it does not provide information about the distribution of the rates of return between the extremes.

$$\text{Range} = \text{Best possible rate of return} - \text{Worst possible rate of return}$$

The degree of risk of an underlying security is reflected in the magnitude of the differences. The smaller the difference the lower will be degree of risk.”¹³

2.1.4.2 Standard Deviation

Standard deviation is another parameter of return distribution measurement. It measures the tightness or variability of a set of outcomes. In another word, standard deviation measures the magnitude of the difference between best

¹³ Narayan Prasad Poudel (2001), "A study on share price movements of joint Venture commercial banks in Nepal", an unpublished Master's Degree Thesis, T.U.

possible return and worst possible return. Thus, it measures the degree of risk of common stock. Because we have defined risk as the variability of returns, we can measure risk by examining the tightness of the probability distribution associated with the possible outcomes. In general, the width of a probability distribution indicates the amount of scatter, or variability, of the possible outcomes. Therefore, the higher the probability distribution of expected returns, the less is its variability. Thus, the smaller the risk associated with the investment".¹⁴ The measure we probably use most often is the standard deviation. The symbol for which is σ (pronounced as sigma).

$$\sigma = \sqrt{\sum_{i=1}^n (R_i - R)^2 (P_i)}$$

Where,

R_i = Expected rate of return

P_i = Probability

σ = Standard Deviation

Thus the standard deviation is a weighted average deviation from the expected value and it gives an idea of how far above or below expected value and the actual value is likely to be.¹⁵

2.1.4.3 Systematic Risk and Unsystematic Risk

Systematic risk is the portion of the total risk of an individual security caused by market factors that simultaneously affect the prices of all securities. It cannot be diversified. It is also called market risk or unavoidable risk or non diversifiable risk or beta risk. It stems from factors, which systematically affect all firms, such as war, inflation, recession, high interest rate, depressions, and long term changes in consumption in the economy.

¹⁴ Weston Basley & Brigham (1996) "Investment Analysis" Mc Graw Hill. New York. USA, pp. 182-183

¹⁵ Ibid. Weston, Basely and Brigham. pp. 182-183.

Unsystematic risk is the portion of total risks that can be diversified. It is also called non-market risk or avoidable risk or company specific risk or diversifiable risk. It is caused by events particular to the firm. For example labor strikes, management errors, inventions, advertising campaigns, shifts in consumer taste, and lawsuits, etc.

Systematic risk has its source factors that affect all marketable assets and thus cannot be diversified away. The sources of systematic risk are market pervasive.

The measure of systematic risk permits an investor to evaluate an asset's required rate of return relative to the systematic risk of the stock. Unsystematic (company specific/unique) risk can be reduced through diversification. The relationship among total risk, systematic risk and unsystematic risk are shown below

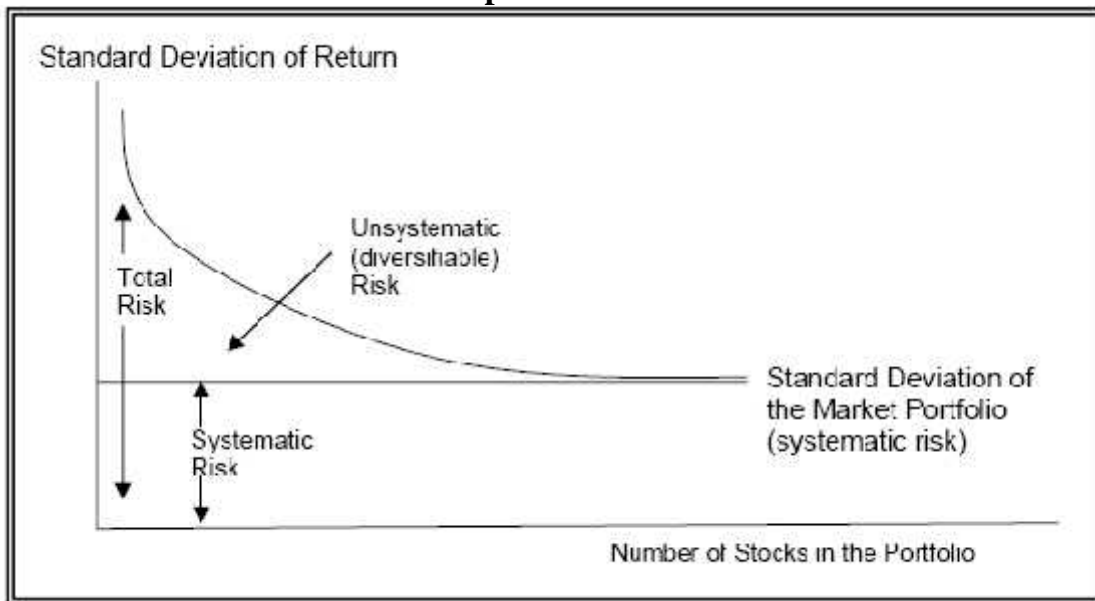
Total risk = Systematic Risk + Unsystematic Risk

$$\text{or, } \sigma_j^2 = (\rho_{jm})^2 \times \sigma_m^2 + (1 - \rho_{jm}^2) \times \sigma_e^2 \quad \text{or, } \sigma_j^2 = \beta_j^2 \times \text{Var}(r_m) + \text{Var}(e)$$

In this equation ρ_{jm} is the correlation coefficient between the return of given stock (j) and the return on market portfolio.

The beta coefficient is an index of systematic risk. Betas can be used for a ranking of the systematic risk of assets. An asset with $\beta = 1$ is moderate asset because market portfolio and asset's return is equal. An asset with $\beta > 1$ is an aggressive asset because it is more volatile than the market portfolio. If an assets has a $\beta < 1$, the asset is defensive asset and the response of the asset will be less than that of the market.

Figure 1- Relation between S.D. of portfolio and Number of securities in portfolio



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.¹⁶

Systematic risk includes Market risk, Interest rate risk and 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's purchasing power risk is the uncertainty of the purchasing power of the amounts to be received. In more, every day terms, purchasing power risk refers to the impact of inflation or deflation on an investment."¹⁷

Unsystematic risk is that portion of total risk that is unique to a firm or industry. Factors such as management capability, consumer preferences, and labor strikes can cause systematic variability of returns for in a firm.

¹⁶ Donald E. Fischer and Ronald J. Jordon (2002), "Security Analysis and Portfolio Management", 6th Ed. (p. 70). New Delhi: Prentice-Hall of India Private Limited.

¹⁷ Ibid p. 73

Unsystematic factors are largely independent of factors affecting securities markets in general. Because these factors affect one firm, they must be examined separately for each company.¹⁸

The uncertainty surrounding the ability of the issuer to make payments on securities seems 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 the 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."¹⁹

2.1.5 Portfolio Analysis

Portfolio Analysis considers the determination of future risk and return in holding various blends of securities. The objectives of portfolio analysis is to develop a portfolio that has the maximum returns at whatever level of risk the investor deems appropriate. Diversification of portfolio helps to minimize risk and different diversification techniques have been developed for reducing portfolio's risk. The objectives of portfolio analysis are to reduce risk by combing securities of low risks with securities of high risk.

2.1.5.1 Portfolio

Conceptually portfolio is a collection of securities that have been gathered to achieve certain investment goals.²⁰ Investors usually diversify their portfolio in order to minimize their risk given the rate of return. To minimize the risk of portfolio an individual invest in securities with different risk and return characteristics. This procedure is called diversification. The degree of diversification varies depending on how risk avert the investor, is. This determines the level of risk and return of the portfolio.

¹⁸ Ibid. Donald E. Fischer and Ronald J. Jordon, p. 72

¹⁹ Ibid. Donald E. Fischer and Ronald J. Jordon, p. 74-75

²⁰ Hadi Salavitar, "*Investment Analysis and Portfolio Management*", (p. 173) State University of New York, P.173.

“An efficient portfolio is that portfolio which maximizes return for a given risk or minimizes, risk for a given return. The efficient frontier may be defined as the collection of all possible portfolios that are not dominated or that have the maximum possible expected return, given a level of risk or standard deviation”²¹

According to Raymond, Brockington "The term 'Portfolio simply means collection of investments. For an investor through the stock exchange will be a collection of shareholdings in different companies. For a property investor, portfolio will be a collection of building. To a financial manager with in an industrial company, portfolio will be a collection of real capital projects. It will be apparent that the actual nature of the components of a portfolio demands on the population of opportunities from which the selection has been made."²²

"Portfolio management is the art of handling a pool of funds so that it not only preserves its original worth but also overtime appreciates in value and yields an adequate return consistent with the level of risk assumed." ²³

2.1.5.2 Diversification

Diversification means reducing the investment risk by dividing the investment among a variety of assets. Diversification helps to reduce risk because different investments will rise and fall independent of each other. The combinations of these assets more often than not will cancel out each others fluctuation, there of reducing risk.

Diversification is a risk management technique that mixes a wide variety of investment with in a portfolio. It is a designed to minimize the impact of any one security on overall portfolio performance." Diversification is possibly the greatest way to reduce the risk. This is why mutual funds are so popular." ²⁴

²¹ Ibid. p.173.

²² Brockington, R.,Financial Management.(New Delhi:Arnold Publication, 1990).p.187

²³ B. C. Feorge, et al., *Investment Analysis and Portfolio Management*. 3rd ed. (USA : Richard D. Irwin, 1999). p. 75

²⁴ [http:// www.investopedia.com](http://www.investopedia.com)

Diversification in investment can be achieved in many different ways. Individuals can diversify across one type of asset classification- such as stocks. To do this, one might purchase shares in the leading companies across many different (and unrelated) industries. Many other diversification strategies are also possible. You can diversify your portfolio across different types of assets (stock, bonds, and real estate for example) or diversify by regional decisions (such as state, region, or country) Thousands of opinions exists." ²⁵

Investors can reduce their potential for loss through diversification. The key to diversification is the age ld adage, don't put all of your eggs i one basket. The main point of diversification is to reduce risk rather than improve expected return. This is the power of diversification: **the whole is greater than the sum of its parts.** ²⁶

Diversification can help to reduce portfolio risk by eliminating unsystematic risk for which investors are not rewarded. Investors are rewarded for taking market risk. By choosing securities of different companies in different industries, we can minimize the risk associated with a particular company's "bad luck". Diversification among companies, industries and asset classes affords the investor the greatest protection against business risk, financial risk and volatility.

"Diversification is important for every investor In fact it is so important that in 1990's Harry M Markowitz won the Nobel Prize largely for his work on diversification"²⁷

Investments whose price movements are opposite each other are negatively correlated. When negatively correlated assets are combined with in a portfolio, the portfolio volatility is reduced. Diversification leads to an averaging of market risk and it can substantially reduce unique risk

²⁵ [http:// www.ameritrade.com](http://www.ameritrade.com)

²⁶ <http://www.dfaus.com>

²⁷ <http://www.nefe.org>

There are some different diversification techniques for reducing a portfolio risk.²⁸

Simple Diversification

Simple diversification can be defined as "not putting all the eggs in one basket" or "spreading the risks". However, selecting stocks randomly more than 10 -15 will not reduce a portfolio's total risk to the undiversifiable level.

Diversification across Industries

Some investment counselors advocate selecting securities from different industries to achieve better diversification. It is certainly better to follow this advice than to select all the securities in a portfolio from one industry. But, empirical research has shown that diversification across industries is not much better than simply selecting securities randomly.

Superfluous Diversification

If 10 - 15 different assets are selected for a portfolio, the maximum risk reduction benefits from simple diversification have most likely been attained. Further spreading of the portfolio's assets is superfluous diversification and should be avoided. Superfluous diversification will usually result in the following portfolio management problems:

1. Impossibility of good portfolio management
2. Purchase of lackluster performer
3. High search costs
4. High transaction cost

²⁸ Francis, op cit. pp. 228-235

Simple Diversification across quality Rating Categories

Quality rating measure default risk - essentially the risk of bankruptcy. The highest quality portfolio of randomly diversified stocks was able to achieve lower levels of risk than the simply diversified portfolios of lower quality stocks. This result reflects the fact that default risk (as measured by the quality ratings) is part of total risk. The higher quality portfolios contain assets with less default risk. This finding suggests that portfolio managers can reduce portfolio risk to levels lower than those attainable with simple diversification by not diversifying across lower-quality assets.

Markowitz Diversification

Markowitz diversification may be defined as combining assets which are less than perfectly positively correlated in order to reduce portfolio risk without sacrificing portfolio returns.²⁹ It can sometimes reduce risk below the undiversifiable level. Markowitz diversification is more analytical than simple diversification and considers assets correlations (or covariance). The lower the correlation between assets, the more that Markowitz diversification will be able to reduce the portfolio's risk.

Applying Markowitz diversification to a collection of potential investment assets with a computer is called Markowitz Portfolio Analysis. It is a scientific way to manage a portfolio, and its results are quite interesting. Since Markowitz portfolio analysis considers both the risk and return of dozens, or hundreds, or thousands of different securities simultaneously, it is a more powerful method of analyzing a portfolio than using intuition.

²⁹ H. Markowitz. "Portfolio Selection". *Journal of finance* (1952 March), p. 89

2.1.5.3 Portfolio Return and Risk

Expected Portfolio Return

The expected portfolio return is the simple weighted average of the expected returns from the investment represented by a portfolio. This expected return is calculated by determining the expected return of each component of the portfolio and using these returns to compute a weighted average. The weights used are the portfolio weights, which describe how the portfolio's investment is weighted among the various assets/ securities. Portfolio weights are percentages of the total dollar amount available to be investment in the portfolio and sum to 1. The expected return of a portfolio, $E(R_p)$, is calculated as:

$$\text{Expected Portfolio Return} = E(R_p) = \sum_{j=1}^n X_j E(R_j)$$

Where,

$E(R_p)$ = the expected return on the portfolio

$E(R_j)$ = the expected return of assets j

X_j = the portfolio weight for assets j, where $\sum W_j = 1.0$

n = number of assets / securities in a portfolio

Portfolio Risk

Total portfolio risk is measured by the variance of the portfolio's rate of return distribution. The portfolio risk depends on the risk of the individual securities and the covariance between the returns of the individual securities. The risk (variance of returns) from a portfolio made up of assets is denoted as

$$\text{Portfolio Risk} = \text{Var}(R_p) = \sum_{i=1}^n \sum_{j=1}^n X_i X_j \rho_{ij} \sigma_i \sigma_j$$

Where,

X_i = proportion of investment in security i

X_j = proportion of investment in security j

ρ_{ij} = correlation coefficient between i and j securities

σ_i = standard deviation of security i

σ_j = standard deviation of security j

2.1.5.4 Markowitz Portfolio Selection Model

A portfolio is a collection of securities. There exists a problem of portfolio selection. Investors face a problem of selecting optimal portfolio from a set of possible portfolios. Hence, it is often referred to as portfolio selection problem. One solution to this problem was put forth in 1952 by Harry M. Markowitz, when he published a landmark paper that is generally viewed as the origin of the modern portfolio theory approach to investing.

Markowitz's approach begins by assuming that an investor has a given sum of money to invest at the present time. This money will be invested for a particular length of time known as the investor's holding period. At the end of; holding period, the investor will sell the securities purchased at the beginning of that period.

Markowitz's model is a theoretical framework for the analysis of risk-return choices. Decisions are based on the concept of efficient portfolios. A portfolio is said to be efficient when it provides maximum expected return for the same level of risk or provides minimum risk for the same level of return.

Portfolio Theory Assumptions

The portfolio selection model developed by Harry M. Markowitz is based on several assumptions regarding investors' behaviors ³⁰

- i) Investors consider each investment alternatives as being represented by a probability distribution of expected returns over same holding period.
- ii) Investors maximize one period - expected utility and possess utility curve, which demonstrates diminishing marginal utility of wealth.
- iii) Individuals estimate the risk on the basis of the variability of expected returns

³⁰ V.K. Bhalla, Investment Management, 8th edition.(New Delhi: S. Chand & Company Limited. 2001) p.261

- iv) Investors base decisions solely on expected return and variance of returns only.
- v) For a given risk level, investors prefer high returns to lower returns. Similarly, for a given level of expected return, investors prefer less risk to more risk.

2.1.5.5 The Efficient set Theorem³¹

An infinite number of portfolios can be formed from a set of N securities. The investor can buy any one security or buy more securities in order to create a portfolio. An investor can distribute his or her investing money in different securities. The investor should not have to evaluate all these portfolios. The investor can select an optimal portfolio from a feasible set of portfolios. Efficient set theorem states that:

An investor will choose his or her optimal portfolio from the set of portfolios that:

- i) Offer maximum expected return for varying levels of risk, and
- ii) Offer minimum risk for varying levels of expected return.

The set of portfolios meeting these two conditions is known as the efficient set. Efficient set is also known as the efficient frontier.

2.1.5.6 The Feasible Set³²

Figure 2 is an illustration of the location of the feasible set / the opportunity set. Efficient set can be identified from the feasible set. The feasible set simply represents all portfolios that could be formed from a group of N securities. All the possible portfolios, which could be formed from the N securities, lie either

³¹ Sharpe et al., op. cit., p. 171

³² *ibid.*, p. 172

on or within the boundary of feasible set. In general, this set will have an umbrella type shape similar to the one shown in the Figure 2

2.1.5.7 The Efficient set theorem applied to the feasible set

The efficient set can now be located by applying the efficient set theorem to this feasible set.³³ To begin with, the set of portfolios that meet the first condition of the efficient set theorem must be identified. Looking at Figure 2 there is no portfolio offering less risk than that of portfolio E because if a vertical line were drawn through E, there would be no point in the feasible set that was to the left of the line. Also, there is no portfolio offering more risk than that of portfolio H because if a vertical line were drawn through H, there would no point in the feasible set to the right of the line. Thus the set of portfolios offering maximum expected return for varying levels of risk is the set of portfolios lying on the northern boundary of the feasible set between points E and H.

Considering the second condition next, there is no portfolio offering an expected return greater than portfolio S (because no point in the feasible set lies above a horizontal line going through S). Similarly, there is no portfolio G, because no point in the feasible set lies below a horizontal line going though G. Thus, the set of portfolios offering minimum risk for varying levels of expected return is the set of portfolios lying on the western boundary of the feasible set between G and S.

Remember that both conditions have to be met in order to identify the efficient set. It can be seen that only those portfolios lying on the northwest boundary between points E and S do so. Accordingly, these portfolios from the efficient set and it is from this set of efficient portfolios that the risk - averse investor

³³ *ibid.* p. 172 - 173

will find his or her optimal one. All the other feasible portfolios are inefficient portfolios and can be ignored.

2.1.5.8 Selection of the Optimal Portfolio³⁴

To select an optimal portfolio, an investor should plot his or her indifference curves on the efficient set and then proceed to choose the portfolio that is on the indifference curve that is farthest northwest. This portfolio will correspond to the point at which an indifference curve is just tangent to the efficient set. As can be seen in the Figure.3, this is portfolio O on indifference curve I₂. Although the investor would prefer a portfolio on I₃, no such portfolio exists; wanting to be on this indifference curve is just wishful thinking. In regard to I₁, there are several portfolios that the investor could choose (for example O). However, the figure shows that portfolio O dominates such portfolios because it is on an indifference curve that is farther northwest. The portfolio selection for a highly risk - averse investor has been shown in Figure 4.

Figure 3- Selecting an optimal Portfolio

Figure 4 - Portfolio Selection for a Highly Risk Averse Investor

Upon reflection, the efficient set theorem is quite rational. The efficient set theorem, stating that the investor needs to be concerned only with portfolios that lie on the northwest boundary of the feasible set, is a logical consequence.

2.1.6 Capital Asset Pricing Model (CAPM)

³⁴ *ibid.* p. 173

CAPM is a model that describes the relationship between risk and expected return. In this model, a security's expected return is the risk free rate plus a premium based on the systematic risk of the security.

Sharpe & Litner developed 'Capital assets pricing Model' (CAPM). This model provides the intellectual basis for a number of the current practices in the investment industry. Although many of these practices are based on various extensions and modifications of the CAPM, a sound understanding of the original version is necessary in order to understand them; CAPM is based on the following assumptions.³⁵

1. Investors evaluate portfolios by looking at the expected returns and standard deviations of the portfolio over a one-period horizon.
2. Investors are risk averse, so when given a choice between two otherwise identical portfolios, they will choose the one with the higher expected return.
3. Investors are never satisfied, so when given a choice between two otherwise identical portfolios, they will choose the one with lower standard deviation.
4. Individual assets are infinitely divisible meaning that an investor can buy a fraction of a share if he or she so desires.
5. There is a risk-free rate, at which an investor may either lend (that is invest) money or borrow money.
6. Taxes & transactions costs are irrelevant.
7. All investors have the same for one period horizon.
8. The risk-free rate is the same one period horizon.
9. Information is freely and instantly available to all investors.
10. Investors have 'homogeneous expectation' meaning they have the same perception in regard to the expected returns, standard deviations, and covariance of Securities.

³⁵ Litner, John. (1990). "The valuation of Risk Assets & the Selection of Risky Investments in Stock Portfolios & Capital Budgets" (pp. 13-37). Review of Economics & Statistics.

The equation for CAPM is

Where,

$E(r_i)$ is the expected return for an assets.

R is the risk-free rate (usually assumed to be one year T-bill rate).

$E(r_m)$ is the expected market return.

b_i is the systematic or market related risk.

It means the sensitivity of a stock's returns. It changes in returns on the market portfolio. The beta of portfolio is simply a weighted average of the individual stock beta in the portfolio."³⁶

"CAPM model based on the proposition that any stocks required rate of return is equal to the risk-free rate of return plus a risk premium where risk reflects diversification."³⁷

"Remember the relevant risk associated with an individual stock is based on its systematic risk, which depends on how sensitive the firm's operations are to economic events such as interest rate changes and inflationary pressures. Because the general movements in the financial market reflect movement in the economy, the market risk of the stock can be measured by observing its tendency to move with the market, or with an average stock that has the same characteristics as the market. The measure of the stock's sensitivity to market fluctuations is called its beta coefficient. Beta is a key element of the CAPM."³⁸

"Based on the behavior of the risk averse investor, there is implied an equilibrium relationship between risk and expected return for each security. In market equilibrium, a security will be expected to provide a return commensurate with its unavoidable risk. This is simply the risk that cannot be avoided by diversification. The greater the unavoidable risk of a security, the greater the return that investor will expect from the security. The relationship

³⁶ Op. Cit., Van Horne, James C. p.100

³⁷ Op. Cit., Weston, Basely and Brigham. p. 193

³⁸ Ibid. Weston, Basely and Brigham p. 202

between expected return and unavoidable risk, and the valuation of securities that follows, is the essence of the capital asset pricing model (CAPM)"³⁹

"The major implication of the CAPM is that the expected return of an asset will be related to a measure of risk for that asset known as beta (β). The exact manner in which expected return and beta are related is specified by the CAPM. The model provides the intellectual basis for a number of the current practices in the investment industry."⁴⁰

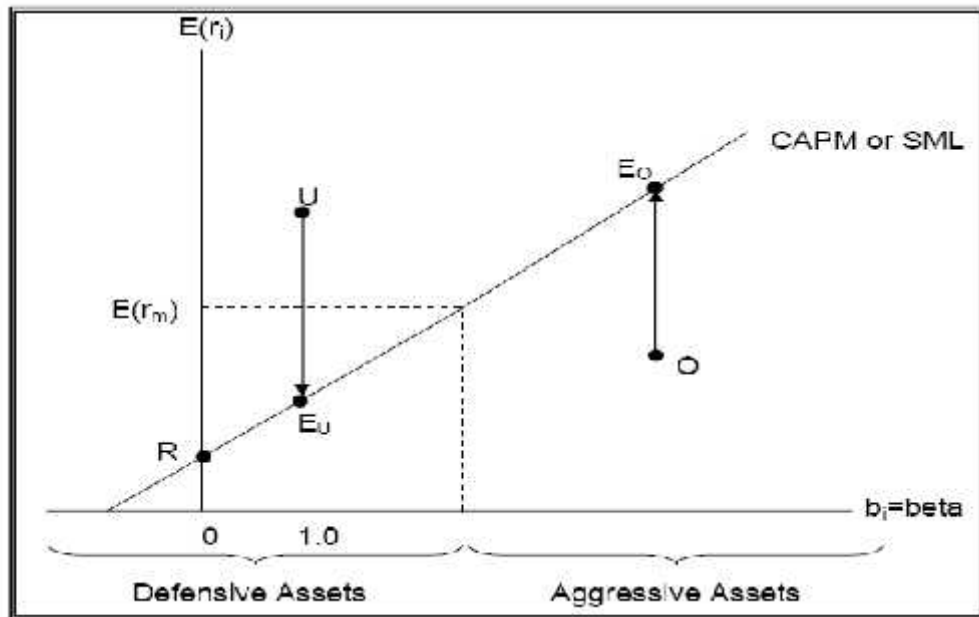
Beta measures undiversifiable risk. Beta shows how the price of a security responds to market forces. In effect, the more responsive the price of a security is to changes in the market, the higher will be its beta. Beta is calculated by relating the returns on a security with the returns for the market.

In summary, CAPM expresses the relationship between an asset's return and its systematic risk. The relevant risk for an individual asset is systematic risk (or market-related risk) because of non-market can be eliminated by diversification. The CAPM is an equilibrium model for measuring the risk return tradeoff for all assets including both inefficient and efficient portfolio.

Figure 5 - The Capital Assets Pricing Model

³⁹ Op. Cit. Van Horne, James C. pp.64-65

⁴⁰ William F. Sharpe, Gordon J. Alexander & Jeffery V. Bailey (1996), "*Investment*", 5th Ed. (pp. 261-262). New Jersey: Prentice-Hall.



Source: Jack Clark Francis, Investment: Analysis and Management: Seventh Edition McGraw-Hill, Inc, New York, P-276.

A vertical line in the Figure 5 shows a risk class for systematic risk. The CAPM relates an expected return to each of the systematic risk. These expected returns can be interpreted as the appropriate discount rates, as the cost of capital, or as equilibrium rate of return that investors expect for that amount of systematic risk. In the figure, U and O are not in equilibrium on the CAPM. Asset U is undervalued and therefore desirable to own the asset. The price of U will rise in the market as more investors purchase it. When price goes up of asset U, its return falls. When U's return falls to the return consistent with its beta on the SML, equilibrium is attained. The asset O is overvalued. Investors will attempt to sell O, and therefore puts the downward pressure on O's price. When the return on asset O increases to the rate that is consistent with the beta risk level given by the SML, equilibrium will be achieved and downward price pressure will cease. Hence, the CAPM or SML is relationship in which the expected rate of return of the individual asset is a linear function of that asset's systematic risk as represented by beta (β), symbolically. According to Sharpe & Litner (CAPM) study: the greater the beta of a security, the greater the risk and the greater the expected return required. The lower the beta, the lower will be the risk.

Under and Over Valuation

In market equilibrium, the CAPM implies an expected return-risk relationship for all individual securities (the security market line). If an individual security has an expected return -risk combination that places it above the security line, it will be undervalued in the market.⁴¹ That is, it provides an expected return in excess of that required by the market for the systematic risk involved:

$R_j > R_f + [E(R_m) - R_f] B_j$ An overvalued security is characterized by an expected return - risk combination that places it below the security market line. This security is unattractive, and investors holding it will sell it and those not holding it will avoid it. The price will fall and expected return will rise until there is consistency with the security market line and with equilibrium pricing.

2.1.7 Portfolio Performance Evaluation

Portfolio performance is measured by applying different models developed by William F. Sharpe, Jack Treynor, and Dr. Michael C Jensen. These models and objectives have been explained below:

2.1.7.1 Sharpe's Portfolio Performance Measure

Ranking portfolio's average returns ignores the skill with which they minimize risk and therefore presents an oversimplified picture. Hence, in assessing the performance of a portfolio, it is necessary to consider both risk and return. William F. Sharpe devised an index of portfolio performance for portfolio i as.⁴²

$$S_i = \frac{\text{Risk Premium}}{\text{Total Risk}} = r_j - R$$

⁴¹ Van Horne, op.cit., p. 71

⁴² Francis. Op., cit. pp. 644 – 662

Where,

S_i = Sharpe index of portfolio performance for portfolio i

r_j = Average return from portfolio i

σ_i = Standard deviation of returns for portfolio i

R = Riskless rate of interest

$r_j - R$ is the risk premium for portfolio i. the risk premium is the additional return over and above the risk-less rate that is paid to induce investors to assume risk.

2.1.7.2 Treynor's Portfolio Performance Measured

Jack Treynor conceived an index of portfolio performance that is based on systematic risk, as measured by portfolios' beta coefficients. He suggests measuring a portfolio's return relative to its systematic risk rather than relative to its total risk, as does the Sharpe measure, Treynor's index is ascertained as:⁴³

$$T_p = \frac{\text{Risk Premium}}{\text{Systematic risk Index}} = \frac{r_j - R}{\beta_p}$$

Where,

T_p = Treynor's index of portfolio performance for portfolio i

R_j = Average return from portfolio i

β_p = Systematic risk index of returns for portfolio i

R = Risk less rate of interest

⁴³ ibid

2.1.7.3 Jensen's Portfolio Performance Measure

Dr. Michael C. Jensen has modified the characteristic regression line to make it useful as a one parameter investment performance measure. The basic random variables in Jensen's model are risk premiums, such as:⁴⁴

$$rp_{it} = r_{it} - R_t$$

Where,

rp_{it} = risk premium for assets I in period t

r_{it} = one period rate of return from asset I in period t

R_t = risk – less rate observed in period t

2.2 Review of Articles

i) Radhe Shyam Pradhan, carried out a study on the topic of “Stock market behavior on a small capital market: a case in Nepal” in 1993. The study was based on the data collected for seventeen enterprises from 1983 through 1990.⁴⁵ One of the major objectives which are related to this study was “To access the stock market behavior in Nepal” Pradhan summarized the following findings:-

-) Dividend per share and market price per share was positively correlated.
-) Higher the earning on stocks, larger the ratio of dividends per share to market price per share.
-) There are positive relationship between dividend pay out and liquidity.

ii) Manohar Krishna Shrestha, carried out the study on “Shareholders Democracy and annual general meeting (AGM) feedback”. This study critically

⁴⁴ ibid

⁴⁵ Radhe S. Pradhan (1993), “*Stock market behaviour in a small capital market: A case of Nepal*”, Vol. IX-No. 1, (pp. 23-49), The Nepalese management review.

analyzed the situation of common stock investors and the situation is not improved significantly till now. Though the size of the shareholders population in Nepal has been growing constantly the government seems to have not taken any initiation in formulating the separate Act which protects the shareholders right. ⁴⁶Company and other acts relating to financial and industrial sector have provisioned rights of the shareholders as: -

- Voting right
- Participation in general meeting
- Right of getting information
- Electing as BOD
- Participation in the profit and loss of company.
- Transferring shares.
- Proxy representation.
- Collective rights of shareholders are:
 - Amend the internal bylaws.
 - Authorize the sales of assets
 - Enter into merges
 - Change the amount of authorized capital.

Some public limited companies have floated the shares of the general public without having shareholders representation in the board. There are many such companies, which conduct the annual general meetings just to fulfill their desire and do not consider the voice of the shareholders. Shrestha argued further to safeguard the investors interest: “The encouraging and growing confidence of shareholders over their investment seek an independent inquiry of disclosed contents of prospectus. This helps to satisfy a minimum standard of faith on investment in shares through relying on pros and cons of prospectus. It is therefore, important to disclose everything in prospectus, which could reasonably influence the mind of the prudent investors.

⁴⁶ Manohar K. Shrestha (1947), “*Shareholders democracy and annual general meeting feedback*”, (p. 12).

Various annual general meetings held by different public limited companies reveal a greater gap between disclosure made in prospectus and the actual results, which were reported. In this context the expression of disclosures philosophy and investigation of frauds in prospectus need to be reconciled to check and growing problems in the development of the capital market in Nepal.

iii) Mr. Narayan Paudel, has carried out study about “Investing in shares of commercial Banks in Nepal: An assessment of return and risk elements. To analyze the risk characteristics of the shares of joint venture commercial banks, the share prices of different six banks data has been analyzed. From that analysis it appears that none of the shares are correctly priced. Mr. Narayan Paudel, has carried out study about “Investing in shares of commercial Banks in Nepal: An assessment of return and risk elements.”

To analyze the risk characteristics of the shares of joint venture commercial banks, the share prices of Nepal Arab Bank Ltd.(NABIL), Nepal Indosuez Bank Ltd. (NIBL), Standard Chartered Bank Ltd. (SCBNL), Himalayan Bank Ltd. (HBL), Nepal SBI Bank Ltd. (NSBL), Nepal Bangladesh Bank Ltd.(NBBL), Everest Bank Ltd. (EBL) and Bank of Katmandu Ltd. (BOKL) have been analyzed. Six years data are analyzed. His findings are summarized as below table.

Table 1 - Average rate of return and required rate of return of the companies

Bank	Price	Kavg	K
Nepal Arab Bank Ltd	Over-priced	5.9	6.18
Nepal Indosuez Bank Ltd.	Over-priced	5.79	5.9
Standard Chartered Bank Ltd.	Under-priced	7.06	5.72
Himalayan Bank Ltd.	Over-priced	5.52	6
Nepal SBI Bank Ltd	Under-priced	8.56	5.82
Nepal Bangladesh Bank Ltd.	Under-priced	14.24	5.81
Everest Bank Ltd.	Under-priced	13.09	5.75
Bank of Kathmandu Ltd.	Under-priced	15.57	5

Where,

K_{avg} = Average mean return

K = The required rate of return using CAPM (Capital Assets Pricing Model)

It shows with larger standard deviations seem to be able to produce higher rate of return. The portion of unsystematic risk is very high with the shares having negative beta co-efficient. The risk per unit of return, as measured by beta co-efficient of variation, is less than that of the market as a whole for all the individual shares. Most of the shares fall under the category of defensive stocks (having beta co-efficient less than 1), except the shares of Bank of Kathmandu Ltd. Return on the shares of Nepal Arab Bank Ltd. Is negatively co-related with the return on the market portfolio and, therefore, it has negative beta co-efficient. From the analysis it appears that none of the shares are correctly priced.

Theoretically, the market price of an overpriced share (under-priced) will fall (rise) in order to increase the expected return such that the expected return equals the required return. Therefore, shares of Nepal Arab Bank Ltd., Nepal Indosuez Bank Ltd. and Himalayan Bank Ltd. which are overpriced relative to equilibrium thus market focus, will decline. The remaining shares appear to be under-priced indicating a possible positive long-term price trend.

2.3 Review of Thesis:

Before this, several thesis works have been concluded by various students regarding the various aspects of commercial banks such as financial performance, lending policy, investment policy, interest rate structure, etc. Some of them, as supposed to be relevant for the study are presented below:

i) Mr. Ramesh Kumar Bhandari conducted the study on “Risk Return analysis in common stock Investment of listed companies in Nepal” (2003) ⁴⁷ His finding was that expected return on the common stock of Nepal Finance and Saving Co. Ltd. is highest (i.e. 91.56%). His study was related with various types of organizations but results derived some relevant organizations are as below table.

Table 2 - Expected return, standard deviation and co-efficient of variation

Bank	Expected return	Standard deviation	Co-efficient of variation
HBL	58.64%	0.7112	1.213
SCBNL	57.84%	0.7201	1.245

ii) Mr. Deepak Adhikari, conducted the study on common stock investment by using nine years data year from 1992/1993 to 2000/2001. ⁴⁸ There were various objectives of the study; among them one “to evaluate common stock of listed commercial banks in terms of risk and return and to perform sector wise comparison on the basis of market capitalization” is related to this study.

Expected return of HBL is minimum (i.e. 13.3%) only HBL’s expected rate of return is lower than market return (i.e. 13.3 % < 23.85%). The risks C.V of SCBNL has 0.9689 risks per 1% return but HBL has highest risk 1% of return (i.e. 2.9261). Market beta of Bank of Kathmandu ltd. is most volatile (i.e. β =1.9656) and SCBNL’s CS is least volatile (i.e. β =0.2218). All banks common stocks are under-priced.

iii) Mr. Riddi Prakash Sitaula, “Risk and Return Analysis of Joint Ventur Banks of Nepal” 2003 ⁵¹ Mr. Riddi Prakash Sitaula, “Risk and Return Analysis of Joint Venture Banks of Nepal” 2003, ⁴⁹he conducted his study between NABIL, HBL and SBI, he create the portfolio of two asses case. His findings are summarized as below table.

⁴⁷ Ramesh Kumar Bhandari (2003), “*Risk Return analysis in common stock Investment of listed companies in Nepal*”, an unpublished Master’s Degree Thesis, T.U.

⁴⁸ Deepak Adhikari (2002), “*Risk and return on common stock investment A study of some listed Commercial Banks in Nepal*”, an unpublished Master’s Degree Thesis, T.U.

⁴⁹ Riddi Prakash Sitaula (2003), “*Risk and Return Analysis of Joint Venture Banks of Nepal*”, an unpublished Master’s Degree Thesis, T.U.

Table 3 - Expected return, standard deviation and co-efficient of variation

Bank	Expected return	Standard deviation	Co-efficient of variation
NABIL	46.05%	54.30%	1.1786
SBI	45.09%	44.05%	0.9768
HBL	34.77%	34.90%	1.0038

At the time of study expected return of market was 22.08% and return on TB was 4.96% that is very high as compared to return of TB in 2003, 2.98%.

iv) Mr. Narayan Pokhrel conducted the study on Portfolio analysis on common stock of Joint venture Banks in Nepal, (2004)⁵⁰ by using nine years data year from 1993/94 to 2002/2003. He has conducted the study of all the Joint Venture banks that are NABIL, SCBNL, HBL, SBI, NBBL, and EBL. There were various objectives of the study; among them one “to estimate the optimal portfolio among CS investment of JVBs” is related to this study. In his study all the CS of JVBs are underpriced.

Correlation between HBL and EBL was found to have 1, there is no chance to minimize risk by creating portfolio of HBL and EBL so excluding the EBL, he has estimated the optimal portfolio among the remaining five JVBs whose return was 88.2% and the risk underlying on it was 102.3% with the investing weight as table below.

Table 4 - Bank and their weights

Bank	NABIL	SCBNL	HBL	SBI	NBBL
Wight	45.33%	38.13%	-7.11%	49.57%	-25.92%

v) Review of Ph.D. research by Post Doctoral researcher of CCER, Peking University of People Republic of China. In this research paper a mathematical/Algorithm model for the optimal portfolio is designed. It gives

⁵⁰ Narayan Pokhrel (2004), “*Portfolio analysis on common stock of Joint venture Banks in Nepal*”, an unpublished Master’s Degree Thesis, T.U.

a new thought to gain the capital market line (CML). Although the problem of the identifying the market portfolio has puzzled the academia for more than twenty years, using the way that this paper afford can solve the conundrum. More detail is explained later.

2.4 Research Gap

This thesis fulfills the data presentation and analysis part from the year 097/098 to 2006/2007. Similarly opinion survey has also been taken with the individual investors. The data used are of recent and are more empirical or analytical based.

Similarly this thesis has tried to analyze the MPS of sample banks with reference to their financial indicators and risk in common stock investment which may probably provide real pictures of sampled banks to both the outstanding and potential investors in order to make correct decision.

CHAPTER - III

RESEARCH METHODOLOGY

This chapter refers to the overall approach to the research process, from the theoretical underpinning to the collection and analysis of data. As most of the data are quantitative, the research is based on scientific methods. It is composed of both part of technical aspect and logical aspect. On the basis of historical data, using both financial and statistical tools performs detail analysis of different variables. Results are presented in simple way. Detail research methods are described in following headings.

3.1 Research Design

In Nepal there have been no up to date studies carrying out regarding portfolio management of investment in the securities issued by listed companies. Independent studies regarding the analysis of stocks have not yet been found. It is found that only master's degree students have been carrying out thesis works in such topics. Nevertheless, these studies are concentrated only on loan and advances portfolio analysis of commercial banks. No study has been carried out regarding securities portfolio consisting of the stocks of listed companies. Most of the studies are concentrated on the risk and return analysis of stocks of listed companies. Only few thesis, related on the portfolio Analysis in investment in securities of listed companies. However this thesis was concentrated only on three assets portfolio assigning different weights to different three assets.

The research is based on recent historical data that are collected from secondary sources. It covers Five years period from F/Y 2002/2003 to F/Y 2006/07 A.D. It deals with the study of risk, return and portfolio analysis of different companies listed on NEPSE on the basis of available information. As the title of the research suggests, it is more analytical, empirical and less descriptive.

Analytical, in the sense that the available data are analyzed by using various statistical tools and techniques such as standard deviation, co-efficient of variation, regression model etc.

3.2 Population and Sample

Population of this study includes all the companies, which have listed their shares in NEPSE for trading in secondary market. At present, there are 135 companies that have listed their shares to make them eligible for trading in the secondary market of Nepal. They have only been considered as population. Mainly there were 8 different categories of companies in NEPSE list. For Sample one company is taken from each category but because of unavailability of data only 7 different companies from the seven different categories are taken for the study. Furthermore 50% of the samples are from class A stocks as categorized by NEPSE. Rests are on the basis of other classification such as volume traded, data availability, and price movement and so on. The sampled companies are listed in Table 5

Table 5 - Population and Sample of the study

Category	Population size	Sample size	Sampled Companies
Commercial Banks	15	1	Standard Chartered Bank Limited
Insurance Companies	16	1	Everest Insurance Company Limited
Finance Companies	53	1	Kathmandu Finance Limited
Manufacturing & Processing Companies	21	1	Bottlers Nepal Limited
Hotels	4	1	Hotel Soltee
Development Banks	16	1	Development Credit Bank Limited
Trading	5	1	Salt Trading Corporation Limited

3.3 Data Collection Techniques

The data are collected from secondary sources in a convenience sampling method. Informal discussions were conducted with individual investors, SEBO/N and NEPSE staffs and stockholders. Official website of NEPSE “<http://www.nepalstock.com>” and Nepal Rastra Bank “<http://www.nrb.org.np>” are accessed for data. Stock price of the different stocks publications of NEPSE and published financial statements are used as sources of secondary data. NEPSE indices have been collected from NEPSE office and web site as well. Financial statements of different commercial banks and their annual financial reports have been collected from respective commercial banks. NEPSE periodicals, articles and previous research have also been considered.

3.4 Data Analysis Tools

To analyze the collected data different methods and techniques were used. Analysis tools are those which help to analyze the collected data in a right way. There are many tools and techniques that were used in analysis data and some of them are as follows which are going to use in this study.

3.4.1 Risk and Return Analysis of Individual stocks

Market price of stock (P):

Among the various major data of the study, market price of stock is the most important. There are three-price records available, namely high price, low price and closing price of each year. Therefore two approaches either average price (i.e. average of high and low price) or closing price can be used. By using average price, result may be very close to reality as it represents the price of whole year, but it is very difficult to obtain the real average. To get the real average, volume and price of each transaction in the stock and duration of time of each transaction in the whole year are essential. So, it is, of course, very hard and difficult together and includes all these information and average of high

and low price cannot be used for this study. Due to such difficulties, it is very difficult to use average price as market price of stock, which has a specific time span of one year and the study has focused in annual basis⁵¹

Dividend Per Share (D):

Company pays dividend to its existed shareholders in case of the declaration of only cash dividend, it is easy to calculate dividend amount. In case of the declaration of stock dividend (i.e. bonus shares) it is difficult to obtain the amount that really a shareholder has gained. In such condition, shareholders get additional number of shares as dividend and simultaneously price of stock declines, as a result of increased number of outstanding stocks. So, to get the real amount of dividend, there is no model or formula developed yet. In this study, models have been developed considering practical and theoretical aspect as well.⁵²

Dividend per share (DPS) is calculated using the following model:

$$\text{DPS} = \text{Cash Dividend} + \text{Stock Dividend}$$

In case of stock dividend;

$$\text{Total dividend amount} = \text{Cash Dividend} + \text{Stock Dividend \%} \times \text{Next year MPS}$$

Where,

MPS = Market Price Per share

Return on common stock investment (R)

Holding Period Return

Return is the income received in an investment plus any change in market price, usually expressed as a percent of the beginning market price of the investment.

⁵¹ Op. cit., James C. Van Horne and Wachowicz pp. 90-109

⁵² Model Based on J.B. Sapkota "*Risk and Return Analysis in common stock investment*", an unpublished Master's Degree Thesis, T.U.

Symbolically,

$$\frac{D_t + (P_t - P_{t-1})}{P_{t-1}}$$

Where,

R = Amount rate of return on common stock at time t.

D_t = Dividend received at time t.

P_t = Price of stock at time t.

P_{t-1} = Price of stock at time (t-1).

Expected Return of common stock $E(R_j)$

One of the main aims of the study is to determine the expected return on the investment in common stock. Generally, this rate is obtained by arithmetic mean of the past year's return.

Symbolically,

$$\frac{\sum R_j}{n}$$

Where,

$E(R_j)$ = Expected rate of return on stock j.

N = Number of years that the return is taken.

= Sign of summation.

Risk on Common Stock

Standard Deviation ()

It is the statistical measure of the variability of a distribution of return around its mean. It is the square root of the variance and measures the unsystematic risk on stock investment.

Symbolically,

Where, σ_j = Standard deviation of returns on stock j during the time period n.

3.4.2 Risk and Return Analysis of Market

Return on Market

Annual return on market is the average return of market based on the index of market. It is denoted by R_m . Under this study, NEPSE index will be used. It is a value weighted index and comprises of all the stocks listed in NEPSE. The NEPSE index issued for the study.

$$\frac{\text{Ending NEPSE Index} - \text{Beginning NEPSE Index}}{\text{Beginning NEPSE Index}}$$

Average Market Return (R_m)

$$\frac{R_m}{n}$$

Where,

R_m = Summation of annual market return

n = Number of observations

Risk on Market Return

Risk on Market return is also measured by the standard deviation of the returns of market. The standard deviation of market return is computed as

$$\frac{(\sum (R_m - R_m)^2)}{n-1}$$

3.4.3 Market Sensitivity Analysis

Co-efficient of variation (C.V.)

It is the ratio of standard deviation of returns to the mean of that distribution. It is a measure of relative risk.⁵³

⁵³ Op. Cit., Van Horne and Wachowicz, p. 94

Symbolically,

$$C.V = \frac{\sigma_j}{R_j}$$

Beta ()

It is an index of systematic risk. It measures the sensitivity of a stock's return on the market portfolio.⁵⁴

$$\beta_j = \frac{\text{Cov}(R_j, R_m)}{\sigma_m^2}$$

β_j = Beta co-efficient of stock J.

σ_m^2 = Variance of market return.

Covariance

The covariance measures how two variables co-vary. It is a measure of the absolute association between two variables. Here, how the returns of individual stocks and the market return co vary will be measured by covariance between the return of individual stocks and market return. It is computed as:

$$\text{Cov}(R_j, R_m) = \frac{\sum (R_j - \bar{R}_j)(R_m - \bar{R}_m)}{n}$$

Or,

$$\text{Cov}_{ij} = \beta_{jm} \beta_{jm}$$

If two variables are independent, their covariance is zero.

Correlation Co-efficient (ρ_{ij}):-

The correlation is also a measure of the relationship between two assets. The correlation co-efficient can taken on a value ranging from -1 to +1.

⁵⁴ Ibid. p. 102

Correlation and covariance are related by the following equation.

$$\text{Cov}_{ij} = \sigma_i \sigma_j \rho_{ij}$$

$$\therefore \rho_{ij} = \frac{\text{Cov}_{ij}}{\sigma_i \sigma_j}$$

Where, σ_i and σ_j are standard deviations of returns for assets i and j and ρ_{ij} is the correlation co-efficient for assets i and j.

There are various cases of correlation and risk condition, which are presented as below:

Perfect positive correlation ($\rho_{ij} = +1$)

Returns on two perfectly correlated stocks would move in direct proportional and a portfolio consisting of two such stocks would be exactly as risky as the individual stocks. Thus diversification does nothing to reduce risk if the portfolio consists of perfectly positively correlated stock.

Perfect Negative Correlation ($\rho_{ij} = -1$)

Returns on two perfectly correlated stocks would move perfectly together but in exactly opposite direction. In this condition, risk can be completely eliminated. Perfect negative correlation almost never found in the real world.

No relationship between returns ($\rho_{ij} = 0$)

When the correlation between two stocks is exactly zero, there is no relationship between the returns; they are independent of each other. In this condition, some risk can be reduced.

Intermediate risk ($\rho_{ij} = +0.5$)

Most stocks are positively correlated, but not perfectly. On average the returns on two stocks would lie on the range of +0.4 and +0.75 under this condition combining stocks into portfolio reduces risk but does not eliminated completely.

3.4.4 Analysis of Systematic Risk and Unsystematic Risk

Systematic Risk

Systematic risk refers to that portion of total variability in return caused by factors affecting the prices of all securities. Systematic risk is external to an industry and, of business and is attributed to board forces out of the business. Unlike systematic risk it is the risk that can be diversified away. Due to this character of this risk it is said to be relevant risk to be concerned.

We can sort out systematic risk out of total risk using tool below:

$$\begin{aligned} \text{Total risk} &= \text{Systematic risk} + \text{Unsystematic risk} \\ \sigma_j^2 &= \beta_j^2 \sigma_m^2 + \sigma_e^2 \end{aligned}$$

$$\text{Portion of systematic risk} = \frac{\text{Systematic Risk}}{\text{Total Risk}} =$$

Where,

$$\sigma_j^2 = \text{Variance of stock J.}$$

$$\beta_j^2 = \text{Square of beta to of stock j.}$$

$$\sigma_m^2 = \text{Variance of Market Return}$$

Unsystematic Risk

Unsystematic Risk is that portion of total risk of an individual stock that can be diversified away. It is also called diversifiable risk, company specific risk or non market risk. It is calculated as

$$\begin{aligned} \text{Unsystematic Risk} &= \text{Total risk} - \text{Systematic Risk} \\ &= \text{Var}(R_j) - \beta_j^2 \text{Var}(R_m) \\ &= \sigma_j^2 - \beta_j^2 \sigma_m^2 \end{aligned}$$

Portion of Unsystematic risk will simply be (1-Portion of systematic risk)

$$\text{Or } 1 - \frac{\beta_j^2 \sigma_m^2}{\sigma_i^2}$$

3.4.5 Portfolio Analysis

Portfolio return (R_p)

Portfolio is combination of two or more securities or assets and portfolio return is simply a weighted average of individual stock returns

In case of two assets case:

$$\bar{R}_p = W_A \bar{R}_A + W_B \bar{R}_B$$

In case of three assets case:

$$R_p = W_A R_A + W_B R_B + W_C R_C$$

Where,

R_p = Expected return on portfolio of stocks

W_A, W_B, W_C are weight of stock A, B and C respectively.

$W_A + W_B + W_C = 1$ (or 100%) always.

Portfolio Risk (σ_p):

The portfolio risk is measured by the variance of the portfolio's rate of return distribution. The risk (variance of return) from a portfolio made up of n assets is calculated as

In case of two assets case:

$$\sigma_p = \sqrt{W_A^2 \sigma_A^2 + W_B^2 \sigma_B^2 + 2W_A W_B \text{Cov}(R_A, R_B)}$$

In case of three assets case,

$$\sigma_p = \sqrt{W_A^2 \sigma_A^2 + W_B^2 \sigma_B^2 + W_C^2 \sigma_C^2 + 2W_A W_B \text{Cov}(R_A, R_B) + 2W_B W_C \text{Cov}(R_B, R_C) + 2W_C W_A \text{Cov}(R_C, R_A)}$$

Where,

- σ_p = Standard deviation of portfolio return of stock A, B and C
- $\text{Cov}(R_A, R_B)$ = Equivalent representation for covariance of returns between assets A & B
- $\text{Cov}(R_B, R_C)$ = Equivalent representation for covariance of returns between assets B & C
- $\text{Cov}(R_C, R_A)$ = Equivalent representation for covariance of returns between assets C & A

Risk minimizing Portfolio

It is the ratio of two assets, which minimize the risk

Symbolically,

$$W_A = \frac{\sigma_B^2 - \text{Cov}(R_A, R_B)}{\sigma_A^2 + \sigma_B^2 - 2\text{Cov}(R_A, R_B)}$$

Where,

- W_A = Weight of Stock A that minimize the portfolio risk of stock A & B.
- σ_A = Standard Deviation of stock A
- σ_B = Standard Deviation of stock B

Capital Asset Pricing Model (CAPM)

Assets with high degree of systematic risk must be priced to yield high rates of return in order to induce investors to accept high degree of risk that is undiversifiable within that market. Hence, CAPM illustrates the positive relation between assets systematic risks and their expected rates of return. CAPM is also called Security Market Line (SML). The SML equation is as

$$K_j = R_f + (\beta_j)(R_m - R_f)$$

Where,

K_j = required rate of return on security j

R_f = Risk free rate (Government security)

R_m = Return on market

β_j = Beta of security j (systematic risk index of security j)

3.4.5 Sharpe's Portfolio Performance Measure

William F. Sharpe devised an index to assess the portfolio performance by considering both the risk and return of any portfolio simultaneously. The Sharpe index of portfolio performance is calculated as

Risk Premium
Total Risk

$$\frac{R_j - R_f}{\beta_j}$$

Where,

S_j = Sharpe index of portfolio performance of portfolio j

R_j = Average return from portfolio j

R_f = Risk Free rate of return

β_j = Standard deviation of returns for portfolio j

3.4.6 Simple Sharpe portfolio Optimization Model

i) Calculating excess return to beta ratio

The construction of an optimal portfolio is simplified if a single number measure the desirability of including a stock in the optimal portfolio. If we accept the single index model (Sharpe), such a number exists. In this case, the desirability of any stock is directly related to its excess return to beta ratio.

$$\text{Excess return to beta ratio} = (R_j - R_f) / \beta_j$$

Where,

R_j = expected return on stock j

R_f = return on risk free assets

β_j = expected change in the rate of return on stock j associated with a 1 percent change in the market return

ii) Ranking the assets from highest to lowest ratio

For determining which of these stocks will be included in the optimal portfolio it is necessary to rank the stocks from highest to lowest based on excess return to beta ratio. For this selection only those stocks with returns greater than the risk free rate of return and with positive beta have been selected.

iii) Establishing a cut off rate

This step is to determine the stocks for which the excess return to beta ratio is higher than a particular unique cutoff point C^* . The value of cutoff rate is calculated as

Where,

σ_m^2 = Variance in the market return

σ_{ei}^2 = unsystematic risk (variance of residual error) which is not associated with market index movement.

iv) Selecting securities for optimum portfolio

The optimal portfolio consists of investing in all stocks for which the excess return to beta ratio is greater than the calculated cut off rate.

iv) Assigning weight to individual securities

Once the composition of the optimal portfolio is known, the next step is to calculate the percentage to be invested in each security which is calculated as

$$Z = \frac{2}{\sigma_j^2 / \sigma_{ei}^2} [(R_j - R_f) / \sigma_j] - C_i$$

3.5 Research Hypothesis

To test set hypotheses, t –test has been employed. Under Null Hypothesis (H_0), t-test statistic is

$$\frac{\bar{X} - \mu}{S / \sqrt{n}}$$

Where,

\bar{X} = average return of the common stock of sample under study

μ = average market return (assumed as population)

S = sample standard deviation

n = number of observation

Hypothesis Testing

In order to achieve the set objectives, following hypotheses are set for testing

Return Characteristics

Null Hypothesis (H_0): $R_j = \mu$ i.e. There is no significant difference between the return of market and sample. i.e. the portfolio return is equal to market return.

Alternative Hypothesis (H_A): $R_j > \mu$ i.e There is a significant difference between the return of market and sample. i.e the portfolio return is higher than market return.

Risk Characteristics

Null Hypothesis (H_0): $\rho = 1$ i.e. There is no significant difference between the systematic risk of sample and market. i.e. the weighted average beta of sample is equal to 1

Alternative Hypothesis (H_A): $\rho < 1$ i.e The systematic risk of the sample portfolio is less than market i.e the weighted average beta of sample portfolio is less than 1

The set hypotheses have been tested on 5% level of significance ($\alpha = 5\%$)

CHAPTER - IV

PRESENTATION AND ANALYSIS OF DATA

This chapter is concerned with the presentation and analysis of the return and risk characteristics of common stock of the companies that have listed their common stock in NEPSE. Logically, the chapter is divided into three sections: Analysis of secondary data, analysis of primary data and major findings of the study. Risk return characteristics of common stocks of some of the listed companies have been analyzed and interpreted on the basis of secondary data. Return and risk characteristics of the three assets portfolio have also been analyzed. Moreover, tables, diagrams and charts have been used to depict the information precisely where necessary.

4.1 Presentation and Analysis of Secondary Data

Risk and return characteristics on the common stocks of individual companies, systematic and unsystematic risk, market sensitivity of the stocks, required rate of return, return and risk of portfolio consisting of three assets have been analyzed in this section. Furthermore, the portfolio performance has also been evaluated using Sharpe index of portfolio performance measure. Ranking of the portfolio has also been made based on risk and return characteristics.

4.1.1 Risk and Return of common stocks

The return on common stock is the percentage increase/decrease in share price and any cash receipts such as dividends over a specific period of time. Here, one year holding period return (R_t) are calculated.

The risk is the possibility that the actual return from holding a stock may deviated from the expected rate of return. It is measured by variance of standard deviation of returns. Average rate of returns, variance of returns,

standard deviation and coefficient of variation are presented in Table 6. The calculations have been shown in Annex II.

Table 6 - Average rates of return, variance, SD and CV

Listed Companies	R_j	Var	SD()	CV
Standard Chartered Bank Nepal Limited (SCBNL)	44.68%	7.16%	26.76%	0.60
Kathmandu Finance Limited (KFL)	18.55%	20.07%	44.80%	2.38
Everest Insurance Company (EIC)	7.44%	2.86%	16.91%	2.27
Soaltee Hotel Limited (SHL)	14.73%	37.75%	61.44%	4.17
Bottlers Nepal Limited (BNL)	-5.07%	2.36%	15.36%	-3.03
Salt Trading Corporation Limited (STCL)	7.44%	0.04%	2%	0.27
Development Credit Bank Limited (DCBL)	49.22%	22.42%	47.35%	0.96

The statistical results in Table 6 shows that the share of Development credit Bank Limited offers the highest average rate of return where as the share of Bottlers Nepal limited offers the negative rate of return and Everest Insurance Company and Salt Trading Corporation Limited offers the lowest rate of return, the share of DCBL seems to be the best for investment. Considering the average rate of return, however, the shares of other companies are also attractive for investment point of view except that of BNL. Hereafter, the stock of BNL has been ignored for portfolio creation due to the fact that the return is negative.

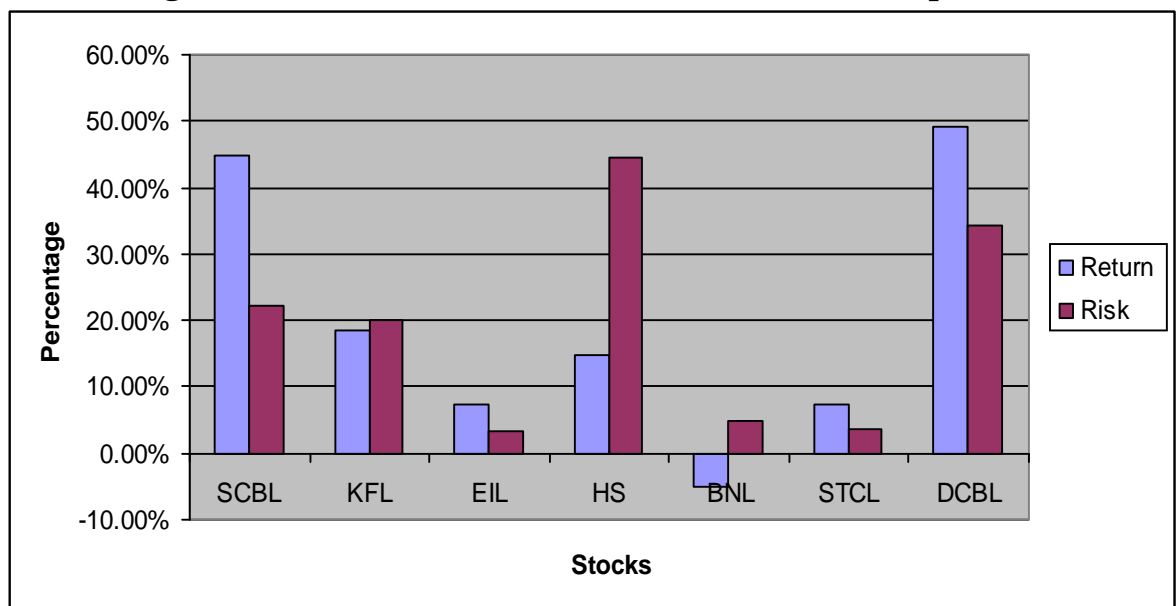
Each and every return carries an uncertainty or risk. Risk can explain the variability of returns from its central tendency. The risk is measured by the standard deviation of the returns. Observing the standard deviation of returns of the companies, Salt Trading Corporation has the lowest i.e. 2% and Soltee Hotel has the highest i.e. 61.44%. DCB, KFL, SCB, EICL and BNL have standard deviation of 47.35%, 44.80%, 26.76%, 16.91%, and 15.36% respectively. Above all Salt Trading Corporation has the lowest risk.

However, the average rates of return are not the same and in such a situation, standard deviation may not provide a meaningful basis for measuring risk. So,

the decision based on risk and return separately can not be taken as rational. So coefficient of variation can depict the exact poison of risk per unit of return. Higher the CV higher the risk and lower the CV lower the risk. So, lower CV is preferable. The CV of SCBL is 0.60, KFL is 2.38, EIC is 2.27, Soltee Hotel is 4.17, STC is 0.27 and DCBL is 0.96. It seems that the CV i.e. risk per unit of return of Soltee Hotel is highest and Salt Trading is lowest among all ignoring the negative CV of BNL. It seems that one percent increase in return of SHL causes 4.17% increase in risk. Like wise for 1% increment of return in stocks of above companies, the investor should assume the risk level at same in percentage of CV. On the basis of CV, the common stock of SCBL seems attractive among all. SH offers the highest risk per unit of return. So, investors retaining the stocks of SH should assume more risk than any others.

The rates of return and risk have been depicted in Figure

Figure 6 - Risk and Return of the stocks of listed companies

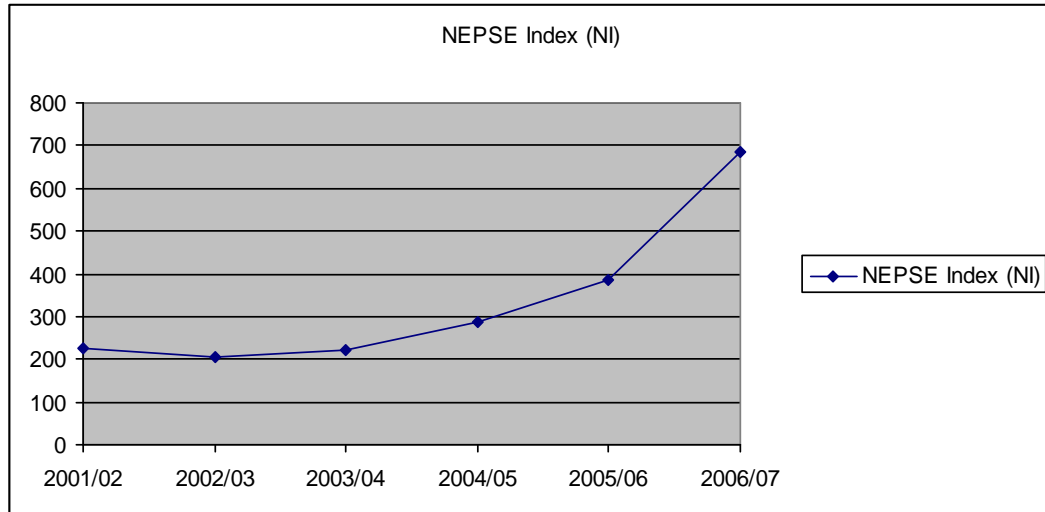


4.1.2 Market Risk and Return

Nepal Stock Exchange Limited (NEPSE) is the only secondary market of Nepal. Hence, NEPSE index represents the market. Market return is calculated

on the basis of NEPSE index. The market indexes of last six years and annual rate of returns have been presented in Figure 7 and 8.

Figure 7 - Movement of Annual NEPSE Index



In the figure 7 it shows that NEPSE index has been increasing every year. In year 2002/03 to 2003/04 its increment was very least but from year 2003/04 to 2006/07 it is increasingly very highly. According to the figure maximum increment was in year 2005/06 to 2006/07.

Figure - 8 Annual Rate of Return of Market



In figure 5 the market return was negative in year 2002/03. From year 2003/04 to 2006/07 the market return is increasing every year. The highest return was shown in year 2006/07.

Average rate of return, variance and standard deviation of market have been shown in Table 7. The calculation have been shown in Annex III

Table 7 - Average Return, Variance, SD and CV of Overall Market Returns

	Average Return	Variance	Standard Deviation	CV
NEPSE (Market)	27.85%	10.64%	32.62%	1.17

Average Rate of Return of Market is 27.85% with a standard deviation of 32.62% Coefficient of variation of the market return is 1.17.

4.1.3 Market Sensitivity of Stocks

Covariance measured how the returns on common stock of individual companies and market co-vary. It measures the absolute association between two variables. Likewise, the correlation coefficient measures the relative association between two variables. The correlation between two variables can be with in the limit of +1 to -1.

The variability of a security's return with the return of the overall market, say NEPSE, return is called systematic risk and can not be avoided. It is un-avoided risk and is measured by beta coefficient. Beta depicts the sensitivity of the security's excess returns to that of the market portfolio.

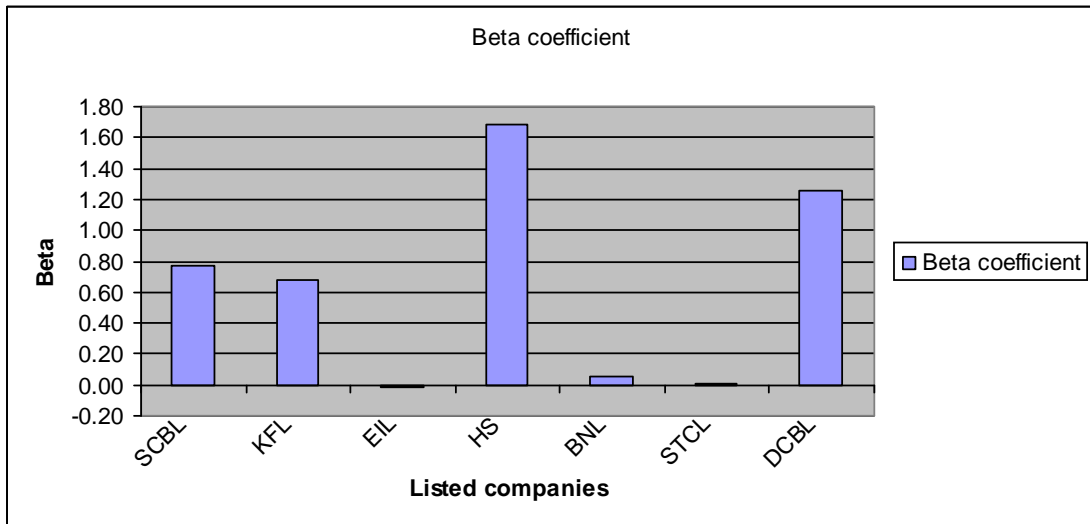
The calculated covariance, correlations and beta coefficients of the stocks of companies are presented in Table 2 Required calculations are shown in Annex IV and V

Table 8 - Covariance and Beta coefficients of companies

Stocks	Beta coefficient	Cov(R_jR_m)
SCBL	0.77	8.18
KFL	0.68	7.23
EICL	-0.01	-0.12
SH	1.69	18
BNL	0.05	0.51
STCL	0.01	0.07
DCBL	1.26	13.44

From the above table it shows that the beta coefficient of the Soltee hotel is highest among all and the lowest is Botllers Nepal Limited ignoring the negative beta of EICL. Similarly, the Soltee Hotel seems highest covariance with market among all and the lowest is STCL ignoring the negative one.

Figure 9 - Beta coefficients of the stocks of listed companies



From the results, covariances of the returns of SCBL, KFL EIL HS BNL, STCL and DCBL with the overall market returns are 8.18%, 7.23%, -0.12%, 18%, 0.51%, 0.07% and 13.44% respectively. As covariance between two variables measures the absolute association, there is the highest absolute association between the returns of HS and market. Among all DCBL has the second highest association, then after KFL, SCBL, BNK and STCL have respectively the lower association with the market. Similarly, EFL have the negative co-variances i.e. there is inverse association between the returns of EFL and market.

By observing the individual shares beta coefficients, the stocks of SCBL, KFL, BN, and STC appear to be defensive since their beta coefficients are less than one. Share with low beta coefficient are less volatile than the market as a whole. The beta coefficients of SCBL, KFL, BN, and STC are 0.77, 0.68, 0.05, and 0.01 respectively which indicate that they are less volatile than the market. However, the beta coefficient of HS and DCBL are 1.69 and 1.26 respectively.

Since their beta coefficients are greater than one, they are called aggressive stock. It indicates that the stock of HS and DCBL are riskier and volatile than market. HS is more risky as its beta coefficient is highest among all the stocks. Stocks of SCBL, KFL, BN and STC are less risky among all.

4.1.4 Systematic and Unsystematic Risk

Total risk is measured by the variance of returns and can be partitioned into systematic and unsystematic risk. Systematic risk is also called unavoidable or undiversifiable risk. It is caused by market factors. Change in the economic, political and sociological environment that affect securities markets are sources of systematic risk.

$$\text{Total risk} = \text{Systematic Risk} + \text{Unsystematic Risk}$$

The systematic Risk is computed as:

$$\text{Systematic Risk} = 2 \text{ Var.}(R_m)$$

The percentage of systematic risk, also called proportion, is measured by coefficient of determination. Proportion of systematic risk is calculated by

$$\text{Proportion of systematic Risk} = \frac{\text{Systematic Risk}}{\text{Total Risk}} = \frac{2 \text{ Var.}(R_m)}{\text{Var.}(R_i)} = r_{im}^2$$

Unsystematic Risk is also called avoidable or diversifiable risk or non market risk or company specific risk. It is ascertained as:

$$\text{Unsystematic Risk} = \text{Total Risk} - \text{Systematic Risk}$$

$$= \text{Var.}(R_i) - 2 \text{ Var.}(R_m)$$

Total, systematic and unsystematic risk and their proportions of the stocks of the companies are presented in Table 9. Required calculation have been shown in Annex VI

Table 9 - Total systematic and unsystematic risk and their proportions

Comp anies	Total Risk (var)	Systemati c Risk [² Var(R _m)]	Proportion of Systematic Risk	Unsysteme tic Risk	Proportion of Unsystematic Risk	Var(R _m)	β_{jm}^2	β_{jm}
SCBL	7.16%	6.31%	88.11%	0.85%	11.89%	0.1064	0.59	0.77
KFL	20.07%	4.97%	24.75%	15.10%	75.25%	0.1064	0.47	0.68
EICL	2.86%	0.00%	0.03%	2.86%	99.97%	0.1064	0.00	-0.01
SH	37.75%	30.39%	80.50%	7.36%	19.50%	0.1064	2.86	1.69
BNL	2.36%	0.03%	1.13%	2.33%	98.87%	0.1064	0.00	0.05
STCL	0.04%	0.00%	0.85%	0.04%	99.15%	0.1064	0.00	0.01
DCBL	22.42%	16.89%	75.34%	5.53%	24.66%	0.1064	1.59	1.26

From the statistical result shown in Table 5, the stocks of SCBL, KFL, EICL, SH, BNL, STCL and DCBL have the systematic risks of 6.31%, 4.97%, 0%, 30.39%, 0.03%, 0%, and 16.89% respectively. Comparing each other, the share of SH has the highest systematic risk i.e. 30.39%, where as the share of EICL and STCL has the least systematic risk. On the basis of systematic risk EICL and STCL shares are more attractive than others. The stocks of SH appears most risky.

Out of total risk of individual stocks return, the proportion of systematic risks of SCBL, KFL, EICL, SH, BNL, STCL and DCBL are 88.11%, 24.75%, 0.03%, 80.50%, 1.13%, 0.85% and 75.34% respectively. It seems that 88.11% of variability of returns of the common stock of SCBL is systematic or caused by market factors. Likewise all the stocks systematic risk is due to the market factor. These cannot be reduced. Considering the unsystematic risk, unsystematic risk of stocks SCBL, KFL, EICL, SH, BNL, STCL and DCBL are 0.85%, 15.10%, 2.86, 7.36%, 2.33% 0.04% and 5.53% respectively. Among them, the stock of KFL has the greatest unsystematic risk and STCL has the least unsystematic risk. Out of total risk of SCBL, KFL, EICL, SH, BNL, STCL and DCBL 11.89%, 75.25%, 99.97%, 19.50%, 98.87%, 99.15% and 24.66% are unsystematic or company specific risks which can be diversified away with an optimal portfolio construction. There is highest

company specific risk of the stocks of EICL i.e. 99.97%. From the unsystematic risk perspective, the management errors or company specific weaknesses of EICL are the highest among all. Out of total risk of stocks unsystematic risks are can be diversified away.

4.1.5 Price situation of the stocks of listed companies

The required rate of return is the minimum rate of return that an investor expects from his/her investment in risky assets. It is the function of real rate of return and systematic risk. The required rate of return is the return on risk free assets i.e. government securities plus risk premium. It is determined by CAPM/SML.

The greater the beta of a security, greater will be the risk and the greater the expected return required. Likewise, the lower the beta, lower will be the risk, the more valuable it becomes and the lower the expected return required.

The beta coefficient, risk premiums and required rate of return on the stock of listed companies have been summarized in Table 10 Required calculations have been shown in **Annex VII & VIII**

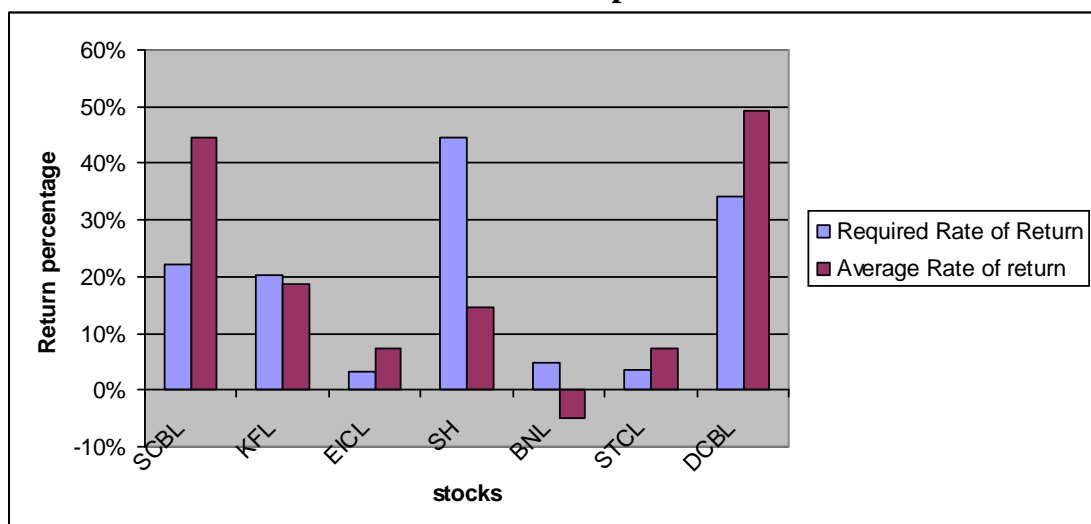
Table 10 - Price Situations of Common Stocks of listed companies

Companies	Beta	Rf	Rm	Risk Premium (Rm-Rf)	Required Rate of Return	Average Rate of return	Price Situation
SCBL	0.77	3.50%	27.85%	24.35%	22.25%	44.68%	Underpriced
KFL	0.68	3.50%	27.85%	24.35%	20.14%	18.55%	Overpriced
EILC	-0.01	3.50%	27.85%	24.35%	3.27%	7.44%	Underpriced
SH	1.69	3.50%	27.85%	24.35%	44.65%	14.73%	Overpriced
BNL	0.05	3.50%	27.85%	24.35%	4.72%	-5.07%	Overpriced
STCL	0.01	3.50%	27.85%	24.35%	3.64%	7.44%	Underpriced
DCBL	1.26	3.50%	27.85%	24.35%	34.18%	49.22%	Underpriced

From Table 10, it has been observed that the overall average market return is 27.85%. The Treasury bill rate is 3.50%. The risk premium for the stocks of all

the companies in the market is the difference between risk free rate and market return. i.e. 24.35%. Based on the risky ness of the stocks, the required rate of return for individual stocks are 22.25%, 20.14%, 3.27%, 44.65%, 4.72%, 3.64%, 34.18% for SCBL, KFL, EIL, HS, BNL, STCL, and DCBL respectively. Higher the beta, higher will be the required rate of return and vice versa. Since, the beta coefficients of the stock of SH is highest among all i.e. 1.69, its required rate of return is also the highest among all. Higher systematic risk requires higher risk premium. Likewise, the beta coefficient of the stock of STCL is the lowest among all i.e. 0.01 having the risk premium 24.35% and requiring the return 3.64%. Comparing the required rate of return and the expected rate of return the stocks of listed companies, the required rates of return of the most companies are less than expected / average rate of return of the SH and KFL is over priced because its required rate of return is more than expected/average rate of return. As a result the shares of all the companies given in the above table appear attractive to investors expect shares of SH and KFL. (Ignoring the shares of BNL due to its negative returns). Hence, investors are advised to purchase not to sell the common stocks of the SCBL, EICL, STCL and DCBL in the market and sell the common stock of HS if they are holding. The investors are required to take long position to gain from the stocks of SCBL, EICL, STCL and DCBL.

Figure 10 - Required Rate of Return and Average Rate of Return of Stocks of Listed Companies



4.1.6 Portfolio Analysis

The objectives of portfolio analysis is to develop a portfolio that has the maximum return at whatever level of risk the investor deems appropriate. Because a portfolio is a collection of securities the optimal portfolio has been selected from a set of possible portfolios. For this purpose the stocks with lesser coefficient of variation has been selected and different sets have been created and different weights have been assigned to them. The calculations of correlation between the stocks of the different companies have been shown in **Annex IX**

Three assets portfolio returns of the companies is the weighted average return of the return of three assets based on the investment proportions. Three assets portfolio returns is calculated as

$$\text{Portfolio Return (Rp)} = X_1R_1 + X_2R_2 + X_3R_3$$

Here, X_1 , X_2 and X_3 represent the investment proportion in asset 1, 2 and 3 respectively, likewise, R_1 , R_2 and R_3 represent the return of assets 1, 2 and 3 respectively.

Table 11 - Portfolio between SCBL KFL and EICL (Set 1)

	SCBL	KFL	EICL			
Return	44.68%	18.55%	7.44%			
Risk	26.76%	44.80%	16.91%	rSK = 0.42	rSE = 0.19	rKE = 0.68
Portfolio set	X1	X2	X2	E(Rp)	SDp	CV
A	0	0	1	7.44%	16.91%	2.27
B	0	0.5	0.5	13.00%	85.40%	6.57
C	0.33	0.33	0.34	23.40%	80.33%	3.43
D	1	0	0	44.68%	26.76%	0.60
E	0.5	0.5	0	31.62%	89.01%	2.82
F	0	1	0	18.55%	44.80%	2.42
G	0.5	0	0.5	29.78%	17.34%	0.58

From the different opportunity sets shown in Table 11 the highest portfolio return is derived from set D and the least portfolio risk is from set A. If the person makes equal investment in stock SCBL and KFL, the total risk is highest among all. But if an investor divides his invest able funds into two

assets stocks as per set G, the return can be averaged and the total risk can be reduced where the risk per unit of return is minimum. Since the two stocks are perfectly positively correlated the total risk cannot be significantly reduced.

Table 12 - Portfolio between SCBL KFL and STCL (Set 2)

	SCBL	KFL	STCL			
Return	44.68%	18.55%	7.44%			
Risk	26.76%	44.80%	2.00%	rSK = 0.42	rSS = 0.01	rKS = 0.35
Portfolio set	X1	X2	X3	E(Rp)	SDp	CV
A	0	0	1	7.44%	2%	0.27
B	0	0.5	0.5	13.00%	22.42%	1.73
C	0.33	0.33	0.34	23.40%	57.11%	2.44
D	1	0	0	44.68%	26.76%	0.60
E	0.5	0.5	0	31.62%	29.68%	0.94
F	0	1	0	18.55%	44.80%	2.42
G	0.5	0	0.5	26.06%	13.42%	0.51

From the different opportunity shown in table 12 the highest portfolio return is from set D and the lowest portfolio return is from set A. And the highest risk is from Set C and lowest risk is from set A also. Risk can be significantly reduced with a well diversified portfolio. If an investor makes entire investment in stock SCBL, the return is highest among all and risk is in average. But the investor divides his invest able fund into two stock as per set G, the return is average and the risk is per unit of return is minimum. Since the stocks are nearly perfectly correlated, the total risk can not be significantly reduced.

Table 13 - Portfolio between SCBL KFL and DCBL (Set 3)

	SCBL	KFL	DCBL			
Return	44.68%	18.55%	49.22%			
Risk	26.76%	44.80%	47.35%	rSK = 0.42	rSD=0.43	rKD=0.03
Portfolio set	X1	X2	X3	E(Rp)	SDp	CV
A	0	0	1	49.22%	47.35%	0.96
B	0	0.5	0.5	33.89%	37.58%	1.11
C	0.33	0.33	0.34	37.60%	30.57%	0.81
D	1	0	0	44.68%	26.76%	0.60
E	0.5	0.5	0	31.62%	29.68%	0.94
F	0	1	0	18.55%	44.80%	2.42
G	0.5	0	0.5	46.95%	32.24%	0.69

From the different opportunity sets shown in Table 13, the highest portfolio return is derived from set A and the least portfolio risk is from set D. However, the total risk can be significantly reduced with a well diversified portfolio. If an investor makes entire investment in stock DCBL, the total risk is highest among all but if the investor invests the fund in stock SCBL the return is average but risk is minimum among all.

Since the stocks are nearly perfectly correlated, the total risk can not be significantly reduced.

Table 14 - Portfolio between SCBL STCL and EICL (Set 4)

	SCBL	STCL	EICL			
Return	44.68%	7.44%	7.44%			
Risk	26.76%	2.00%	16.91%	rSS=0.01	rSE=0.19	rSE=-0.37
Portfolio set	X1	X3	X2	E(Rp)	SDp	CV
A	0	0	1	7.44%	16.91%	2.27
B	0	0.5	0.5	7.44%	8.51%	1.14
C	0.33	0.33	0.34	19.73%	11.57%	0.59
D	1	0	0	44.68%	26.76%	0.60
E	0.5	0.5	0	26.06%	13.42%	0.51
F	0	1	0	7.44%	2.00%	0.27
G	0.5	0	0.5	29.78%	17.34%	0.58

From the different opportunity shown in table 14 the highest portfolio return is derived from set D and least portfolio risk is form set F. However the total risk can be significantly reduced with the well diversified portfolio. If an investor makes entire investment in stock of STCL, the return is least but the risk is minimum among all. But the investor divided his fund into stock SCBL and STCL the return is average but total risk can be reduced where the risk per unit of return is minimum than that others. The stocks are negatively correlated.

Table 15 - Portfolio between SCBL STCL and DCBL (Set 5)

	SCBL	STCL	DCBL			
Return	44.68%	7.44%	49.22%			
Risk	26.76%	2.00%	47.35%	rSS=0.01	rSD=0.43	rSD=0.00
	X1	X3	X3	E(Rp)	SDp	CV
A	0	0	1	49.22%	47.35%	0.96
B	0	0.5	0.5	28.33%	23.70%	0.84
C	0.33	0.33	0.34	33.93%	21.73%	0.64
D	1	0	0	44.68%	26.76%	0.60
E	0.5	0.5	0	26.06%	13.42%	0.51
F	0	1	0	7.44%	2.00%	0.27
G	0.5	0	0.5	46.95%	32.24%	0.69

From the different opportunity sets shown in table 11 the highest portfolio return is derived from set A and the least portfolio risk is from set F. However the total risk can be significantly reduced with a well diversified portfolio. If an investor makes all investment in stock of DCBL, the return is highest among all as well risk is also highest among all. But if the investor divided his invest able fund into stock SCBL and STCL the return is average but risk factor is also minimum or average in all. Since the stocks are perfectly positively correlated the total risk can not be significantly reduced.

Table 16 – Portfolio between SCBL EICL and DCBL (Set 6)

	SCBL	EICL	DCBL			
Return	44.68%	7.44%	49.22%			
Risk	26.76%	16.91%	47.35%	rSE=0.19	rSD=0.14	rSD=-0.41
	X1	X2	X3	E(Rp)	SDp	CV
A	0	0	1	49.22%	47.35%	0.96
B	0	0.5	0.5	28.33%	21.95%	0.77
C	0.33	0.33	0.34	33.93%	21.39%	0.63
D	1	0	0	44.68%	26.76%	0.60
E	0.5	0.5	0	29.78%	17.34%	0.58
F	0	1	0	7.44%	17%	2.27
G	0.5	0	0.5	46.95	32.24%	0.01

From the different opportunity sets shown in table 16 the highest portfolio return is derived from set A and the least portfolio risk is from set F. However the total risk can be significantly reduced with a well diversified portfolio. If an investor makes all investment in stock of DCBL, the return is highest among all

as well risk is also highest among all. But if the investor divided his invest able fund into stock SCBL and DCBLL the return is high but risk factor is also average in all. The stocks are negatively correlated the total risk can be significantly reduced.

Table 17 - Portfolio between KFL, EICL and STCL (Set 7)

	KFL	EICL	STCL			
Return	18.55%	7.44%	7.44%			
Risk	44.80%	16.91%	2.00%	rKE=0.68	rES=0.35	rES=-0.37
	X1	X2	X3	E(Rp)	SDp	CV
A	0	0	1	7.44%	2.00%	0.27
B	0	0.5	0.5	7.44%	8.51%	1.14
C	0.33	0.33	0.34	11.11%	13.52%	1.22
D	1	0	0	18.55%	44.80%	2.42
E	0.5	0.5	0	13.00%	85.40%	6.57
F	0	1	0	7.44%	16.91%	2.27
G	0.5	0	0.5	13%	22.42%	1.72

From the different opportunity sets shown in table 17 the highest portfolio return is derived from set D and the least portfolio risk is from set F. However the total risk can be significantly reduced with a well diversified portfolio. If an investor makes all investment in stock of STCL, the return is average among all as well risk is least among all. In this set we can see that stocks are risky for investment or we can say that risk factor is higher in average in this combination.

Table 18 - Portfolio between EICL, STCL and DCBL (Set 8)

	KFL	STCL	DCBL			
Return	18.55%	7.44%	49.22%	rKS= 0.35	rSD= 0	rKD= 0.03
Risk	44.80%	2.00%	47.35%			
	X1	X3	X3	E(Rp)	SDp	CV
A	0	0	1	49.22%	47.35%	0.96
B	0	0.5	0.5	28.33%	23.70%	0.84
C	0.33	0.33	0.34	25.31%	25.20%	1.00
D	1	0	0	18.55%	44.80%	2.42
E	0.5	0.5	0	13.00%	22.42%	1.72
F	0	1	0	7.44%	2.00%	0.27
G	0.5	0	0.5	34%	37.58%	1.11

From the different opportunity sets shown in table 18 the highest portfolio return is derived from set A and the least portfolio risk is from set F. However the total risk can be significantly reduced with a well diversified portfolio. If an investor makes all investment in stock of DCBL, the return is highest among all as well risk is also highest among all. But if the investor divided the investable fund into all three stocks the return is average but risk factor is also average in all. Since the stocks are perfectly positively correlated the total risk can not be significantly reduced.

Table 19 - Portfolio between KFL, STCL and DCBL (Set 9)

	EICL	STCL	DCBL			
Return	7.44%	7.44%	49.22%	rES= -0.37	rSD= 0	rED= -0.41
Risk	16.91%	2.00%	47.35%			
	X1	X3	X3	E(Rp)	SDp	CV
A	0	0	1	49.22%	47.35%	0.96
B	0	0.5	0.5	28.33%	23.70%	0.84
C	0.33	0.33	0.34	21.65%	15.13%	0.70
D	1	0	0	7.44%	16.91%	2.27
E	0.5	0.5	0	7.44%	8.51%	1.14
F	0	1	0	7.44%	2.00%	0.27
G	0.5	0	0.5	28%	21.95%	0.77

From the different opportunity sets shown in table 19 the highest portfolio return is derived from set A and the least portfolio risk is from set F. However the total risk can be significantly reduced with a well diversified portfolio. If an investor makes all investment in stock of DCBL, the return is highest among all as well risk is also highest. But if the investor divided the investable fund into all three stock the return is average as well risk factor is also average in all. Since the stocks are perfectly positively correlated the total risk can not be significantly reduced.

Ranking sets of portfolio have been ranked based on their return, risk and coefficient of variation, which have been shown in Table 20

Table 20 – Ranking based on portfolio return, risk and coefficient of variation

Set	Combination with weights			R _p	ρ	CV	Ranking Based on CV
	SCBL	STCL	EICL				
4-E	0.5	0.5	0	26.06%	13.42%	0.51	1
	SCBL	KFL	STCL				
2-G	0.5	0	0.5	26.06%	13.42%	0.51	1
	SCBL	STCL	DCBL				
5-E	0.5	0.5	0	26.06%	13.42%	0.51	1
	SCBL	EICL	DCBL				
6-E	0.5	0.5	0	29.78%	17.34%	0.58	2
	SCBL	KFL	EICL				
1-G	0.5	0	0.5	29.78%	17.34%	0.58	2
	SCBL	KFL	DCBL				
3-D	0.5	0	0.5	46.95%	32.24%	0.69	3
	EICL	STCL	DCBL				
9-C	0.33	0.33	0.34	21.65%	15.13%	0.70	4
	KFL	STCL	DCBL				
8-B	0	0.5	0.5	28.33%	23.70%	0.84	5
	KFL	EICL	STCL				
7-B	0	0.5	0.5	7.44%	8.51%	1.14	6

From the different subsets of portfolio consisting of different weights, the best subset of each set has been summarized in table 20. From those different opportunities sets, the best portfolio is set 4-E, consisting of the stock of SCBL and STCL with equal weights and it has been ranked as the 1st term of highest return with comparing lowest risk. Likewise the portfolio between the stocks of SCBL and EICL with the equal weights and it has been ranked as 2nd and the stock of SCBL and DCBL with the equal weight as 3rd rank and the stock of EICL and STCL and DCBL with the weight of 0.33, 0.33 and 0.34 has been rank as 4th rank and the portfolio between the stock of STCL and DCBL with the equal weight ranked as 5th rank and the portfolio between stock of EICL and STCL with the equal weight has been ranked as 6th rank. If the investors are required to create a well diversified portfolio between those stocks, they are shown in table 20.

4.1.7 Portfolio Performance Evaluation

William F. Sharpe, Jack Treynor and Dr. Michael C. Jensen developed different indices of measuring the portfolio performance. William F. Sharpe considered both risk and return simultaneously. Here, the portfolio performance of listed companies has been evaluated based on Sharpe index.

The portfolio performance indicators using Sharpe index of each stocks of listed companies have been presented in Table 21.

Table 21 – SHARPE Index for the different portfolios

Stocks	R_p	R_f	σ_p	$S_p = \frac{R_p - R_f}{\sigma_p}$	Rankings
STCL	7.44%	3.50%	2%	1.97	1
SCBL	44.68%	3.50%	26.76%	1.54	2
DCBL	49.22%	3.50%	47.35%	0.97	3
KFL	18.55%	3.50%	44.80%	0.34	4
EICL	7.44%	3.50%	16.91%	0.23	5
SH	14.73%	3.50%	61.44%	0.18	6
BNL	-5.07%	3.50%	15.36%	-0.56	7

From the table 21, it has been seen that the sharpe index of portfolio performance measure of STCL, SCBL, DCBL, KFL, EICL, SH and BNL seemed 1.97, 1.54, 0.97, 0.34, 0.23, 0.18 and -0.56 respectively. The portfolio performance measuring index of STCL seemed highest and that the SH seemed the lowest among all. (Ignoring the negative index of BNL). On the basis of Sharpe index, the portfolio of STCL is the best performer. Then after are SCBL, DCBL, KFL and EICL respectively.

Sharpe Index of portfolio performance measures also reveals that if investors are willing to create a well diversified portfolio then they are required to create a portfolio between the stocks of STCL and SCBL to maximize the return and minimize the risk.

4.1.8 Optimum Portfolio

Based on simple Sharpe Portfolio Optimization Model, an optimum portfolio has been creating selecting different securities with different weights. The calculations are shown in table below. For the calculation Risk free return (R_f) is the bank rate which is 3.5% p.a.

Table 22- Ranking of stocks based on Excess Return to Beta ($R_i - R_f$)/

Sn	Stock Name	Mean Return	Excess Return	Beta	Unsystematic Risk	Excess Return to Beta
		R_i	$R_i - R_f$		σ_{ei}^2	$(R_i - R_f) /$
1	STCL	7.44%	3.94%	0.01	0.04%	5.9888
2	SCBL	44.68%	41.18%	0.77	3.09%	0.5356
3	DCBL	49.22%	45.72%	1.26	11.54%	0.3620
4	KFL	18.55%	15.05%	0.68	16.93%	0.2215
5	HS	14.73%	11.23%	1.69	18.26%	0.0664
6	BNL	-5.07%	-8.57%	0.05	2.34%	-1.7879
7	EIL	7.44%	3.94%	-0.01	2.86%	-3.4935

From the above table it can be seen that only one stock gave negative returns. As the criteria for selection mentioned above ignores stock with negative return have been ignored. The Sharpe model will automatically exclude such stocks as its ranking is based on excess returns (returns greater than risk free rate of return)

AS can be seen from above table, except one all stock has expected returns higher than the risk free rate of returns. For determining which of these stocks will be included in the optimal portfolio it is necessary to rank the stocks from highest to lowest based on excess return to beta ratio.

The next step is to determine the stocks for which the excess return to beta ratio is higher than a particular unique cutoff point C^* . The calculation is given below in table.

Table 23 - Calculation for determining cut off rate

Sn	Stock Name	Excess Return to Beta	Unsystematic Risk						
		$(R_i - R_f) / \sigma_{ei}^2$	$(R_j - R_f)^*$	$(R_i - R_f)^* / \sigma_{ei}^2$	σ_{ei}^2	$(R_i - R_f)^* / \sigma_{ei}^2$	σ_{ei}^2		Cut off rate C
1	STCL	5.9888	0.04%	0.0003	0.6536	0.1091	0.6536	0.1091	0.0687
2	SCBL	0.5356	3.09%	0.3166	10.2430	19.1229	10.8966	19.2320	0.3806
3	DCBL	0.3620	11.54%	0.5775	5.0051	13.8280	15.9016	33.0601	0.3745
4	KFL	0.2215	16.93%	0.1023	0.6041	2.7273	16.5057	35.7874	0.3653
5	HS	0.0664	18.26%	0.1900	1.0403	15.6722	17.5460	51.4596	0.2883

From the above calculation it shows that only the two stock have higher Excess Return to beta than the cutoff rate so the cut off point is 0.3806.

The second expression determines the relative investment in each security, and the first expression simply scales the weights on each security so that they sum to 1. The residual variance plays an important role in determining how much to invest in each security.

Table 24 - Securities in an optimum portfolio and their weights

Sn	Stock Name	σ_{ei}^2	$(R_i - R_f) / \sigma_{ei}^2$	C	Z	% investment
1	STCL	0.1091	5.9888	0.0687	0.6461	0.1789
2	SCBL	19.1229	0.5356	0.3806	2.9649	0.8211
					3.6109	1.0000

From the table only two securities i.e. STCL and SCBL have been selected for an optimal portfolio from available alternatives as their excess return to beta ratios are higher than cutoff rate. The optimal weights are 17.89% and 82.11% if an investor wants to create an optimal portfolio between available stocks; it is advised to select those stocks with above weights.

Table 25 - Calculation of Expected returns on Portfolio

Sn	Stock Name	Expected Return	% investment	EW
		E	W	
1	STCL	7.44%	0.1789	0.01331
2	SCBL	44.68%	0.8211	0.36687
Expected return on portfolio				0.38018
From two assets model Portfolio variance				0.0483

From the above table the calculation shows that the Expected Return on Portfolio between the two stock STCL and SCBL with the weight of 17.89%

and 82.11% is 38.18%. If the investor wish to make best portfolio to reduce the risk it is the best option. Because the portfolio variance is only 4.8% and comparing to return the risk is very low.

4.1.9 Hypothesis Testing

4.1.9.1 Return Characteristics

Null Hypothesis (H₀): $R_j = \mu$ There is no significant difference between the portfolio return and market return.

Alternative Hypothesis (H_A): $R_j > \mu$ Portfolio return is higher than market return.

DECISION: Calculated value of t is -1.087 and critical value at 5% level of significance for one tail test is 1.94. Since, the calculated value is less than critical value, null hypothesis is accepted which means that there is no significant difference between the portfolio return and market return.

4.1.9.2 Risk Characteristics

Null Hypothesis (H₀) $\rho = 1$ There is no significant different between the systematic risk and of market and sample portfolio.

Alternative Hypothesis (H_A) $\rho < 1$ The systematic risk of sample portfolio is less than the market i.e. 1

DECISION: Calculated value of t is 0.6 and critical value at 5% level of significance for one tail test is 1.94. Since the calculated value is less than the critical value, null hypothesis is accepted which means that the systematic risk of the sample portfolio is equal to market i.e.1

4.2 Major Findings of the Study

On the base on above analysis there are some findings in this study which are as follows.

4.2.1 Return and Risk Characteristic

The shares of Development Credit Bank Ltd. Offers the highest average rate of return where as the shares of Bottlers Nepal offers the negative rate of return and Soltee Hotel and Salt trading offers the lowest return. The different shares have different rate of returns with in the range of -5.07 to 49.22. On the basis of average rate of return, the share of DCBL seems to be the best for investment.

Observing the standard deviation of returns of the companies, Salt trading Corporation has the lowest standard deviation i.e. 2% and Soltee Hotel Limited has the highest i.e. 61.44%. SCBL, KFL, EICL, BNL and DCBL have standard deviation of 26.76%, 44.80%, 16.91%, 15.36% and 47.35% respectively. Salt trading Corporation has the lowest risk among all.

Coefficient of variation can depict the exact position of risk per unit of return. Higher the CV higher the risk and lower the CV lower the risk. So, lower CV is preferable. On the basis of CV, the common stocks of Salt trading Corporation Limited seem attractive among all with CV of 0.27 and Bottlers Nepal Limited offers the highest risk per unit of return with CV of 4.17. So investors retaining the stocks of BNL should assume more risk than any others.

4.2.2 Market Risk and Return

Average rate of return of market is only 27.85% with the standard deviation of 32.62%. Coefficient of variation, which measures the risk per unit of return, is 1.17.

4.2.3 Market Sensitivity

The stock of SCBL, KFL, EICL, BNL and STCL appeared to be defensive since their beta coefficients are less than 1 and are less volatile than the market as a whole. However the beta coefficient of HS and DCBL is 1.69 and 1.26 respectively and are aggressive stock which indicates that the stocks are riskier and volatile than market. Among them stock of HS is more risky as its beta coefficient is highest among all other stocks and the stocks of STCL is least risky among all. Ignoring the negative beta of EICL.

4.2.4 Systematic and Unsystematic Risk

The stock of SCBL, KFL, EICL, SH, BNL, STCL and DCBL have the systematic risk of 6.31%, 4.97%, 0%, 30.39%, 0.03%, 0%, and 16.89% respectively. Comparing each other, the share of SH has the highest systematic risk i.e. 30.39%, whereas the share of EICL and STCL has the least systematic risk. On the basis of systematic risk EICL and STCL shares are more attractive than others. The stocks of HS appear most risky.

Comparing the proportion of systematic risks of each other it seems that 88.11% of variability of returns of the common stock of SCBL is systematic or caused by market factors. Likewise KFL, EICL, SH, BNL, STCL and DCBL are 24.75%, 0.03%, 80.50%, 1.13%, 0.85% and 75.34% respectively. In all the stocks systematic risk is due to the market factor. These cannot be reduced.

The unsystematic risk of stocks SCBL, KFL, EICL, SH, BNL, STCL and DCBL are 0.85%, 15.10%, 2.86, 7.36%, 2.33% 0.04% and 5.53% respectively. Among them, the stock of KFL has the greatest unsystematic risk and STCL has the least unsystematic risk. Out of total risk of SCBL, KFL, EICL, SH, BNL, STCL and DCBL 11.89%, 75.25%, 99.97%, 19.50%, 98.87%, 99.15% and 24.66% are unsystematic or company specific risks which can be diversified away with an optimal portfolio construction. There is highest company specific risk of the stocks of EICL i.e. 99.97%. From the

unsystematic risk perspective, the management errors or company specific weaknesses of EICL are the highest among all. Out of total risk of stocks unsystematic risks are can be diversified away.

4.2.5 Price Situation

Comparing the required rate of return and the expected rate of return of the stocks of listed companies, the required rates of return for SCBL, EICL STCL and DCBL companies are less than expected / average rates of return, the stocks are under priced in the market and they are attractive to the investors. Hence investors are advice to purchase not to sell the common stocks of these companies. The shares of KFL, HSL and BNL are over priced. Whose expected / average rate of return are less than required rate of return so investors are advice to sell the shares of these companies if they are holding.

4.2.6 Portfolio Analysis

From the different opportunity sets, the best portfolio consisting of the stocks of SCBL and STCL with the equal weights and has been ranked in 1st in terms of highest return and lowest risk. Likewise the portfolio between the stocks of SCBL and EICL with the equal weights has been ranked as 2nd and the SCBL and DCBL with the equal weights has been ranked as 3rd and the stocks of EICL, STCL and DCBL with the weight of 0.33,0.33 &0.34 respectively has been ranked as 4th and the stock of STCL and DCBL with the equal weight has been ranked as 5th and finally stock of EICL and STCL with the equal weight has been ranked as 6th which is last.

4.2.7 Portfolio performance Evaluation

The Sharpe index of portfolio performance measure of, SCBL, KFL, EICL, HS, BNL, STCL and DCBL are 1.54, 0.34, 0.23, 0.18, -0.56, 1.97, and 0.97 respectively. The portfolio performance measuring index of STCL seemed highest and HS seemed the lowest among all. (Ignoring the negative return of

BNL). On the basis of Sharpe index the portfolio of STCL is the best performer and than after SCBL, DCBL, KFL, EICL and HS respectively.

SHARPE index of portfolio performance measures also reveals that if investors are willing to create a well diversified portfolio than they are required to create well diversified portfolio between the stocks of STCL and SCBL to maximize the return and minimize the risk.

4.2.8 Optimal Portfolio

Based on the comparison of excess return to beta ratios with cutoff rate, only 2 securities i.e. STCL and SCBL have been selected for an optimum portfolio form available alternatives. The optimum weights are 18% and 82% respectively. The Portfolio Expected Return from the two securities is 38.18% and the variance is 4.83%.

CHAPTER - V

SUMMARY, CONCLUSION AND RECOMMENDATIONS

This chapter is concerned with the summary of the study, conclusion and recommendation on the basis of study findings. Logically, this chapter is divided into three sections: i) Summary ii) Conclusion iii) Recommendations.

5.1 Summary

Like blood is necessary for human beings, finance is for business organizations and industries. Each and every business organization should base their decision making in financial management. Financial management is mainly concerned with the acquisition and utilization of funds. For this, financial market plays vital role in utilizing financial resource for expanding productive sectors in the country. It mobilizes unproductive and unutilized financial resources towards productive sectors and helps in expanding economic growth of a country.

Investment in capital markets collect necessary funds and divert the collected funds towards the productive sectors. Due to this, industrialization is possible. Capital market is a significant mechanism for the development of national economy. It reinvigorates and boosts up the economic activities by mobilizing especially domestic financial resources. It provides best investment opportunities by transferring the funds from surplus savings to need based sectors through the transaction of financial instruments.

Financial instruments are traded in securities market. Stock market is the largest financial market all over the world where stocks of various business organizations are traded. It has the greatest role in the development of financial system. Capital market consists of i) Primary Market and ii) Secondary Market.

After the formation of SEBO and conversion of SEC into NEPSE, brokers and market makers operate on the trading floor as per the securities Exchange Act, Rules and Byelaws of NEPSE. NEPSE began its trading operation as a secondary market on 13th January 1994 through its licensed members.

Portfolio management is concerned with efficient management of portfolio investment in financial assets, including shares and debentures of companies. The management may be by professionals, by others or by individuals themselves. A portfolio of an individual or corporate unit is the holding of securities and investment in financial assets. These holdings are the results of individual preferences and decisions regarding risk and return.

The objective of portfolio management is to analyze different individual assets and delineate efficient portfolios keeping in mind the safety or security of investment through diversification. Furthermore, the marketability and liquidity factors should also be considered in portfolio management.

Diversification is important for every investor. In fact, it is so important that Harry Markowitz won the Nobel Prize in 1990 largely for his work on diversification.

The essence of portfolio theory can be simply stated. The two characteristics of interest are the expected return from the portfolio and the risk. Regarding the risk of the portfolio, the whole (the risk characteristics of the portfolio) is unequal to the sum of the parts (the risk characteristics of the individual assets)

The expected portfolio return is the simple weighted average of the expected returns from the investment represented by a portfolio. And total portfolio risk is measured by the variance of the portfolio's rate of return distribution. The portfolio risk depends on the risk of the individual securities and the covariance between the returns of the individual securities.

Investment is ever followed by risk. So an investor must think about the risk before making an investment in any securities. Nepalese individual investors do not seem to be investing their funds in stocks of different companies i.e. portfolio creation is not found in Nepalese context. In this regard, portfolio management is crucial for the minimization of risk associated to the return of their investment. Hence, this study is mainly focused on the risk and return of the portfolios consisting of the securities of different listed companies in NEPSE.

Due to lower interest rate provided by the banks, Nepalese investors seem to invest their money in capital market in shares and debentures. Such tendency has been seen since the last decade significantly. After the establishment of NEPSE, private sectors initiated to raise funds through capital market. Capital market/stock market thus has created investment opportunities to investors.

The general objective of this study is to analyze the portfolio return and risk consisting of different listed companies in NEPSE.

Each study is conducted under some constraints and limitations. Likewise, this study is also limited by some common constraints. This study is based on the fundamental analysis of the common stocks of listed companies in NEPSE. The published data from F/Y 2002/03 to 2006/07 have been taken to analyze.

5.2 Conclusion

Stock market investment is considered as a gambling. Many people have unrealistically optimistic or pessimistic expectations about stock market investment or perhaps just a fear of the unknown. This study enables investors to put the returns they can expect and the risk they may take into better perspective. Nepalese stock market is in emerging stage. It is developed in accelerating since the political change in 1990 is effect of openness and liberalization in national economy. But, due to the lack of knowledge and

required information, Nepalese private investors are unable to analyze the securities as well as market prosperity.

From the above study, the share of DCBL offers the highest average rate of return where as the share of BNL offers the negative rate of return and STCL offers the lowest average rate of return.

Observing the standard deviation of returns of the companies, STCL has the lowest i.e. 2% and SHL has the highest i.e. 61.44%. Therefore STCL has the lowest risk among all stock.

Coefficient of variation can depict the exact position of risk per unit of return. Higher the CV higher the risk and lower the CV lower the risk. So, lower CV is preferable. On the basis of CV the common stock of STCL seem attractive among all with CV of 0.27 and SHL offers the highest risk per unit of return with CV of 4.17. So, investors retaining the stocks of SHL should assume more risk than any others. The return of the market might not be regarded as attractive with respect to risk point of view.

The stock of SCBL, KFL, EICL, BNL and STCL appeared to be defensive since their beta coefficients are less than 1 and are less volatile than the market as a whole and the stocks of SHL and DCBL are aggressive stock, which indicates that the stocks are riskier and volatile than market.

Comparing each other, the share of SCBL has the highest systematic risk i.e. 6.31% where as the share of EICL has the least systematic risk. On the basis of systematic risk, the stock of the EICL is more attractive than others. The stock of SCBL appears more risky.

Comparing the expected rate of return and required rate of return some of the stocks have been under priced except the share of KFL, SHL and BNL. Hence,

investor are advised to purchase rather than to sell the under priced stocks if they are holding.

Correlation between almost all stocks is higher i.e. closer to 1. Hence, portfolio return is not as higher as expected. And portfolio return could not be reducing as wished. However, if the investors are required to create a well diversified portfolio between those available stocks, they are recommended to create the portfolio between the stocks of SCBL and STCL with the equal weight to maximize the return and minimize the risk.

The SHARPE index of the portfolio between the stocks of SCBL and STCL seemed highest and that of SHL seemed the lowest among all. On the basis of Sharpe index, the portfolio of SCBL and STCL are the best performance.

SHARPE index of portfolio performance measures also reveals that if investors are willing to create a well diversified portfolio than they are required to create well diversified portfolio between the stocks of SCBL and STCL to maximize the return and minimize the risk.

However, the portfolio between the stocks of SCBL and STCL with the weight of 82% and 18% respectively is the best and optimum portfolio from the available alternatives. Sharpe portfolio performance evaluation and simple Sharpe Portfolio Optimization model give the consistent result due to the fact that the portfolio as suggested by both the models has the same securities.

The stocks of banking sector of Nepal are mostly attractive for investment. Most of the Nepalese investors invest in the stocks of those companies and do not create portfolio. They buy or purchase stocks based on price fluctuations. Fundamental analysis has not been found to be adopted in Nepal. Those, who create portfolio, select securities in randomly. The major objective of portfolio

creation is maximizing return and they are also satisfied with the return from portfolio.

There are very few investment alternatives in Nepalese market. The market price of the stocks available in the market differs significantly. Stock price of some of the companies stocks are 20 or more than 20 times higher than that of some other companies. In such a situation, it is difficult to select securities for the creation of portfolio.

5.3 Recommendations

On the basis of major findings of the study based on available data analysis, the researcher thinks appropriate to recommend the concerned institutions, individuals, authorities as well as others in order to consider the following:

-) In Nepalese context, the investors do not undertake any fundamental analysis when making investment decision. There is a trend of just purchasing the stocks on the basis of rumors. Hence, the investors are recommended to make stock transactions on the basis of scientific analysis.
-) The portfolio between the stocks of SCBL and STCL with the weight of 82% and 18% respectively has been found to be the best and optimum portfolio from available alternatives. Sharpe portfolio performance evaluation and simple portfolio optimization model give the consistent result due to the fact that the portfolio as suggested by both models has the same securities. Hence, Nepalese investors who wish to create a well diversified portfolio are suggested to create a portfolio between those stocks by assigning the stated weights.

-) Based on the sampled, the best portfolio is between SCBL and STCL with equal weights. Hence the individual investors are recommended to create a portfolio between those stocks in order to minimize the risk.
-) The practice of creating a well diversified portfolio can not be found in Nepalese financial market. The investment risk can be significantly reduced with a well diversified portfolio. Hence it is suggested to diversify their investment in different securities that behave differently i.e. with negative or low correlation for reducing poor portfolio performance.
-) The investment strategies adopted by Nepalese individual investors are passive. They just hold the securities and wait for dividend. Hence, active strategy should be followed to gain from the stock price movement.
-) The public limited companies that have listed their shares in NEPSE should disseminate the exact and updated information to the general public. The financial statement of each year should be published through appropriate means. The system of manipulation should be removed. Manipulated and inconsistent information make investment analysis and decisions very difficult making the decisions wrong. Hence, the updated and exact statement should be published.
-) Academicians are undertaking no sufficient studies regarding portfolio analysis and behaviors of investors of forming well diversified portfolios. Hence, the researchers strongly recommend the future researchers to conduct studies related to portfolio management.

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ANNEXES

Annex	Heading
I	Share Price Information of Individual Companies
II	Risk and Return of Individual Companies
III	Risk and Return of Market (NEPSE)
IV	Covariance between the Return of Stocks and Return of Market
V	Correlation and Beta Coefficients of selected companies with Market Return
VI	Total Systematic and Unsystematic Risk of Companies
VII	Required Rate of Return
VIII	Price Situation of Stocks
IX	Correlation between the Stocks of different Companies
X	Ranking of Portfolio based on Excess Return to Beta
XI	Hypothesis Testing

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