

CHAPTER - I

INTRODUCTION

1.1 Background of the Study

Successful formulation and effective implementation of investment policy is the prime essential for the successful performance of banks and other companies. Good investment policy has a positive impact on economic development of the country and vice versa. The current state of Nepalese economy is characterized by unutilized natural resources, miserable agriculture, deficit trade, mass poverty, illiteracy, and so forth. Agriculture is the main occupation of almost village people but Nepal has not yet implemented scientific methods of agriculture. The natural resources available here have remained unutilized due to various reasons. However, it is regarded as one of the richest countries in the world in terms of natural resources. Majority of the Nepalese people are below poverty line. The living standard of people is very low. Poverty, misery and conflict are dancing all around. The vicious circle of poverty is found here. The economic inequality is also great. While the country has been moving toward a market-friendly economy since the early 1990s, frequent changes in government and even the worsened security situation at present have obstructed the realization of policy reforms and delayed the implementation of development works.

Nepal has many implicit and explicit obstacles for every facets of the development. Investments in productive sectors are necessary for the economic development of any country. This increases economic activities which finally accelerates economic growth. The unutilized financial resources should be diverted towards productive sectors in order to increase the economic activities. Hence, sustained and balanced economic development of all sectors is possible.

. Financial management is mainly concerned with the acquisition and utilization of funds. 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.

- (i) **Primary Market:** New securities are usually issued by corporations and governmental bodies in what is called primary market¹. “The financial market in which securities are initially issued, the only market in which the issuer is directly involved to the transaction is called primary market.”²
- (ii) **Secondary Market:** “The secondary market is that financial market in which pre-owned securities are traded.”³ Once the securities are issued into primary market, then they are traded in secondary market. The corporations need to list their shares in any organized securities exchanges to qualify for the trading. In Nepal, Nepal Stock Exchange Limited (NEPSE) represents the secondary stock market.

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 when Gunjaman Singh, the first secretary at the Nepalese Embassy in England returned back to Kathmandu and set up the 'Industrial Council'. The council drafted the Company Act and Nepal Bank Act for the first time in 1936. The first public floatation of shares in the securities market was initiated by Biratnagar Jute

¹ Jack Clark Francis. *Investments: Analysis and Management*. (New York: McGraw Hill Publication, 1986). p. 68.

² Lawrence J. Gitman. *Principle of Managerial Finance*. 4th ed. (New York: Harper and Row Inc., 1985). p 33.

³ Ibid.

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 a 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 savings 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.⁴

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 Rs13.1 million with a maturity period of five years for the first

⁴ Nepal Rastra Bank, Research Department. *Economic Review: Occasional Paper, April 2001, Number 13.*

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 except in the operation of few small-scale industries was almost nil during that period.

Institutional development of securities market in Nepal started from the year 1976 when Securities Exchange Centre (SEC) was established under the Companies Act with the joint capital contribution of Nepal Rastra Bank and Nepal Industrial Development Corporation. The Industrial Policy of the Government also encouraged the promotion of securities exchange activities in Nepal. The main objective of the establishment of the Centre was to mobilize public savings and encourage the people to participate in the ownership of industries and business enterprises. As a securities market intermediary, its role was to organize and provide marketing facilities of channeling securities exchange business through the centre. Its activities included the purchase, underwrite and sale, directly or through the licensed brokers or sub-brokers of the Centre, the shares, stocks and debentures of public limited companies and also development bond as well as Treasury bills issued by the Government.

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 operating on 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 of an individual or corporate unit is the holding of securities and investment in financial assets. These holding are the results of individual preferences and decisions regarding risk and return.

“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 an adequate return consistent with the level of risk assumed.”⁵

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

- Safety or security of investment through diversification
- Risk avoidance or minimization of risk
- Income through dividends and interests
- Marketability of investment
- Liquidity of investment
- Tax planning – capital gain

⁵ B. C. George et al., *Investment Analysis and Portfolio Management*. 3rd ed. (USA: Richard D. Irwin, 1999), p. 591.

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 of 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. Portfolio theory suggests creating a well-diversified investment 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 suggesting 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 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 invested 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 asset j

X_j = the portfolio weight for asset 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 n assets is defined 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

1.5 Focus of the Study

Public limited companies are playing the crucial role in the economic growth of Nepal. Many public limited companies have issued common stock to the general public and listed their shares in NEPSE in order to become eligible for trading in secondary market.

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. The study also focuses on the market volatility of those stocks. Furthermore, the study is also focused on the risk and return of individual stocks, covariance and correlation between them, market sensitivity of the individual stocks, and finally the portfolio risk and return of the three-asset portfolios created by selecting securities from different groups of NEPSE listed companies. Additionally, the study will attempt to create one best portfolio between the stocks with optimum weights using **Simple Sharpe Portfolio Optimization Model**.

1.6 Statement of the Problem

“The investment process is concerned with 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”.⁶

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.

In Nepal, stock market is a new concept. There is only one secondary market i.e. NEPSE. There are no specialized investment analysts rendering professional services to the investors. Most of the investors are even unknown about the stock market. There is a big chance to be manipulated. Many companies which have listed their shares do not want to disseminate necessary information to the existing and prospective investors. Most investors are claiming that they are being cheated by the financial institutions, intermediaries, and brokers. It arises a question - whether Nepalese investors make their investment by studying the market and risk return status of the securities they choose or just they gamble to make the profit. The price of stocks is very much sensitive in a free market economy. Many factors affect the value of stock directly or indirectly. Risk associated with the return should be analyzed before making any investment. Whether

⁶ William F. Sharpe et al., *Investments*. (New Delhi: Prentice Hall of India, 2002), p. 1.



the stock prices of listed companies is correctly priced or not is another aspect of the study. Likewise, it is also important that Nepalese investors are not making investment portfolios of different stocks to reduce the risk.

Nepalese stock market has experienced a noticeable growth during last decade. However, the market has been confronted many difficulties. Even, investors have difficulties in choosing the best securities and create a well diversified portfolio. They are misadvised by the brokers. They only see the market price when making investment. They do not analyze the risk factors associated with the return. In most cases, they have considered stock market as an important gambling place to make fortunes overnight without considering how such irrational behavior can put them possibly into greater loss.

“Most investors use linear logic to formulate their investment strategies and make investment decisions. Linear logic is based in the assumption that the future will resemble the past in a highly predictable fashion.”⁷ Assets having a greater probability of loss are felt as more risky than those with lesser chance of loss.⁸ Investment decisions based on research and study are always better than any investments based on gambling.

The rapid expansion in quantum of fund raised, a number of investors in the primary market and increasing number of listed securities has speedily raised the market capitalization which is an indication of bright future of capital market of Nepal. Despite these efforts and development, whether the existing mechanism of capital market is able and efficient to provide equitable opportunities and give return to all interested investors or its activities are limited only to for a few clever and high income class investors? It is another question for which answer should be sought?

In a nutshell:

-  Do Nepalese investors undertake risk and return analysis before making an investment in securities?
-  Do they diversify available funds in different securities i.e. do they create portfolios consisting of different securities?

⁷ T. S. Grewal, “The Thinking Investor”. (New Delhi: Vision Books, 1995)

⁸ Foreman Gary. “Your Money: All About Risk and Return”.

 If yes, do they adopt appropriate diversification technique?

These are the key issues in investment decisions for investors. Hence, this study deals with those problems in terms of risk and return characteristics, and portfolio concepts.

1.7 Objectives of the Study

The general objective of this study is to analyze different individual assets and delineate efficient portfolios of the listed companies in NEPSE. However the specific objectives are as follows:

1. To analyze the return and risk of the common stocks of listed companies in NEPSE.
2. To analyze the covariance and correlation between the stocks under study
3. To analyze the diversifiable and undiversifiable risk of the return on common stocks of the listed companies in NEPSE.
4. To determine whether the shares of listed companies are correctly priced or not.
5. To analyze the return and risk of the portfolios consisting of the stocks of different listed companies.
6. To determine the optimum weight on the stocks to create best portfolio consisting of the stocks of listed companies.
7. To provide suggestions and make necessary recommendations regarding diversification and portfolio creation on the basis of fundamental analysis of the common stocks of the selected listed companies.

1.8 Significance of the Study

First of all, it is the fact that this study is undertaken to apply the theoretical concepts and knowledge of Financial Management to the practical field as a partial fulfillment of

the requirement of Masters of Business Studies (MBS) under Faculty of Management, Tribhuvan University.

After the restoration of multi party democracy and introduction of economic liberalization, public involvement in securities investment has tremendously increased. But most of the individual investors are not aware about the risk associated with the return from the stocks. They are just making investment decisions based on hearsay and rumors. Systematic investment practices do not getting practiced. In such a situation, this study determines the diversifiable risk, undiversifiable risk, market volatility of returns and so on. Likewise, this study will assess whether the market price of listed stocks are correctly priced or not. After all, the findings based on fundamental analysis of this study will be beneficial to all the prospective investors who wish to make investment in the securities of listed companies in NEPSE as well as they will be able to create the best portfolios by selecting the stocks of different companies as directed by the analysis. Moreover, respective institutions under study, the officials of stock market, brokers, market makers, university graduates and undergraduates, professors can use the findings of this study.

Moreover, investment practices under the organized stock exchanges are heading progressively in Nepal. But very few studies and researches have been undertaken regarding the stock market. Since we are moving towards the free and open market economy, such studies have become more significant. Due to growing number of investors – individual as well as corporate, such type of studies help them make rational investment decisions.

1.9 Limitations of the Study

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. However, the specific limitations of the study are as follows:

- ⊕ The study is primarily based on secondary data and primary data as well.

- ⊕ Data of the stocks of the respective companies traded in NEPSE during last 5 years (F/Y1999/00 to F/Y 2003/04) are only considered. The companies that have published their financial statement have only been considered.
- ⊕ The study area is also limited; it is limited within the Kathmandu valley.
- ⊕ When analyzing portfolio risk and return, only three asset portfolios are considered due to problems in mathematical model consisting more than three securities.
- ⊕ This study is affected by financial resources of the student. Time and work force are also the limiting factors in undertaking this study.

1.10 Organization of the Study

This study has been divided into five chapters as:

Chapter I – Introduction

Chapter II – Review of Literature

Chapter III – Research Methodology

Chapter IV – Data Presentation and Analysis

Chapter V – Summary, Conclusions and Recommendations

Chapter I consists of the general background of the study, the institutional setup of capital markets, the introduction, functions and history of banking in Nepal, the focus area of the study, statement of the problem, importance of the study, objectives of the study, limitations of the study, the definition of portfolio theory, risk and return, the hypotheses, and so on.

Chapter II consists of the review of available literature. Books, journals, articles, and the previous research reports on the related field will be reviewed. Review of literature has been divided into two sections viz. (i) Conceptual / Theoretical Review, and (ii) Review of Related Studies.

Chapter III 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 limitations of the methodology are included.

Chapter IV includes the data presentation and analysis. It consists of descriptive analysis of the gathered data and information using statistical as well as financial tools/models. Additionally, this will also include the major findings of the study.

The last chapter, **Chapter V**, will include Summary, Conclusions, and Recommendations based on the analysis.

CHAPTER - II

REVIEW OF LITERATURE

This chapter deals with theoretical aspects of risk and return characteristics of common stocks, portfolio management; diversification or asset allocation concepts etc. For this, some relevant books, journals, magazines, newspapers, websites and so on related to financial management and other related studies have been reviewed. Moreover, some latest Master's degree theses have been reviewed.

2.1 Theoretical Review

Conceptual review or theoretical review deals with the theoretical aspects of investment, return, risk, portfolio, diversification etc.

2.1.1 Investment

“Investment in its broadest sense means the sacrifice of current dollars for future dollars. Two different attributes are generally involved: **time** and **risk**. The sacrifice takes place in present and is certain. The reward comes later, if at all, and the magnitude is generally uncertain.”⁹

“Investing, or speculating in the stock market have all the characteristics of a game. The purpose of stock market game, like that of any other game, is to win.”¹⁰

➤ Investment Process

The investment process describes how an investor should go about making decisions 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 includes¹¹

⁹ Francis, *op. cit.*, p. 1.

¹⁰ Grewal, *op. cit.*, p. 56.

¹¹ Sharpe et al., *op cit.*, pp. 11-14.

1. **Set Investment Policy:** It involves determining the investor's objectives and the amount of his or her investable wealth. Investment objective should be stated in terms of both risk and return.
2. **Perform Security Analysis:** It involves examining several individual securities or groups of securities within the broad categories of financial assets previously identified.
3. **Construct a Portfolio:** The third step in the investment process, portfolio construction, involves identifying those specific assets in which to invest, as well as determining the proportions of the investor's wealth to put into each one. Here the issues of selectivity, timing and diversification need to be addressed by the investor.
4. **Revise the Portfolio:** Portfolio revision concerns the periodic repetition of the previous three steps. That is, overtime the investor may change his or her investment objectives, which in turn may cause the currently held portfolio to be less than optimal.
5. **Evaluate the Performance of the Portfolio:** It involves determining periodically how the portfolio performed, in terms not only the return earned but also the risk experienced by the investor.

2.1.2 Common Stock

“Common stock represents equity or an ownership position in a corporation. It is a residual claim, in the sense that creditors and preference shareholders must be paid as scheduled before common stock holders can receive any payments. In bankruptcy, common stock holders are in the principal entitled only to any value remaining after all other claimants have been satisfied.”¹²

Common stock holders are entitled certain rights. They will have the right to control the corporations through voting right. They can elect the Board of Directors. They will also have preemptive right and residual right. Common stock holders have only limited liability. They don't bear liability exceeding the par value of the common stock. They are the primary claimer of income after bearing all the costs and expenses.

¹² Ibid. p. 457.

Common Stock Values

Common stock values are denoted by par value, book value and market value. However, these three terms are different and their rupee amount differs.

Par Value: The face value of one stock established at the time the stock is initially issued is known as par value. The par value of a common stock remains unchanged unless and until the stock split or reverse split exists. Generally common stocks carry Rs. 100 par value.

Book Value: The sum of the cumulative retained earnings and other entries such as common stock and capital contribution in excess of par value under stock holder's equity is the book value of the equity. The book value per share is obtained by dividing the book value of the equity by the number of shares outstanding. Higher profit indicates higher book value.

Market Value: The value of share in secondary market is the market value. Market value is influenced by various factors such as economic and industry conditions, expected earnings and dividends, and market and company risk.

2.1.2.1 Return

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 HPR might be the average of several HPRs such as:

$$\overline{\text{HPR}} = \frac{\sum_{t=1}^r (\text{HPR}_t)}{n}$$

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 does not suffer from this flaw. The geometric mean rate of return, $\overline{\text{HPR}}_g$, is defined as the rate of return that would make the initial investment equal to the ending investment value. Annualized rate of 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 the 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:

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

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.¹³

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

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

$$\text{Required Rate of Return (K)} = R_f + (R_m - \bar{R}_f) S$$

2.1.2.2 Risk

“Risk may be defines as the likelihood that the actual return from an investment will be less than the forecast return. Stated differently, it is the variability of return from an investment.”¹⁴

“In a world of uncertainty, expected return may not be realized. Risk can be thought of as the possibility that the actual return from holding a security will deviate from the expected return. The greater the magnitude of deviation and greater the probability of its occurrence, the greater is said to be the risk of the security.”¹⁵

“Financial analysts and statisticians prefer to use a quantitative risk surrogate called the variance of returns, denoted by Var (r). The variance of an asset’s rates of return equals

¹³ John M. Cheney & Edward A. Moses. *Fundamentals of Investments*. Fifth Edition. (New York: West Publishing Company, 1995) p. 33.

¹⁴ J. J. Hampton. *Financial Decision Making*. Fourth Edition. (New Delhi: Prentice Hall of India, 1994) p. 340.

¹⁵ James C. Van Horne. *Financial Management and Policy*. (New Delhi: Prentice Hall of India Private Limited, 2000). p. 35.

the sum of the products of the squared deviations of each possible rate of return from the expected rate of return multiplied by the probability that the rate of return occurs.”¹⁶

$$\begin{aligned}\text{Var}(r) &= \sum_{t=1}^T P_t [r_t - E(r_t)]^2 \\ &= P_1 [r_1 - E(r_1)]^2 + P_2 [r_2 - E(r_2)]^2 + \dots + P_T [r_T - E(r_T)]^2\end{aligned}$$

Standard deviation (σ) is the square root of the variance of the rates of return.

$$\text{Standard Deviation } (\sigma) = \sqrt{\text{Var}(r)}$$

The standard deviation and the variance of returns are equally acceptable and conceptually equivalent quantitative measures of total risk.

2.1.2.2.1 Sources of Investment Risk

Every investment involves uncertainties that make future investment returns risky. The sources of uncertainty that contribute to investment risk are¹⁷:

- i. **Interest Rate Risk:** It is defined as the potential variability of returns caused by changes in the market interest rates. If market interest rates rise or fall, then the investments' present value will fall or rise. Present value moves inversely with changes in the market rate of interest. The interest rate risk affects the prices of bonds, stocks, real estate, gold, puts, calls, future contracts, and other investments as well.
- ii. **Purchasing Power Risk:** It is the variability of return an investor suffers because of inflation. Economists measure the rate of inflation by using a price index. The percentage change in the consumer price index is a widely followed measure of the rate of inflation.
- iii. **Bull-Bear market Risk:** It arises from the variability in market returns resulting from alternating bull and bear market forces.

When a security index rises fairly consistently from a low point, called a trough, for a period of time, this upward trend is called a bull market. The bull market

¹⁶ Francis, *op. cit.*, pp. 12-13 .

¹⁷ *Ibid.*, pp. 3-10.

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. Bull markets that usually rise more than enough to compensate for the bear market losses follow bear markets. But the alternating bull and bear market forces create a potential source of investment risk.

- iv. **Management Risk:** Errors made by business managers can harm those who invested in their firms. Forecasting management errors is difficult work that may not be worth the effort and, as a result, imports a needlessly skeptical outlook. **Agency theory** provides investor with an opportunity to replace skepticism with informed insight as they endeavor to analyze subjective management risks.
- v. **Default Risk:** Default risk is that portion of an investments' total risk that results from changes in the financial integrity of the investment. The variability of returns that investors experience as a result of changes in the creditworthiness of a firm in which they invested is their default risk.
- vi. **Liquidity Risk:** Liquidity risk is that portion of an assets' total variability of return which results from price discounts given or sales commissions paid in order to sell the asset without delay.
- vii. **Callability Risk:** Some bonds and preferred stocks are issued with a call provision. Issuers like the call provision because it allows them to buy back outstanding preferred stocks and/or bonds with the funds from a new issue if market interest rates drop below the level being paid on the outstanding securities. But, whatever the issuing company gains by calling in on issue is gained at the expense of the investors who have their securities called.
That portion of a security's total variability of returns that derives from the possibility that the issue may be called is the **callability risk**. Callability risk commands a risk premium that comes in the form of a slightly higher average rate of return. This additional return should increase as the risk that the issue would be called increases.
- viii. **Convertibility Risk:** Conversion is a contractual stipulation that is included in the terms of original security issue. This provision alters the variability of returns from the affected security.
Convertibility risk is that portion of the total variability of return from a convertible bond or preferred stock that reflects the possibility that the

investment may be converted into the issuer's common stock at a time or under terms harmful to the investors' best interests.

- ix. Political Risk:** Political Risk arises from the exploitation of a politically weak group for the benefit of a politically strong group, with the effects of various to improve their relative position increasing the variability of return from the affected asset regardless of whether the charges that causes political risk are sought by political or by economic interests, the resulting variability of return is called political risk if it is accomplished through legislative, judicial or administrative branches of the government. Political risk can be international as well as domestic.
- x. Industry Risk:** industry risk is that portion of an investments total variability of return caused by events that affect the products and firms that make up an industry. The stage of the industry's life cycle, international tariffs and/or quotas on the products produced by an industry, product or industry related taxes, industry wise labor union problems, environmental restrictions, raw material availability, and similar factors interact and affect all the firms in an industry simultaneously. As a result of these commonalities, the prices of the securities issued by competing firms tend to rise and fall together.

These uncertainties are the major sources of investment risk which are of additive nature and add up to total risk. There might be numerous other sources of risk as well.

2.1.2.2.2 Types of risks – systematic vs. unsystematic

Systematic Risk

Systematic risk is the variability of a security's return with that of the overall stock market. It is also called unavoidable risk. It is measured by beta. The beta of a stock is the slope of the characteristic line between returns for the stock and those for the market. Beta depicts the sensitivity of the security's excess returns to that of the market portfolio. If the slope is 1, it means that excess returns for the stock vary proportionately with excess returns for the market portfolio. In other words, the stock has the same unavoidable or systematic risk as the market as a whole. A slope steeper than 1 means that the stock's excess return varies more than proportionately with the excess return of the market portfolio. Put another way, it has more systematic risk than

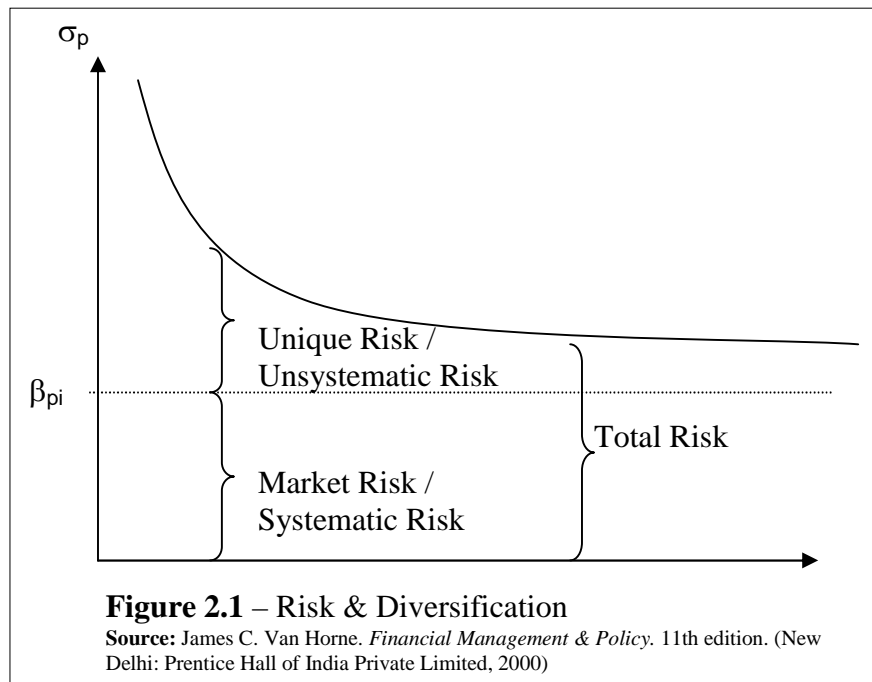
the market as a whole. This type of stock is often called an “aggressive” stock. A slope less than 1 means that the stock has less unavoidable or systematic risk than does the market as a whole. This type of stock is often called a “defensive” stock.¹⁸

“Changes in the economic, political and sociological environment that affect securities markets are sources of systematic risk. Systematic variability of return is found in nearly all securities to varying degrees because most securities tend to move together in a systematic manner.”¹⁹

Unsystematic Risk

It is the amount of a stock’s variance unexplained by overall market movements. It can be diversified away. It derives from the variability of the stock’s excess return not associated with movements in the excess return of the market as a whole.

“Events such as labor strikes, management errors, inventions, advertising campaigns, shifts in consumer taste,



and lawsuits cause unsystematic variability in the value of a market asset. Since unsystematic changes affect one firm, or at most a few firms, they must be forecast separately for each firm and for each individual incident. Unsystematic security price movements are statistically independent from each other, and so they may be averaged

¹⁸ J. Fred Weston & Thomas E. Copeland, *Managerial Finance*, 8th ed., (New York: The Dryden Press, 1992), p. 87.

¹⁹ Francis, *op. cit.*, p. 265.

to zero when different assets are combined to form a diversified portfolio. Therefore, unsystematic risk is also called diversifiable risk.²⁰

2.1.3 Trade-off between Risk and Return

Risk is a complicated subject and needs to be properly analyzed. The relationship between risk and return is described by investor's perception about risk and their demand for compensation. No investor will like to invest in risky assets unless he is assured of adequate compensation for the assumption of risk. Therefore, it is the investors required risk premiums that establish a link between risk and return. In a market dominated by rational investors, higher risk will command higher rational premiums and the trade-off between the two assumes a linear relationship between risk and risk premium.

Utility Functions and Investors Choice²¹

The best mix of expected return and standard deviation for a security portfolio depends on the investors' utility function. If you are a risk averse investor who associates risk with divergence from expected value of return, your utility function might be depicted in the following figure. The expected return is plotted on the vertical axis, while the standard deviation is along the horizontal. The curves are known as indifference curves; the investor is indifferent between any combination of expected return and standard deviation on a particular curve. In other words, a curve is defined by those combinations of expected

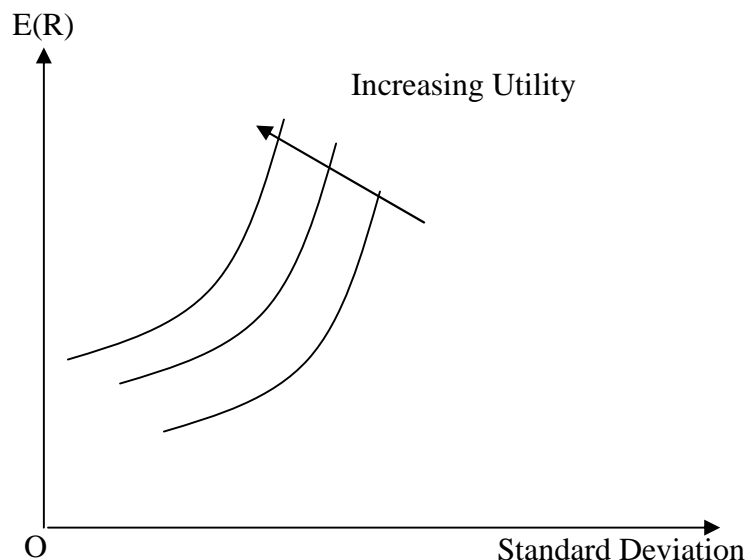


Figure – 2.2: Hypothetical Indifference Curves

Source: James C. Van Horne. *Financial Management and Policy*. 11th Edition. (New Delhi: Prentice Hall of India, 2000) p. 59

²⁰ *Ibid.*

²¹ Van Horne, *op. cit.*, pp. 58-59.

return and standard deviation that results in a fixed level of expected utility.

The greater the slope of indifference curves, the more averse the investor is to risk. As we move to the left in Fig. 2.1, each successive curve represents a higher level of expected utility. It is important to note that the exact shape of the indifference curves will not be the same for different investors. While the curves for all risk-averse investors will be upward sloping, a variety of shapes are possible, depending on the risk preferences of the individual. As an investor, you want to hold that portfolio of securities that places you on the highest indifference curve.

Investors are risk averse. As a result, high-risk assets must offer investors high returns to induce them to make the riskier investments.

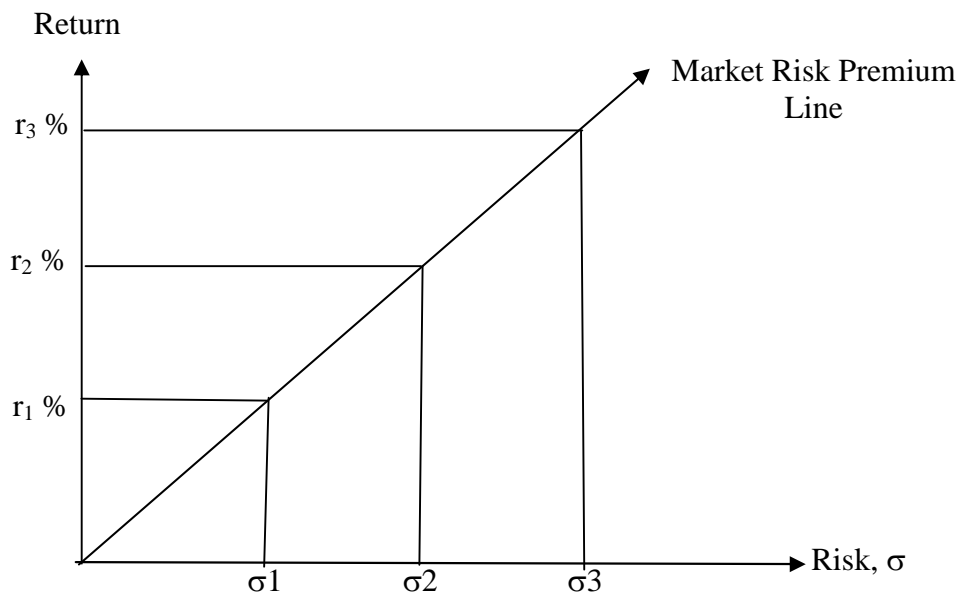


Figure: 2.3 – Positive Trade-off between Risk and Return

The Figure 2.2 represents a higher risk premium. For taking risk σ_1 , the expected return is r_1 when an investor assumes risk σ_2 , the return must be r_2 increasing the return (risk premium) by $r_2 - r_1$ for assuming more risk: $\sigma_2 - \sigma_1$. The assumption of linear relationship states that the risk premium must increase or decrease in proportion to a change in level of risk. It also indicates – higher the risk, higher the return and lower the risk, lower the return.

2.1.4 Portfolio Analysis

2.1.4.1 Portfolio

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 buildings. 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

“Investment positions are undertaken with the goal of earning some expected rate of return. Investors seek to minimize inefficient deviations from this expected rate of return. Diversification is essential to the creation of an efficient because it can reduce the variability of returns around the expected return.”²³

“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.”²⁴

“The portfolio manager seeking efficient investments works with two kinds of statistics – expected return statistics and risk statistics. The expected return and risk statistics for individual assets are the exogenously determined input data analyzed by the portfolio analyst. The objective of portfolio analysis is to develop a portfolio that has the maximum return at whatever level of risk the investor deems appropriate.”²⁵

“Portfolio is simply a combination of two or more securities or assets.”²⁶

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

²³ Francis, *op. cit.* p. 228.

²⁴ Feorge, *op. cit.*, p. 75.

²⁵ James C. Van Horne and Jr. John M. Wachowicz. *Fundamentals of Financial Management*, Ninth Edition. (USA: Prentice Hall Inc., 1997). p. 90.

²⁶ Francis, *op. cit.*, p. 229.

2.1.4.2 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, thereof reducing risk.

Diversification is a risk management technique that mixes a wide variety of investments within a portfolio. It is 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."²⁷

"Diversification in investments 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 (stocks, bonds, and real estate for example) or diversify by regional decisions (such as state, region, or country). Thousands of opinions exist."²⁸

"Investors can reduce their potential for loss through diversification. ... The key to diversification is the age-old adage, "don't put all of your eggs in 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.**"²⁹

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 risks associated with a particular company's "bad luck". Diversification among

²⁷ <http://www.investopedia.com>

²⁸ <http://www.ameritrade.com>

²⁹ <http://www.dfaus.com>

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, Harry M. Markowitz won the Nobel Prize largely for his work on diversification !”³⁰

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

There are some different diversification techniques for reducing a portfolio risk.³¹

2.1.4.2.1 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.

2.1.4.2.2 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 diversifying across industries is not much better than simply selecting securities randomly.

2.1.4.2.3 Superfluous Diversification

If 10 or 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.*

³⁰ <http://www.nefe.org>

³¹ Francis, op cit. pp. 228-235.

2. *Purchase of lackluster performer.*
3. *High search costs.*
4. *High transaction costs.*

2.1.4.2.4 Simple Diversification across Quality Rating Categories

Quality ratings 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.

2.1.4.2.5 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”.³² 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.

2.1.4.3 Portfolio Return and Risk

2.1.4.3.1 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

³² H. Markowitz. “Portfolio Selection”. *Journal of Finance* (1952 March), p. 89.

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 invested 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 asset j

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

n = number of assets / securities in a portfolio

In a three asset portfolio, the portfolio return will be as:

$$\text{Expected Portfolio Return} = E(R_p) = X_A \cdot E(R_A) + X_B \cdot E(R_B) + X_C \cdot E(R_C)$$

2.1.4.3.2 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 n assets is defined 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

2.1.4.4 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 investor's behavior.³³

- i) Investors consider each investment alternative 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.
- iv) Investors base decisions solely on expected return and variance of returns only.

³³ V. K. Bhalla, *Investment Management*, 8th Edition. (New Delhi: S. Chand & Company Limited, 2001) p. 261.

- 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.

2.1.4.5 The Efficient Set Theorem³⁴

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.

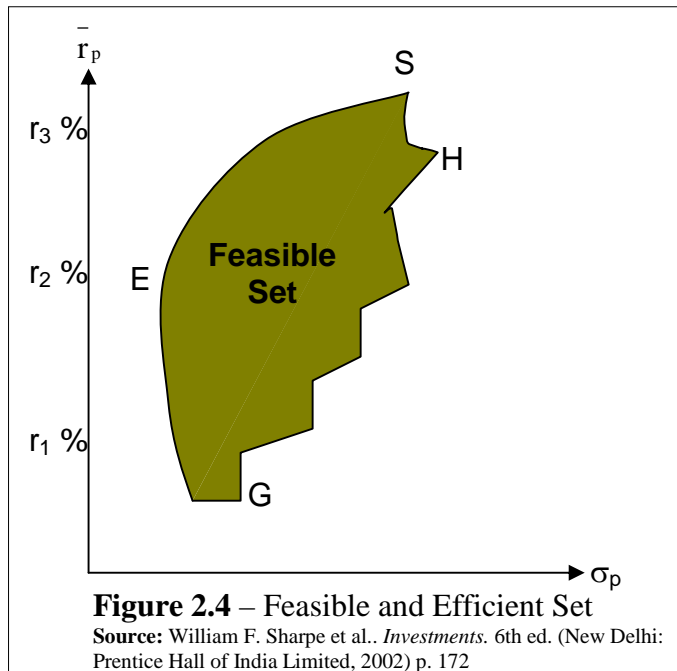
The investor can select an optimal portfolio from a feasible set of portfolios. Efficient set theorem states that:

- 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.

2.1.4.6 The Feasible Set³⁵

Figure 2.4 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



³⁴ Sharpe et al., *op. cit.*, p. 171.

³⁵ *Ibid.* p. 172.

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 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 2.4.

2.1.4.7 The Efficient Set Theorem applied to the Feasible Set³⁶

The efficient set can now be located by applying the efficient set theorem to this feasible set. To begin with, the set of portfolios that meet the first condition of the efficient set theorem must be identified. Looking at Figure 2.4, 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 through 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.

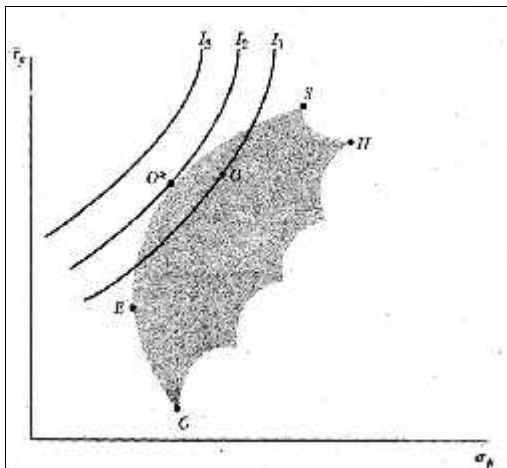
Remember that both conditions have to be met in order to identify the efficient set. It can be seen that only those portfolios lying on the northwest boundary between points E and S do so. Accordingly, these portfolios form the efficient set, and it is from this set of efficient portfolios that the risk-averse investor will find his or her optimal one. All the other feasible portfolios are inefficient portfolios and can be ignored.

³⁶ *Ibid.*, pp. 172-173.

2.1.4.8 Selection of the Optimal Portfolio³⁷

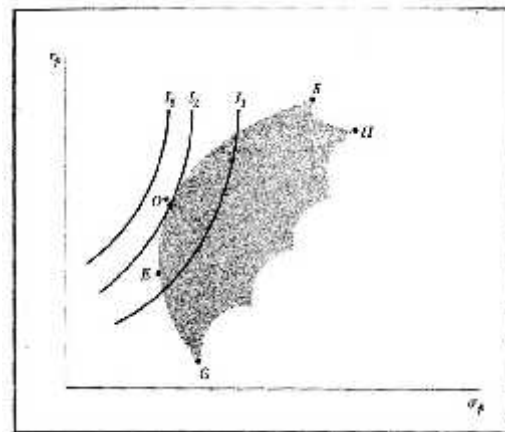
To select an optimal portfolio, an investor should plot his or her indifference curves on the efficient set and then proceed to choose the portfolio that is on the indifference curve that is farthest northwest. This portfolio will correspond to the point at which an indifference curve is just tangent to the efficient set. As can be seen in the Figure 2.5, this is portfolio O* on indifference curve I_2 . Although the investor would prefer a portfolio on I_3 , no such portfolio exists; wanting to be on this indifference curve is just wishful thinking. In regard to I_1 , 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 2.6.

Figure 2.5: Selecting an Optimal Portfolio



Source: William F. Sharpe et al. *Investments*. 6th edition. (New Delhi: Prentice Hall of India Limited, 2002) p. 173

Figure 2.6: Portfolio Selection for a Highly Risk-Averse Investor



Source: William F. Sharpe et al. *Investments*. 6th edition. (New Delhi: Prentice Hall of India Limited, 2002) p. 174

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.

³⁷ *Ibid.*, p. 173.

2.1.5 Capital Asset Pricing Model (CAPM)

Capital Asset Pricing Model (CAPM) is a descriptive model of how assets are priced. The major implication of the model is that the expected return of an asset will be related to a measure of risk for that asset known as beta. The exact manner in which expected return and beta are related is specified by the CAPM.

“The capital assets pricing model states that the expected risk premium on each investment is proportional to its beta. This means that each investment should lie on the sloping security market line connecting Treasury bills and Market Portfolio.”³⁸

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 investors will expect from the security. The relationship between expected return and unavoidable risk, and the valuation of securities that follows, is the essence of the capital asset pricing model (CAPM). This model was developed by William F. Sharpe (1990 Nobel Prize winner in economics) and John Lintner in the 1960s, and it has had important implications for finance ever since.³⁹

The CAPM used to calculate the required rate of return for stock j is:

$$E(R_j) = R_f + [E(R_m) - R_f] \beta_j$$

Where,

$E(R_j)$ = the expected or ex-ante return on the j^{th} risky asset

R_f = the rate of return on a risk less asset

$E(R_m)$ = the expected or ex ante return on the market portfolio

$\beta_j = \text{Cov}(R_j, R_m) / \text{Var}(R_m)$ = a measure of the undiversifiable risk of the j^{th} security.

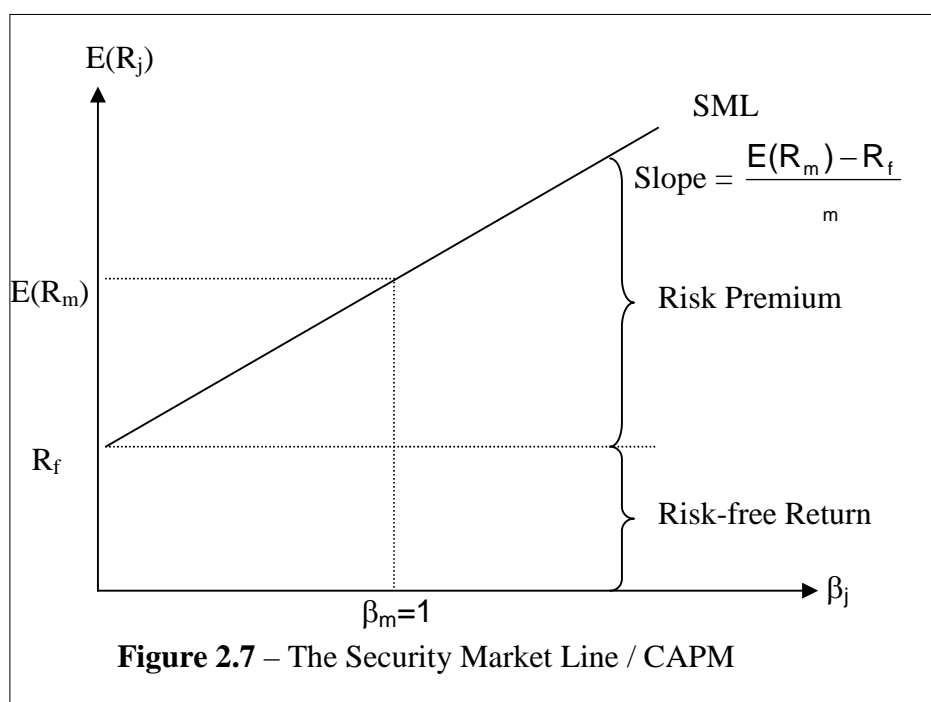
The greater the beta of a security, the greater the risk and the greater the expected return required. Likewise, the lower the beta, the lower the risk, the more valuable it becomes and the lower the expected return required.

"In market equilibrium, the relationship between an individual security's expected rate of return and its systematic risk, as measured by beta, will be linear. The relationship is

³⁸ Stewart C. Myers & Richard A. Brealey, *Principles of Corporate Finance*, 7th Edition, (New Delhi: Tata McGraw-Hill Publishing Company Limited, 2003) p. 200.

³⁹ Van Horne, *op. cit.*, p. 62.

known as the **security market line**."⁴⁰ When the CAPM is graphed in a figure, it is called the Security Market Line (SML). In equilibrium, all securities must be priced so that they fall on the SML. The fact is that they have different variances, which are irrelevant for determining their expected return, because total risk contains a diversifiable component, which is not priced in market equilibrium. SML may be used to explain the required rate of return on all securities whether or not they are efficient. The SML provides a unique relationship between undiversifiable risk (measured by beta) and expected rate of return. Hence, if we can accurately measure the beta of a security, we can estimate its equilibrium risk-adjusted rate of return.



Source: James C. Van Horne. *Financial Management and Policy*. 11th edition. (New Delhi: Prentice Hall of India Limited, 2000) p. 71

The CAPM or SML is an equilibrium theory of how to price and measure risk. It has many applications for capital budgeting, asset valuation, determination of cost of equity capital and the explaining risk in the structure of interest rates.

The logic of the SML equation is that the required return on any investment is the risk free return plus a risk adjustment factor. The risk adjustment factor is obtained by multiplying the risk premium required for the market return by the risky ness of the

⁴⁰*Ibid.*, p. 70.

individual investment. If the returns on the individual investment fluctuate by exactly the same degree as the returns on the market as a whole, the beta for the security is one. In this situation, the required return on the individual investment is the same as the required return on the total market. The risk premium is measured by the slope of SML.

Assumptions of the CAPM⁴¹

Capital market theory (CMT) uses portfolio theory; thus the assumptions underlying portfolio theory also pertain to the CAPM. The additional assumptions underlying CMT and the CAPM appear less realistic than the portfolio theory assumptions. The assumptions of CMT are as follows:

1. All investors are risk-averse. Thus, all investors seek to be on the efficient frontier.
2. There are no constraints on the amount of money that can be borrowed or lent. Borrowing and lending occur at the identical risk-free rate, R_f .
3. All investors have identical beliefs about the expected returns and risks of assets and portfolios; that is all investors have homogeneous expectations.
4. All investors have a common investment horizon, whether it be one month, three months, one year, or whatever.
5. All the investments are infinitively divisible and marketable; that is, it is possible to buy or sell any portion of an asset or portfolio.
6. Taxes and transaction costs do not exist. That is, there are no tax effects, costs of acquiring information or transaction costs associated with buying or selling securities. These are often referred to as perfect market assumptions. Markets are assumed to be competitive; therefore, the same investment opportunities are available to all investors.
7. There are no unanticipated changes in inflation or interest rates.
8. The capital markets are in a state of equilibrium or striving toward equilibrium. There are no under priced or overpriced securities; if under pricing or overpricing exists, the prices will move to correct this disequilibrium situation.

⁴¹ Cheney & Moses, *op. cit.*, p. 75.

Under- and Over Valuations⁴²

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. That is, it provides an expected return in excess of that required by the market for the systematic risk involved: $\bar{R}_j > R_f + [E(R_m) - R_f] \beta_j$. As a result, the security will be attractive to investors. According to the theory, the increased demand will cause the price to rise until the expected return declines sufficiently for the security to lie on the security market line and, thereby, for $\bar{R}_j = R_f + [E(R_m) - R_f] \beta_j$. 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.

2.1.6 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:

2.1.6.1 Sharpe's Portfolio Performance Measure⁴³

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:

$$S_i = \frac{\text{Risk Premium}}{\text{Total Risk}} = \frac{\bar{r}_j - R}{\sigma_j}$$

where

S_i = Sharpe index of portfolio performance for portfolio i

⁴² Van Horne, *op. cit.*, p. 71.

⁴³ Francis, *op. cit.*, pp. 644-662.

\bar{r}_j = Average return from portfolio i

σ_i = Standard deviation of returns for portfolio i

R = Risk-less rate of interest

$\bar{r}_j - R$ 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.

Sharpe's index of performance generates one number that is determined by both the risk and the return of the portfolio or other investment being evaluated.

2.1.6.2 Treynor's Portfolio Performance Measure⁴⁴

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:

$$T_p = \frac{\text{Risk Premium}}{\text{Systematic Risk Index}} = \frac{\bar{r}_j - R}{\beta_p}$$

where

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

\bar{r}_j = Average return from portfolio i

β_p = systematic risk index of returns for portfolio i

R = Risk-less rate of interest

2.1.6.3 Jensen's Portfolio Performance Measure⁴⁵

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:

$$rp_{i,t} = r_{i,t} - R_t$$

⁴⁴ *Ibid*

⁴⁵ *Ibid.*

where

$r_{p_i,t}$ = risk premium for asset I in period t

$r_{i,t}$ = one period rate of return from asset I in period t

R_t = risk-less rate observed in period t.

2.2 Reviews from Articles, Journals, Magazines and Internet

“The investor return is a measure of growth in wealth resulting from that investment. This growth measure is expressed in % forms to make it comparable across large and small investors. Stock returns may be riskier or more volatile. But this concept is a difficult one to express simply. To do so, we borrow a concept from statistics, called standard deviation. It is a single measure, allowing quantifying asset returns by risk, and it also provides the basis for investor’s decisions about portfolio choice.”⁴⁶

American Association of Individual Investors under the “Investing Basis” describes - “It is important to understand how personal circumstances affect investment decisions. If these factors make no differences we could simply publish one suggested portfolio for everyone to follow. However, your tolerance for risk, your return needs (whether income or growth), the length of time you can remain invested and your tax status all have an important effect on the kinds of investments. Investment profile is the beginning of the asset allocation process, which consist of dividing your portfolio among the major asset categories of stocks, bonds and cash. The asset allocation decision that you make here will have a far more effect on your overall portfolio return. Make allocation decisions with the major categories. For instance, stock portfolio can be divided among large capitalization stocks, small capitalization stocks and international stocks. Once these decisions are reached, you will be ready to make selections among the various investment options. Lastly, once you have set up your investment portfolio, you must monitor it making changes, when appropriate. Every investors want the highest assured return possible. But as we have seen returns aren’t certain and different investors have varying degree of uncertainty that they are willing to accept.”⁴⁷

⁴⁶ William N Goetzmann, “An Introduction to Investment Theory”, 1999

⁴⁷ <http://www.aaii.com>

“Some investors got a rude shock in 1995. They thought global diversification would maximize opportunities while reducing their risks. Instead, investors who sank all their savings into a mutual fund indexed to the all American Standard & Poor’s 500-stock Index earned 37%, compared with 12.5% for sophisticates who put their money in funds composed of international stocks and bonds.

But many money managers are betting that 1995 will turn out to have been exception. They argue that Wall Street’s gains were brought about partly by an endemic dollar that didn’t revive until late summer. American’s love affair with their own high technology issues also fueled the rise. Now, the steep run up in US stock prices has many investors chanting their mantra of global diversification more loudly than ever.

Some allocators are shifting their resources to capture the greater gains they expect overseas. Indeed, the best way to exploit the benefits of falling rates around the world may be to carve up a portfolio into fairly even slices.”⁴⁸

Given the benefits, how many investors actually hold diversified portfolio? A study by William N. Goetzmann and Alok Kumar, “Equity Portfolio Diversification,” concluded the number was disturbingly low.⁴⁹ After examining more than 40,000 equity investment accounts at a large discount brokerage firm from 1991-1996, the authors found that the vast majority of investors held portfolios that were clearly undiversified, with holdings typically concentrated in just a few stocks. The average investor held a portfolio consisting of just four stocks. Amazingly, they found that less than five percent of investors held at least ten stocks.

They further argue that many investors mistakenly assume that diversification works by the gross number of holdings rather than by holding stocks with low correlation. Investors are overconfident of their stock-picking skills. However, some stocks might be overpriced in the market.

⁴⁸ Joan Warner, “Diversify is still the Managers’ Mantra” <<http://www.businessweek.com>>

⁴⁹ William N. Goetzmann and Alok Kumar, “Equity Portfolio Diversification”, *Yale ICF Working Paper* No. 00-59, October 2001

By 2000, a newer study found that “even 60-stock portfolios achieve less than 90% of full diversification.”⁵⁰ A study undertaken by Burton Malkiel, John Campbell, Yexiao Xu, and Martin Lettau argues that a dramatic increase in the volatility of individual stocks, and a declining correlation of stocks within the S&P 500 Index has led to a significant increase in the number of securities needed to achieve the same level of portfolio risk.⁵¹ They found that, for the two decades prior to 1985, to reduce to 10 percent the excess standard deviation (a measure of diversifiable portfolio risk), a portfolio would have had to consist of at least twenty stocks. From 1986 to 1997, the figure increased to fifty.⁵²

In December 1968, a *Journal of Finance* paper concluded that investors should doubt “the economic justification of increasing portfolio sizes beyond 10 or so securities.”⁵³ A similar study from the same era found that 90 percent of the diversification benefit came from just 16 stocks and 95 percent of the benefit could be captured by just 32 stocks.⁵⁴

Mr. Narayan Prasad Paudel conducted a study with the objective of whether the shares of commercial banks were correctly priced by analyzing the realized rates of returns and the required rates of return using the CAPM.⁵⁵

The study was based on the data of shares of seven sample commercial banks from Mid July 1996 to Mid July 2001. For the purpose of analyzing risk characteristics of the shares of those commercial banks, Mr. Poudel had used standard deviation, the coefficient of variation, the correlation coefficient between the returns of individual bank’s share and the return on market portfolio and the beta coefficient. Average return on the 91-day Treasury bill was taken as a risk-free rate of return.

⁵⁰ Ronald J. Surz and Mitchell Price, “The Truth About Diversification by the Numbers”, *Journal of Investing*, Winter 2000

⁵¹ James Picerno, “Quality Control”. *Bloomberg Wealth Manager*, July/August 2000

⁵² <http://www.pks-thecpa4u.com>

⁵³ John L. Evans and Stephen H. Archer, “Diversification and the Reduction of Dispersion: An Empirical Analysis” *Journal of Finance*, December 1968

⁵⁴ Lawrence Fisher and James Lorie, “Some Studies of Variability of Returns on Investments in Common Stocks”, *The Journal of Business*, April 1970.

⁵⁵ Narayan Prasad Paudel, “Investing in Shares of Commercial Banks in Nepal: An Assessment of Return and Risk Elements” (Kathmandu: Development Finance Department, Nepal Rastra Bank, 2002)

On the basis of this study, it was found that the shares of BOK offered the highest realized rate of return. The prices of the shares of SCBNL, NSBIB, NBBL, EBL and BOK were under priced.

Based on the standard deviation of the returns on shares, the shares of EBL could be considered as high-risk security. The standard deviation of the returns on shares of HBL was the lowest one. On the basis of CV, the share of BOK had the lowest risk per unit of return, the highest being with the shares of NABIL. It was also observed that the systematic risk was negative with the shares of NABIL. Therefore, the total risk on the returns on shares of NABIL was due to company specific characteristics rather than market pervasive. Returns on all the shares except NABIL had positive correlation with the returns on market.

Most of the shares appeared to be defensive as beta coefficients were less than 1. Only the return on shares of BOK had beta coefficient of greater than 1, indicating that the share was more risky than the market.

Mr. Paudel concluded, “The shares of commercial banks in Nepal are heavily traded in the stock market and, therefore, these shares play a key role in the determination of stock exchange indicators. All the shares produced higher rates of return than the return on market portfolio. However, the risk-return characteristics did not seem to be the same for all the shares reviewed.” He further concluded, “Most of the shares fall under the category of defensive stocks, except the shares of Bank of Kathmandu Limited. From the analysis, it appears that none of the shares are correctly priced.”

Mr. Shiba Raj Shrestha had written an article “Portfolio Management in Commercial Banks; Theory and Practice” in Nepal Bank Patrika (Baisakh Masanta 2055) published by Nepal Bank Limited. In his article, he stated that the portfolio management becomes very important both for individual as well as institutional investors. Investors want to select the best mix of investment assets subject to-

- ❖ Higher return,
- ❖ Good liquidity with adequate safety of investment,
- ❖ Flexible investment,
- ❖ Certain capital gains,

- ❖ Economic, efficient and effective investment mix, and
- ❖ Maximum tax concessions.

Mr. Shrestha stated that the investors try to hold a well diversified portfolio that helps to achieve these stated benefits. Investors want to increase their return with certainty by making investment in different sectors.

Nevertheless, Mr. Shrestha presented approaches to find out the risk of securities depending upon the attitude of investor towards risk, to develop alternative investment strategies for selecting a better portfolio, which will ensure a trade off between risk and return so as to attach the primary objective of wealth maximization at lowest risk and finally to identify securities for investment to refuse volatility of return and risk.

2.3 Review of Theses

2.3.1 Assessment of Performance of Listed Companies in Nepal⁵⁶

Mr. Gopal Prasad Bhatta had undertaken a study entitled “Assessment of Performance of Listed Companies in Nepal” and submitted to Faculty of Management, Tribhuvan University in 1995 for the partial fulfillment of Masters Degree in Business Administration. The major objective of the study was “to analyze the performance of listed companies in terms of expected rate of return and company specific risk, required rate of return, systematic risk and diversification of risk through portfolio context.”

Mr. Bhatta had used descriptive as well as analytical methodology to analyze the secondary data from 1987 to 1991 of 10 listed companies.

After analyzing the secondary data of selected companies, Mr. Bhatta had summarized, “Investors in Nepal have not yet practiced to invest in portfolio of securities. An analysis of two securities portfolio shows that the risk can be totally minimized if the correlation is perfectly negative. In this situation, the risk can be totally diversified but

⁵⁶ Gopal P. Bhatta, “Assessment of Performance of Listed Companies in Nepal”, (Unpublished MBA Thesis, Central Department of Management, Faculty of Management, Tribhuvan University, 1995)

when there is perfectly positive correlation between the returns of the two securities, the risk is undiversifiable. The analysis shows some correlation has negative and some has positive one. Negative correlation between securities returns is preferred for diversification of risk.”

2.3.2 Risk and Return Analysis in Common Stock Investment⁵⁷

The study entitled “Risk and Return Analysis in Common Stock Investment” with special reference to banking industry undertaken by Mr J. B. Sapkota is also relevant to this study. The major objective of the study was to analyze the risk and return of the common stocks in Nepalese stock market.

After analyzing the secondary data, Mr. Sapkota summarized, “Banking industry is the biggest one in terms of market capitalization and turnover. Expected return on the common stocks of Nepal Bank Limited is maximum (i.e. 66.99%) and common stock of SBI Bank Ltd. is found minimum. In this regard, common stock of Nepal Bank Ltd. is most risky and common stock of SBI Bank Ltd. is least risky. In the context of industries, expected return of finance and insurance industry is found highest. Expected return of banking industry is 60.83%.”

2.3.3 Risk and Return on Common Stock Investment of Commercial Banks in Nepal⁵⁸

Mr. Sudeep Upadhyaya had undertaken a study entitled “Risk and Return on Common Stock Investment of Commercial Banks in Nepal” and submitted to Faculty of Management, TU in 2001 which is related to this study. The main objectives of the study were to assess the risk associated with returns on common stock investment of the listed commercial banks on the basis of selective financial tools; to evaluate common stocks in terms of risk and return; to assess the risk compensating returns; and

⁵⁷ J. B. Sapkota, “Risk and Return Analysis in Common Stock Investment”, (Unpublished MBA Thesis, Central Department of Management, Faculty of Management, Tribhuvan University, 1999)

⁵⁸ Sudeep Upadhyaya, “Risk and Return on Common Stock Investment of Commercial Banks in Nepal”, (Unpublished MBA Thesis, Central Department of Management, Faculty of Management, Tribhuvan University, 2001)

to analyze the volatility of common stocks and other relevant variables as an affecting factor in portfolio construction of common stocks.

In order to achieve the objectives, Mr. Upadhyaya had used five years secondary data from 1994/95 to 1998/99 of eight commercial banks as sample.

The major findings of his study are:

In general, most people see stock market investment as a black art that they know little about. Many people have unrealistically optimistic or pessimistic expectations about stock market investment or perhaps a fear of the unknown. Due to the lack of information and poor knowledge, Nepalese individual investors can not analyze the securities as well as market properly.

He further stated, “Expected return on the common stock of Nepal Grindlays Bank is maximum (i.e. 127.84%) which is very high rate of return. In reality this rate exists only due to the effect of unrealistic annual return because of the issue of bonus share and increase in share price at the same. Similarly expected return of the CS of Nepal SBI Bank Ltd. is found minimum. In the context of industries (or sector), expected return of “Others” sector is highest (i.e. 15.5 %). Manufacturing and production sector is the least performer.”

He also revealed, “Common stock of Nepal Grindlays Bank Limited is most risky and of SBI is least risky. This proves the proverb ‘high risk – high return’. Regarding the market volatility, EBL’s common stock is more volatile which has beta value of 3.941 and NIBL’s common stock is least volatile which has beta value of 0.875. Others are also volatile. All the stocks of commercial banks are over-priced. NGBL stock has maximum difference of expected rate of return and required rate of return.”

Mr. Upadhyaya further summarized, “Most of the Nepalese private investors invest in single security. Some of the investors use their fund in two or more securities. But it is found that they don’t make any analysis of portfolio before selecting. They invest their

fund in different securities on the basis of expectation and assumption of individual security rather than analysis of the effect of portfolio.”

According to him, “The correlation of returns between most of the banks is nearer to +1. It is not favorable to construct a portfolio. Only the correlation between NIBL’s CS return and NBBL and EBL CS return is found negative. Investor can reduce risks through holding the CS of NIBL and NBBL or EBL. Portfolio between the CS of NIBL and BBC is very advantageous as far as risk reduction is concerned. Here, portfolio standard deviation is less than individual standard deviation. Hence the portfolio approach of investment is better way to get the maximum return.”

2.3.4 Investors’ Problems in Choice of Optimum Portfolio of Stocks in Nepal Stock Exchange⁵⁹

Mr. Roopak Joshi undertook a thesis work entitled “Investors’ Problems in Choice of Optimum Portfolio of Stocks in Nepal Stock Exchange” in July 2002. The study is related to this research since his study focused on the creation of optimum portfolio between the stocks of listed companies and the relevant objective of the study was “to try to find out the best portfolio of NEPSE to invest”.

Mr. Joshi used historical common stocks data in order to achieve the objectives. He had constructed two-asset and three-asset portfolio between *21 ‘A’ Grade* stocks of listed companies. He had ignored those stocks, which were more variable in terms of covariance.

After analyzing the stocks, Mr. Joshi summarized, “Portfolio management is a new concept for Nepalese investors. Due to lack of sufficient information, proper investment is not possible. Proper investment needs huge information internal as well as external. The stock market of Nepal is also in growing stage only. The only one stock exchange located in Kathmandu. Traditional cry system for trading stocks,

⁵⁹ Roopak Joshi, “Investors’ Problems in Choice of Optimum Portfolio of Stocks in Nepal Stock Exchange”, (Unpublished MBS Thesis, Shanker Dev Campus, Faculty of Management, Tribhuvan University, 2002)

limited number of securities broker, lack of opportunity of investment and many reasons are there, which are acting as barrier of development of NEPSE.”

Mr. Joshi further stated that Nepalese investors don't know in which stock to make investment and how to construct a portfolio. Many brokers are not willing to provide information to the investors. Investors are trading the securities mostly under the pressure of brokers.

Mr. Joshi had further concluded regarding the portfolio that among the available opportunity sets, available set H seemed very attractive than other sets. Set H had the least covariance of all the available sets and was the optimum portfolio which consisted of stocks of Paschimanchal Finance Company (PFC) Ltd. and Citizen Investment Trust (CIT) in the proportion of 55 % and 45 % respectively.

2.3.5 A Study on Risk and Return Analysis of Common Stock Investment⁶⁰

A study entitled “Risk and Return Analysis of Common Stock Investment” was undertaken by Mr. Lila Nath Pandey and submitted to Central Department of Management, FOM, TU in 2003 for the partial fulfillment of MBS.

Under the study, the relevant objectives were to examine risk and return on common stock of individual companies; to calculate risk and return of their portfolio; and to construct the optimum portfolio from listed common stocks.

Mr. Pandey had used secondary data of 6 finance companies from F/Y 2052/53 to F/Y 2058/59 (seven years) listed in NEPSE. Besides finance companies, common stocks of Everest Bank Limited from Banking and of Salt Trading Corporation from Trading sector had been taken as sample for portfolio analysis. His study is more empirical and less descriptive on the basis of historical data. Opinion survey was also conducted with individual investors, insurance officials, NEPSE staff members, and stock brokers.

⁶⁰ Mr. Lila Nath Pandey, “A Study on Risk and Return Analysis of Common Stock Investment”, (Unpublished MBS Thesis, Central Department of Management, Faculty of Management, Tribhuvan University, 2003)

The major findings of the study were:

Without proper analysis of individual security, industry and overall market, it is almost impossible to beat the stock market.

CV suggests finance and investment sectors are the best for investment. Banking sector is the best for investment from ERR point of view and CV is also not so higher than finance and insurance sectors. KAFAL is undoubtedly the best investment from the ERR and CV point of view. CIT has lesser volatility with beta of 0.915 from market sensitivity point of view.

2.3.6 Portfolio Management of listed Commercial Banks and Insurance Companies in Nepal⁶¹

Mr. Durga Mani Sharma has undertaken a study entitled “Portfolio Management of listed Commercial Banks and Insurance Companies in Nepal” in the year 2004 and submitted to Shanker Dev Campus, Tribhuvan University for the partial fulfillment of the Master’s degree of Business Studies (MBS). The relevant objectives of his study were to analyze the return and risk of the common stocks of listed commercial banks and insurance companies; to analyze the diversifiable and undiversifiable risk; and to determine whether the shares of commercial banks and insurance companies are correctly priced or not. Mr. Sharma had analyzed the risk and return of the portfolio created by commercial banks and insurance companies based on two-asset (risk-free and risky market portfolio) portfolio.

The study was based on five years historical data from F/Y 1998 to F/Y 2002. He had analyzed the secondary data using financial as well as statistical tools. Similarly, he had also used questionnaire to study the existing situation of portfolio management of those companies.

Major findings of the study were:

⁶¹ Durga Mani Sharma, “Portfolio Management of listed Commercial Banks and Insurance Companies in Nepal.” (Unpublished MBS Thesis, Shanker Dev Campus, FoM, TU, 2004)

- ⊕ Considering the overall market return and risk, the shares of all the commercial banks were attractive for investment. However, the common stocks of HBL seemed attractive among all considering risk per unit of return. Investors retaining the stocks of SCBNL should assume more risk than any others.
- ⊕ Considering the return and risk characteristics of the common stock of all the select insurance companies, the common stock of EVIC was more attractive than others.
- ⊕ The returns on common stocks of all the commercial banks as well as insurance companies in F/Y 2005/2006 were highest among sampled years. The political and economic scenario was worsening day by day and it had the adverse impact on the economic activities of the companies.
- ⊕ The overall market return could not be regarded as attractive with respect to its risk. The risk per unit of return was very high which proved that the market was more risky than the common stocks of insurance companies and commercial banks.
- ⊕ Almost common stocks of commercial banks and insurance companies moved in the same direction meaning they had positive correlation between them. Hence, no stocks with negative correlation or low positive correlation were available in the stock market.
- ⊕ Most of the stocks seemed to be defensive and only few aggressive.
- ⊕ The unsystematic risk of all the companies was high in comparison to total risk. It seemed that the variability of returns of the common stocks of most of the companies was company specific. The company specific risk could be diversified away with a well-diversified portfolio.
- ⊕ The stocks of commercial banks as well as the insurance companies were under priced since their required rates of return were less than their average rates of returns. Hence, active strategy could not work effectively in Nepalese market. Long position on common stock could work effectively.
- ⊕ The returns from the portfolio managed by the commercial banks and insurance companies could not be taken satisfactory. The portfolio management of the listed commercial banks as well as insurance companies did not seem effective.

- ⊕ In selecting the securities to make investment, it was found that most of the commercial banks adopted simple diversification and very few adopted diversification across quality rating categories. Likewise, majority of the insurance companies adopted simple and some adopted diversification across industries.
- ⊕ The major objective of portfolio management of commercial banks was maintaining liquidity. But for insurance companies, the major objective was risk reduction and liquidity maintenance.

2.4 Research Gap

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. Mr. Roopak Raj Joshi of Shanker Dev Campus undertook only one thesis work related to portfolio analysis in investment in securities of listed companies. However, his thesis was concentrated only on three-asset portfolio assigning different weights to different three assets.

Keeping in view the above facts and situation, different sets of portfolios between the stocks of listed companies have been created using different weights. Optimum portfolio of three assets has also been chosen based on the maximum return and minimum risk from the created sets of portfolios. Furthermore, an another optimum portfolio has also been delineated using *Simple Sharpe Portfolio Optimization Model*. Using *Simple Sharpe Portfolio Optimization Model*, excess return to beta ratios of individual stocks have been calculated; Cutoff rate has been determined; stocks with higher *excess return to beta* ratios than particular cutoff rate have been selected for portfolio; and weight in individual stocks have been assigned in order to determine the best portfolio between available alternatives. This is the unique model that has been used to determine an optimum portfolio between the stocks of listed companies. Hence,

this study has attempted to introduce new model for creating the best portfolio and assigning weights between the stocks available in Nepalese stock market.

CHAPTER - III

RESEARCH METHODOLOGY

This chapter mainly deals with the research methodology used to ascertain the study objectives. Under this, research design, population and sample, sample selection method, data collection and analysis techniques have been described.

3.1 Research Design

This study is based on recent five years historical data from F/Y 2001/02 to F\Y 2003/04. It deals with common stocks of companies, which have listed their shares in NEPSE to make them eligible for trading. Hence, it's a historical research. The common stocks under study have been analyzed in a descriptive and analytical way. It is more analytical and empirical and less descriptive.

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 117 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.

For the study, at least 10 percent sample has been considered. Hence, as far as possible stocks of at least two companies from each group categorized by NEPSE have been sampled considered for the study based on purposive sampling method, which makes the sample 12 i.e. two stocks from each seven category. Furthermore, more than 50% samples are from **Class A** stocks as categorized by NEPSE. Rests are on the basis of other classification such as volume traded, data availability, price movement and so on. The sampled companies are listed in Table 3.1.

Table – 3.1: Population and sample of the study

Category	Population size	Sample size	Sampled Companies
Commercial Banks	11	2	1. Standard Chartered Bank Nepal Limited 2. Bank of Kathmandu Limited
Insurance Companies	13	2	3. Himalayan General Insurance Company Limited 4. Sagarmatha Insurance Company
Finance Companies	40	3	5. Kathmandu Finance Company 6. Nepal Housing & Merchant Finance Limited 7. NIDC Capital Market
Manufacturing & Processing Companies	29	2	8. Nepal Lever Limited 9. Bottlers Nepal limited
Hotels	4	1	10. Hotel Soaltee
Others	20	2	11. Bishal Bazar Company 12. Salt Trading Corporation
Total	117	12	

Source: <http://www.nepalstock.com>

3.3 Sources of Data

The study is based on secondary data. Secondary data have been collected through various books, published annual/trading reports of NEPSE, SEBO-N and concerned companies. Especially the data have been derived from the official website of NEPSE – <http://www.nepalstock.com> and Annual Report of Securities Exchange Board of Nepal.

3.4 Data Collection Technique

The researcher has visited the different libraries, concerned companies, NEPSE, SEBO-N and other useful book stores; and collected related publications and periodicals. Official websites were searched in order to collect required information. Furthermore, secondary data related to common stocks of concerned companies have been downloaded from the official website of NEPSE, <http://www.nepalstock.com>.

3.5 Data Analysis Tools

Under this study, financial as well as statistical tools have been used to analyze the data and information.

3.5.1 Financial Tools

(a) Return and Risk Analysis of Individual Stocks

▪ Dividend Per Share (DPS)

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

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

Cash equivalent of stock dividend is calculated as:

$$\text{Cash Equivalent of Stock Dividend} = \text{SDR} \times \text{Next Year MPS}$$

where, SDR = Stock Dividend Ratio

▪ Market Price of Share (P)

One of the principle measures of the value of the stock is market price of stock. It is denoted by P. Three price records are available in Nepal Stock Exchange Limited namely – High, Low and Closing Price. For our study purpose, closing price of the stocks are taken since our study focuses on annual data.

▪ Return on Common Stock (R)

Holding Period Return

Generally, single period return or holding period return is represented by R and expressed in terms of percentage basis. It is calculated as:

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

Symbolically,

$$\text{HPR} = \frac{P_t - P_{t-1} + D_t}{P_{t-1}} = \text{Capital Gain} + \text{Dividend Yield}$$

Where, P_t = Price of a stock at time t

P_{t-1} = Price of a stock at time t-1

D_t = Dividend per share at time t

Average Return of Common Stock (R)

When probabilities of the return are given, the weighted average rate is known as the expected rate of return, represented by $E(R)$. But when the historical data are used, then the arithmetic mean of the returns is known as average return on common stock, represented by \bar{R} . It is used as proxy for expected rate of return. It is computed as:

$$\text{Average Rate of Return on } j \text{ stock} = \frac{\text{Sum of returns of past years}}{\text{Number of years}}$$

Symbolically,

$$\bar{R} = \frac{\sum R_j}{n} \text{ where } \sum R_j = \text{Summation of annual returns on stock } j$$

n = Number of observations

▪ Risk of Common Stock

Stock returns may be riskier or more volatile, but this concept is a difficult one to express simply. In Finance, a concept from Statistics called Standard Deviation is borrowed to measure the risk on returns of investment. Standard deviation is a summary measure about the average spread of observations around the mean. It is the square root of the variance. The standard deviation and the variance are equally acceptable and conceptually equivalent quantitative measures of an asset's total risk. It is computed as:

$$\text{Standard Deviation } (\sigma_j) = \sqrt{\frac{\sum (R_j - \bar{R}_j)^2}{n-1}}$$

(b) 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 is used for the study.

$$\text{Annual Market Return (R}_m) = \frac{\text{Ending NEPSE Index} - \text{Beginning NEPSE Index}}{\text{Beginning NEPSE Index}}$$

Average Market Return (\bar{R}_m)

$$\bar{R}_m = \frac{\sum R_m}{n}$$

where $\sum R_m$ = Summation of annual market return
 n = Number of observations

▪ **Risk of Market Return**

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

$$\text{Standard Deviation } (\sigma_m) = \sqrt{\frac{\sum (R_m - \bar{R}_m)^2}{n - 1}}$$

(c) **Market Sensitivity Analysis**

▪ **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:

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

If two variables are independent, their covariance is zero.

▪ **Correlation coefficients**

Correlation coefficient is a measure of the relative association between two variables. It describes how much linear co-movement exists between two variables. Correlation between stock j and the market is computed as:

$$\rho_{j,m} = \frac{\text{Cov}(R_j, R_m)}{\sigma_j \sigma_m}$$

- (i) If $\rho_{j,m}$ is positive, the returns on security j and market tend to be large at the same time and small at the same time.
- (ii) If $\rho_{j,m}$ is negative, relatively large return of security j is associated with relatively small return of market.
- (iii) If $\rho_{j,m}$ is zero, the return of security j is uncorrelated to the return on market. Movement on the return of security j appear unrelated to movements in the return of market.

▪ **Beta**

Beta coefficients may be used for ranking the systematic risk of different assets. Beta coefficient of stock j is denoted by β_j . It is functionally related to the correlation and the covariance between the security and the market portfolio. It is computed as:

$$\beta_j = \frac{\text{Cov}(R_j, R_m)}{\text{Var}(R_m)}$$

where, $\text{Cov}(R_j, R_m)$ = covariance of returns of the j^{th} asset with the market

$\text{Var}(R_m)$ = variance of returns for the market portfolio

Individual stocks can be classified as aggressive or defensive or average on the basis of beta coefficients.

Beta coefficients	Stock classification	Degree of risk
Less than 1	Defensive stock	Less risky than the market
Exactly 1	Average stock	Equally risky as the market
Greater than 1	Aggressive stock	More risky than the market

(d) Analysis of Systematic and Unsystematic Risk

▪ **Systematic Risk**

Total risk of any individual stock can be measured by variance or standard deviation. The total risk can be partitioned as (i) systematic and (ii)

unsystematic. Systematic risk is that portion of total risk caused by market factors that simultaneously affect the prices of all securities and can not be avoided or diversified. Undiversifiable risk, market risk, beta risk are equally used terms. It is calculated as:

$$\text{Systematic Risk} = \beta_{jm}^2 \text{Var} (R_m)$$

where β_{jm} = Beta coefficient of stock j with market return

$\text{Var} (R_m)$ = Variance of market return.

The percentage of systematic risk is measured by the coefficient of determination.

$$\begin{aligned} \text{Proportion of Systematic Risk} &= \frac{\text{Systematic Risk}}{\text{Total Risk}} \\ &= \frac{\beta_{jm}^2 \text{Var} (R_m)}{\text{Var} (R_j)} = \frac{\beta_{jm}^2 \sigma_m^2}{\sigma_j^2} = \rho_{j,m}^2 \end{aligned}$$

- **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:

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

(e) **Portfolio Analysis**

- **Portfolio Return**

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

$$\text{Portfolio Return} (R_p) = X_1 R_1 + X_2 R_2 + X_3 R_3$$

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

▪ **Portfolio Risk**

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

▪ **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 degrees of risk that are 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:

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

where,

- K_j = required rate of return on security j
- R_f = risk free rate of return (government security)
- R_m = return on market i.e. risky assets
- β_j = Beta of security j (systematic risk index of security j)

(f) 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:

$$S_j = \frac{\text{Risk Premium}}{\text{Total Risk}}$$
$$= \frac{\bar{R}_j - R_f}{\sigma_j}$$

where, S_j = Sharpe index of portfolio performance of portfolio j

\bar{R}_j = Average return from portfolio j

R_f = Risk free rate of return

σ_j = Standard deviation of returns for portfolio j

(g) Simple Sharpe Portfolio Optimization Model

(i) Calculating *excess return-to-beta* ratio

The construction of an optimal portfolio is simplified if a single number measures 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.

Excess return-to-beta Ratio = $(R_i - R_f) / S_i$

where,

R_i = expected return on stock i

R_f = return on a risk less asset

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

(ii) Ranking the assets from highest to lowest ratio

(iii) Establishing a cut-off rate

$$C_i = \frac{\sum_{i=1}^m \frac{(R_i - R_F)^2}{\sigma_{ei}^2}}{1 + \sum_{i=1}^m \frac{i}{\sigma_{ei}^2}}$$

Where,

σ_m^2 = variance in the market index

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

(iv) Selecting securities for optimum portfolio

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

(v) Assigning weight to individual securities

$$X_i = \frac{Z_i}{\sum_{j=1}^N Z_j}$$

Where,

$$Z_i = \frac{i}{\sigma_{ei}^2} \frac{R_i - R_F}{i} > C^*$$

3.5.2 Statistical Tools

(a) Hypothesis Testing

To test the set hypotheses, t-test has been employed. Under Null Hypothesis (H_0), t-test statistics is:

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

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

3.6 Research Hypothesis

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

3.6.1 Return Characteristics

Null Hypothesis (H_0): $\bar{R}_i = \mu$ 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): $\bar{R}_i < \mu$ i.e. There is a significant difference between the return of market and sample. i.e. the portfolio return is less than market return.

3.6.2 Risk Characteristics

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

Alternative Hypothesis (H_A): $\beta_p < 1$ 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 ($\alpha = 5\%$).

3.7 Limitations of the Methodology

Each and every methodology suffers from some kind of limitations. So, the methodology deployed in this research can not be different from the common limitations of same type of theses. However, in analyzing portfolio risk and return of the select samples, the tools applied can not best describe the relationships between the variables under study since portfolio analysis tools are based on various assumptions. In selecting samples, purposive/judgmental sampling method has been adopted. The samples for secondary data collection were selected on the basis of quality rating, high volume traded, and the availability of published data. Likewise, only 10% samples for secondary data were taken. Hence, as far as possible, stocks of at least 2 companies from each group categorized by NEPSE have been sampled based on purposive sampling method, which make the sample number 12. Hence, the reliability, accuracy and validity of the research findings depend on the samples.

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 stocks 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 returns (R_i) are calculated (*calculations are shown in Annex II*).

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

Average rate of returns, variance of returns, standard deviations and coefficient of variation are presented in Table 4.1.1. The calculations have been shown in **Annex II**.

Table 4.1.1 - Average rates of return, variance, SD and CV

Listed companies	\bar{R}_i	Var (R_i)	r	CV
Standard Chartered Bank Nepal Limited (SCBNL)	21.04 %	10.19 %	31.92 %	1.52
Bank of Kathmandu (BoK)	22.71%	44.06%	66.38%	2.92
Bottlers Nepal Limited, Balaju (BNL)	-1.69%	3.55%	18.84%	-11.15
Hotel Soaltee (HS)	-14.09%	2.67%	16.34%	-1.16
Salt Trading Corporation (STC)	5.00%	0.24%	4.90%	0.98
Bishal Bazar Company Limited (BBCL)	15.60%	9.76%	31.24%	2.00
Kathmandu Finance Limited (KFL)	-5.50%	1.96%	14.00%	-2.55
Himalayan General Insurance Company (HGIC)	-5.32%	2.66%	16.31%	-3.07
Nepal Lever Limited (NLL)	16.93%	14.89%	38.59%	2.28
Sagarmatha Insurance Company Ltd.(SICL)	2.44%	5.65%	23.77%	9.74
Nepal Housing & Merchant Finance Ltd. (NH&MFL)	0.79%	1.16%	13.00%	16.46
NIDC Capital Market (NIDCCM)	-6.97%	22.37%	47.30%	-6.79

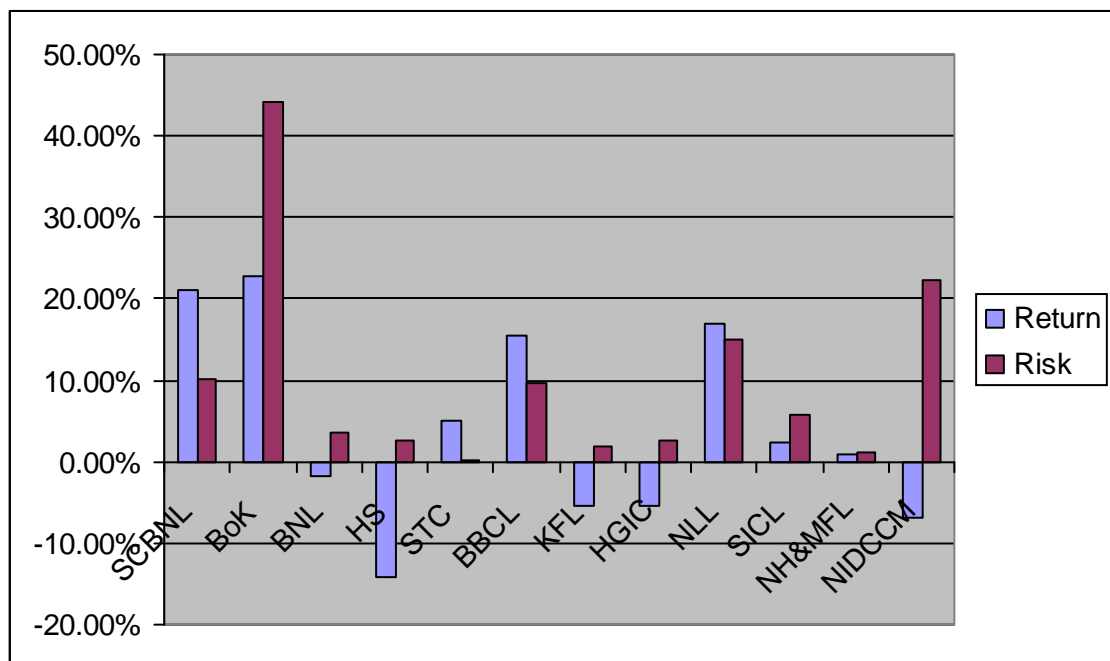
The statistical results in **Table 4.1.1** shows that the share of **Bank of Kathmandu** offers the highest average rate of return where as the share of HS,BNL,KFL,HGFL,NIDCCM offers the negative rate of return and Nepal Housing & Merchant Finance Ltd offers the lowest average rate of return. The different shares have different rates of return with in the range of -14.09% to 22.71%. On the basis of average rate of return, the share of **BOK** seems to be the best for investment. Considering the average rate of return, however, the shares of other companies are not so also attractive for investment point of view. Hereafter, the stock of BNL,HS,KFL,HGIC,NIDCCM 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. 4.90% and **Bank of Kathmandu has the highest i.e. 66.38%.NIDCCM,NLL,SCBL,BBCL,SICL,BNL,HS,HGFL,KFL,NH&MFL** have standard deviation of **47.30%, 38.59%, 31.92%, 31.24%, 23.77%, 18.84%, 16.34%, 16.31%, 14.00%,and 13.00%** respectively. Salt Trading Corporation has the lowest risk among all.

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 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. The CV of SCBNL is 1.52, BOK is 2.92, BNL is -11.15, HS is -1.16, STC is 0.98, BBCL is 2.00, KFL is -2.55, HGIC is -3.07, NLL is 2.28, SICL is 9.74, NH&MFL is 16.46 and NIDCCM is -6.79. It seems that the CV i.e. risk per unit of return of NH&MFL is the highest and of STC is the lowest among all ignoring the negative. It seems that one percent increase in return of NH&MFL causes 16.46% increase in risk. Likewise, for 1 % increase in the return of the stocks of SCBNL, BOK, BBCL, NLL, SICL and STC the investors should assume 1.52%, 2.92%, 2.00%, 2.28%, 9.74%, 0.98%, risks respectively. On the basis of CV, the common stocks of STC seem attractive among all. NH&MFL offers the highest risk per unit of return. So, investors retaining the stocks of NH&MFL should assume more risk than any others.

The rates of return and the risk have been depicted in Figure 4.1.1.

Figure 4.1.1 - Risk and Return of the stocks of listed companies



Stocks of the Companies

4.1.2 Market Risk and Return

Nepal Stock Exchange Limited (shortly called as 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 4.1.2 and 4.1.3**.

Figure 4.1.2 – Movement of Annual

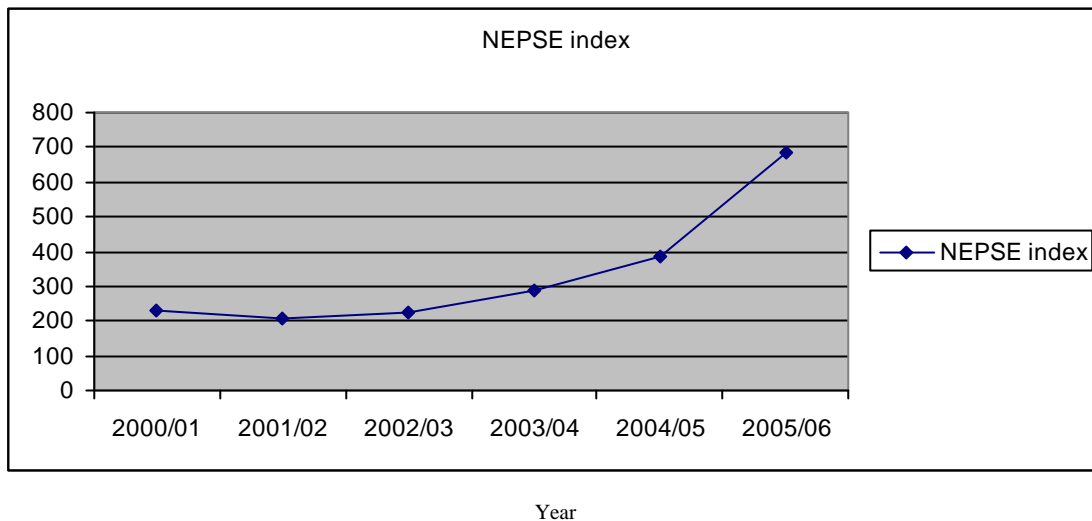
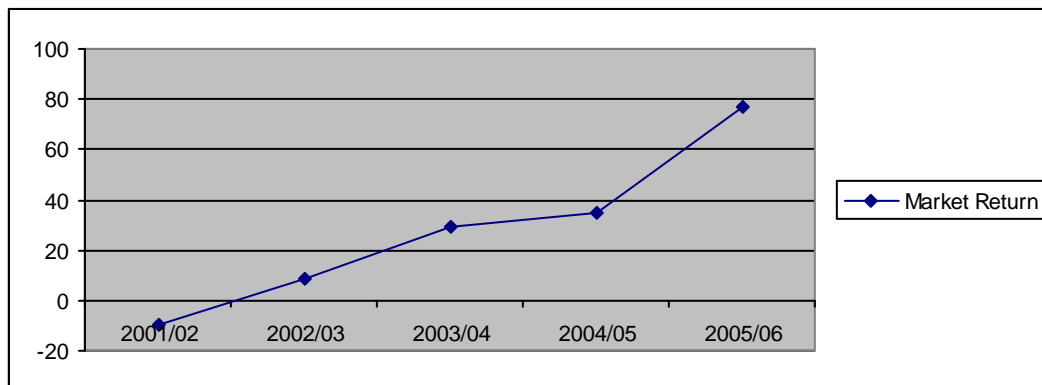


Figure 4.1.3 – Movement on Annual Rate of Return of Market



Average rate of return, variance and standard deviation of market have been shown in Table 4.1.2. The calculations have been shown in **Annex III**.

Table 4.1.2 – Average Return, Variance, SD and CV of Overall Market Returns

	Average Return	Variance	Standard Deviation	CV
NEPSE (Market)	27.86 %	10.65 %	32.63 %	1.17

Average rate of return of market is only 27.86 % with a standard deviation of 32.63%. Coefficient of variation of the market return is 1.17.

4.1.3 Market Sensitivity of Stocks

Covariance measures 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 within the limit of +1 to -1.

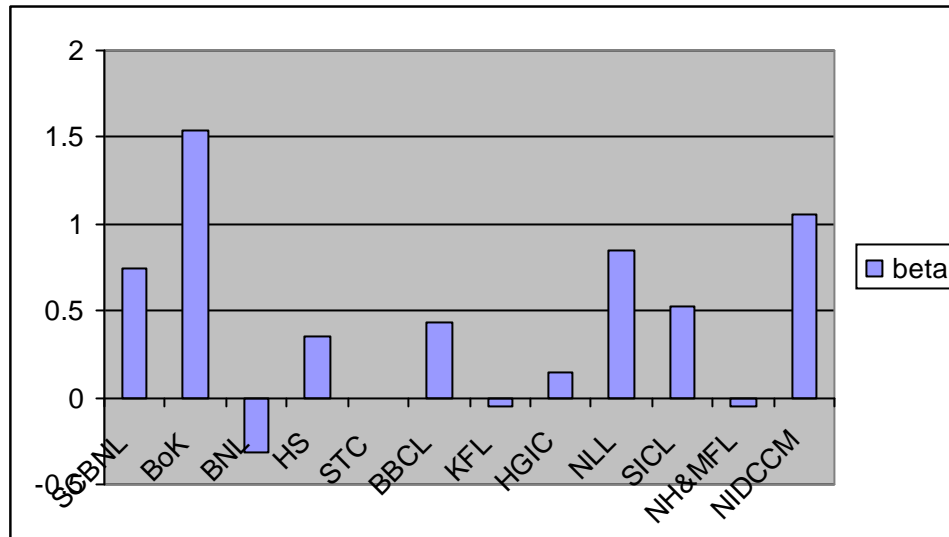
The variability of a security's return with the return of the overall market, say NEPSE, return is called systematic risk and can not be avoided. It is un-avoided risk and is measured by beta coefficient. Beta depicts the sensitivity of the security's excess returns to that of the market portfolio.

The calculated covariance, correlations and beta coefficients of the stocks of companies are presented in Table – 4.1.3. Required calculations are shown in **Annex IV and V**.

Table 4.1.3 – Covariance and Beta Coefficients of Companies

Stocks	Cov (R_i, R_m)	S_{im}
SCBNL	7.83%	0.74
BOK	16.41%	1.54
BNL	-3.34%	-0.31
HS	3.73%	0.35
STC	-0.11%	-0.01
BBCL	4.57%	0.43
KFL	-0.57%	-0.05
HGIC	1.58%	0.15
NLL	9.10%	0.85
SICL	5.50%	0.52
NH&MFL	-0.57%	-0.05
NIDCCM	11.19%	1.05

Figure 4.1.4 – Beta coefficients of the stocks of listed companies



Stocks of Companies

From the results, covariances of the returns of **SCBNL, BOK, BNL, HS, STC, BBCL, KFL, HGIC, NLL, SICL, NH&MFL and NIDCCM** with the overall market returns are 7.83%, 16.41%, -3.34%, 3.75%, -0.11%, 4.52%, -0.57%, 1.58%, 9.10%, 5.50%, -0.57% and 11.19% respectively. As covariance between two variables measures the absolute association, there is the highest absolute association between the returns of **BOK** and market. Among all, NIDCCM has the second highest association, then after NLL, SCBL, SICL, BBCL, HS have respectively the lower association and at last HGIC has the least association with the market. Similarly, BNL, STC, KFL, NH&MFL has the negative co-variances i.e. there is inverse association between the returns of these companies and market.

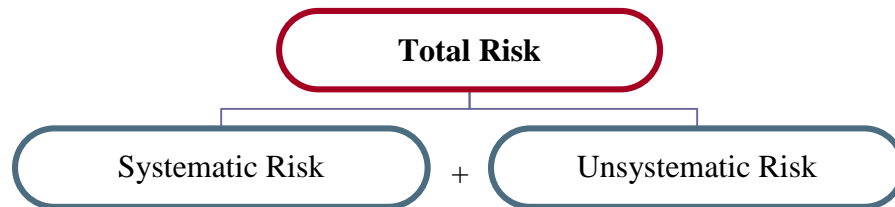
By observing the individual shares beta coefficients, the stocks of SCBNL, HS, BBCL, HGIC, SICL and NLL appear to be defensive since their beta coefficients are less than one. Shares with low beta coefficients are less volatile than the market as a whole. The beta coefficients of SCBNL, HS, HGIC, BBCL, NLL and SICL are 0.74, 0.35, 0.43, 0.15, 0.85 and 0.52 respectively which indicate that they are less volatile than the market. However, the beta coefficient of BoK, HS, KFL, HGIC, SICL, NH&MFL and NIDCCM is 2.74, 1.16, 1.90, 1.44, 1.38, 1.43 and 3.25 respectively. Since their beta coefficients are greater than one, they are called aggressive stock. It indicates that the stocks of BOK and NIDCCM are riskier and volatile than market.

Among them stock of BOK is more risky as its beta coefficient is highest among stocks and the stocks of SCBNL, HS, HGIC, BBCL, NLL, SICL are less risky than market. Stock of HGIC is least 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 un-diversifiable risk. It is caused by market factors. Changes in the economic, political and sociological environment that affect securities markets are sources of systematic risk.

Figure 4.1.5 – Partition of Total Risk



The systematic risk is computed as:

$$\text{Systematic Variance} = s^2 \text{Var} (R_m)$$

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

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

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

$$\begin{aligned} \text{Unsystematic Risk} &= \text{Total Risk} - \text{Systematic Risk} \\ &= \text{Var} (R_i) - \beta^2 \text{Var} (R_m) \end{aligned}$$

Total, systematic and unsystematic risk and their proportions of the stocks of the Companies are presented in Table 4.1.4. Required calculation have been shown in **Annex VI**

Table 4.1.4 – Total, systematic and unsystematic risk and their proportions

Companies	Total Risk (VAR)	Systematic Risk [$\sigma^2 \text{Var}(R_m)$]	Proportion of Systematic Risk	Unsystematic Risk	Proportion of Unsystematic Risk
SCBNL	10.19%	5.85%	57.48%	4.33%	42.51%
BOK	44.06%	25.24%	57.29%	18.82%	42.71%
BNL	3.55%	0.96%	27.00%	2.60%	73.00%
HS	2.67%	1.28%	47.86%	1.39%	52.13%
STC	0.24%	0.00%	0.00%	0.24%	100.00%
BBCL	9.76%	1.91%	19.64%	7.84%	80.36%
KFL	1.96%	0.00%	0.00%	1.96%	100.00%
HGIC	2.66%	0.21%	8.00%	2.44%	92.00%
NLL	14.89%	7.67%	51.50%	7.22%	48.50%
SICL	5.65%	2.88%	50.89%	2.77%	49.10%
NH&MFL	1.16%	0.00%	0.00%	1.16%	100.00%
NIDCCM	22.37%	11.72%	52.37%	10.65%	47.63%

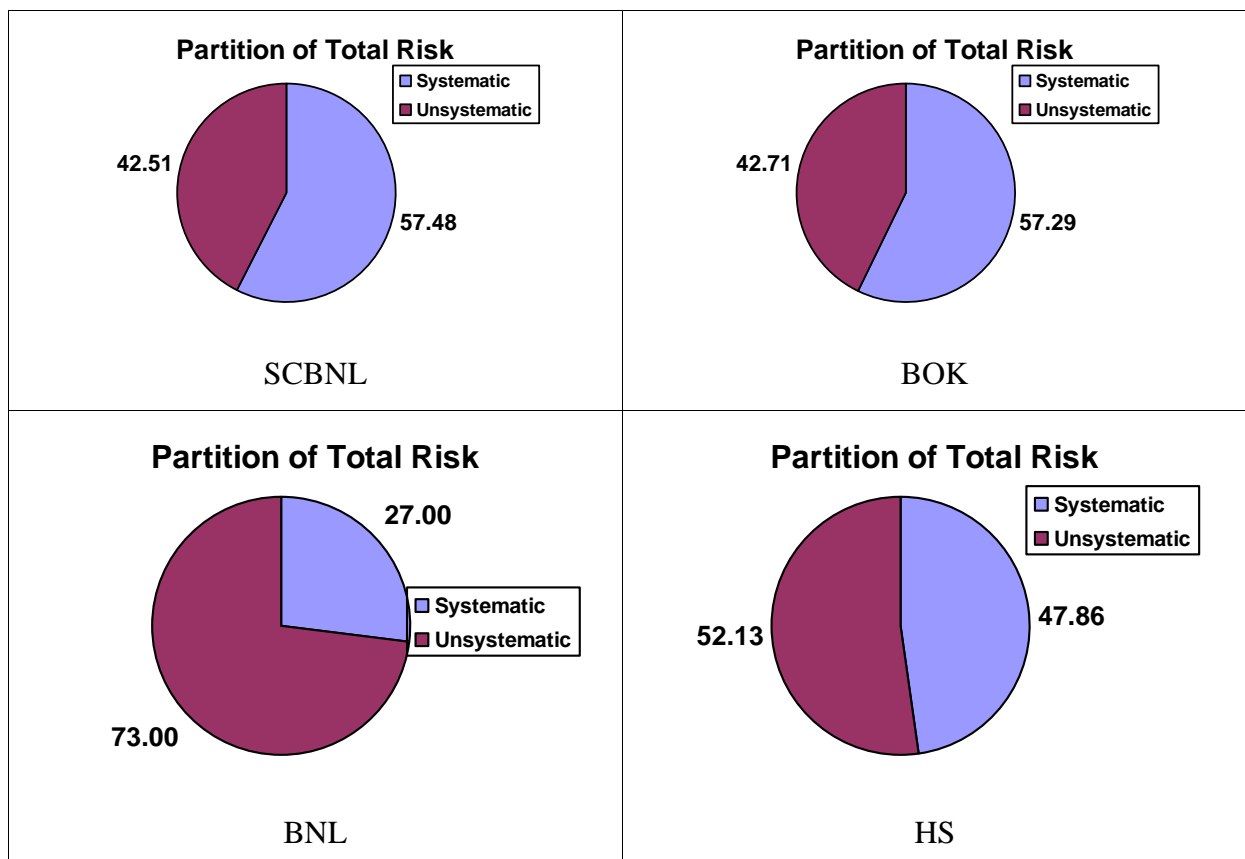
From the statistical results shown in Table 4.1.4, the stocks of **SCBNL, BOK, BNL, HS, STC, BBCL, KFL, HGIC, NLL, SICL, NH&MFL and NIDCCM** have the systematic risks of 5.85%, 25.24%, 0.96%, 1.28%, 0.00%, 1.91%, 0.00%, 0.21%, 7.67%, 2.88%, 0.00% 11.72% respectively. Comparing each other, the share of **BOK** has the highest systematic risk i.e. 25.24% where as the share of **BBCL** has the least systematic risk. (Ignoring the systematic risk of **BNL, HS, KFL, HGIC & NIDCCM** due to its negative return) On the basis of systematic risk, the stock of the **BBCL** is more attractive than others. The stock of **BOK** appears most risky.

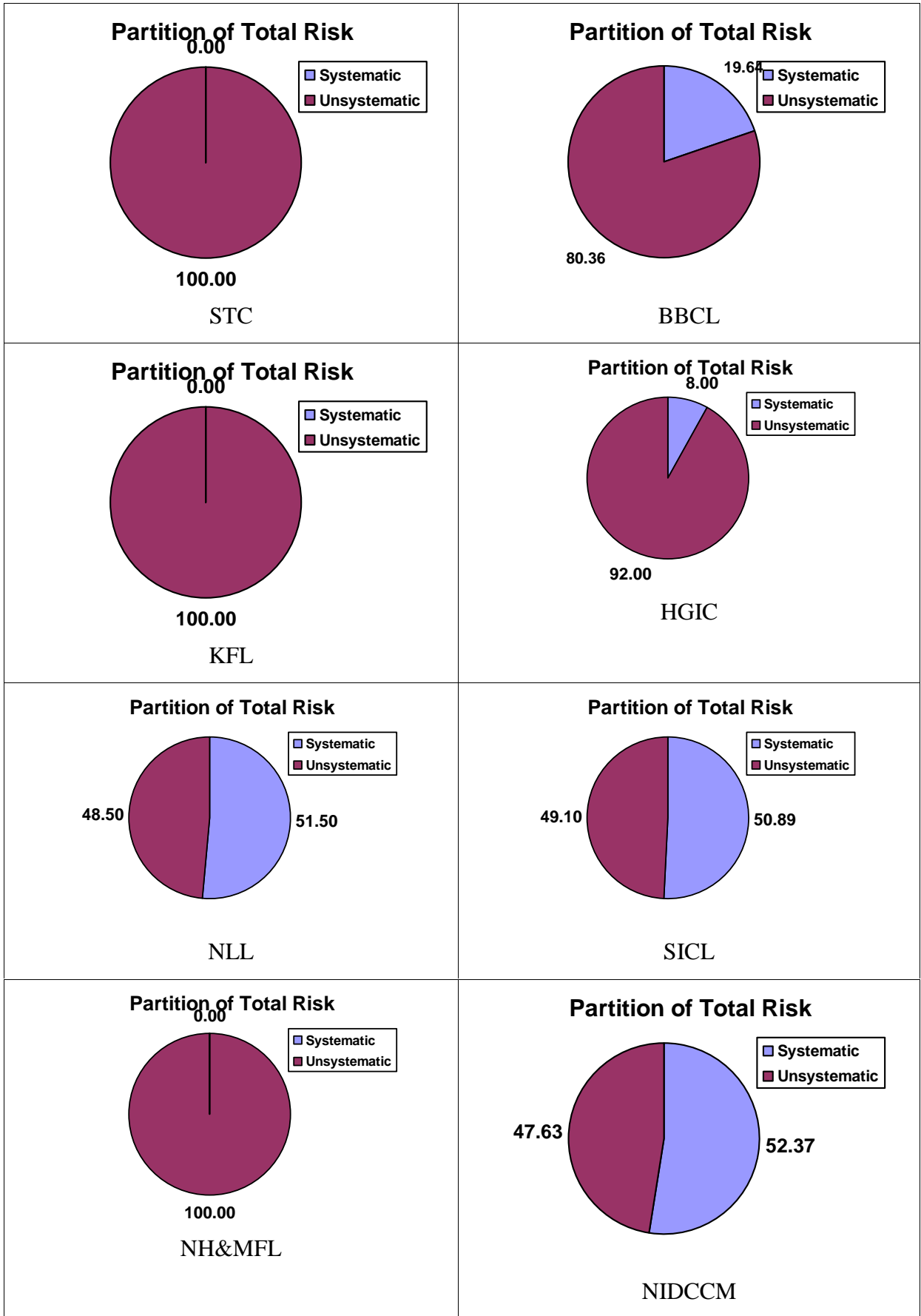
Out of total risk of individual stocks return, the proportion of systematic risks of **SCBNL, BoK, BNL, HS, STC, BBCL, KFL, HGIC, NLL, SICL, NH&MFL and NIDCCM** are 57.48%, 57.29%, 27.00%, 47.86%, 0.00%, 19.64%, 0.00%, 8.00%, 51.50%, 50.89%, 0.00% and 52.37% respectively. It seems that 57.48% variability of returns of the common stocks of **SCBNL** is systematic or caused by market factors. Likewise, 57.29% risk of **BOK** is the result of market factor. Similarly 27.00%, 47.86%, 0.00%, 19.64%, 0.00%, 8.00%, 51.50%, 50.89%, 0.00% and 52.37% risk of **BNL, HS, STC, BBCL, KFL, HGIC, NLL, SICL,, NH&MFL and NIDCCM** respectively are also due to market factors. These can not be reduced. Considering the unsystematic risks, the unsystematic risks of **SCBNL, BOK, BNL, HS, STC, BBCL, KFL, HGIC, NLL, SICL, NH&MFL and NIDCCM** are 4.33%, 18.82%, 2.60%,

1.39%, 0.24%, 7.84%, 1.96%, 2.44%, 7.22%, 2.77%, 1.16% and 10.65% respectively. Among them, the stock of BOK has the greatest unsystematic risk and STC has the least unsystematic risk.(Ignoring the systematic risk of BNL,HS,KFL,HGIC & NIDCCM due to its negative return) Out of total risks of **SCBNL, BOK, BNL, HS, STC, BBCL, KFL, HGIC, NLL, SICL, NH&MFL and NIDCCM** 42.51%, 42.71%,73.00%, 52.13%, 100.00%, 80.36%, 100.00%, 92.00%, 48.50%, 49.10%, 100.00% and 47.63% are unsystematic or company specific risks which can be diversified away with an optimal portfolio construction. There is the highest company specific risk of the stocks of BBCL i.e. 80.36% (Ignoring the systematic risk of BNL,HS,KFL,HGIC & NIDCCM due to its negative return). From the unsystematic risk perspective, the management errors or company specific weaknesses of BBCL are the highest among all. Out of total risk, 42.51%, 42.71%,73.00%, 52.13%, 100.00%, 80.36%, 100.00%, 92.00%, 48.50%, 49.10%, 100.00% and 47.63% of **SCBNL, BOK, BNL, HS, STC, BBCL, KFL, HGIC, NLL, SICL, NH&MFL and NIDCCM** respectively can be diversified away.

The systematic as well as unsystematic risks of the common stocks of listed companies are in Figure 4.1.6.

Figure 4.1.6 – Systematic and Unsystematic Risk of the stocks of listed companies





4.1.5 Price Situations 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 coefficients, risk premiums and required rate of return on the stocks of listed companies have been summarized in Table 4.1.5. Required calculations have been shown in **Annex VII & VIII**.

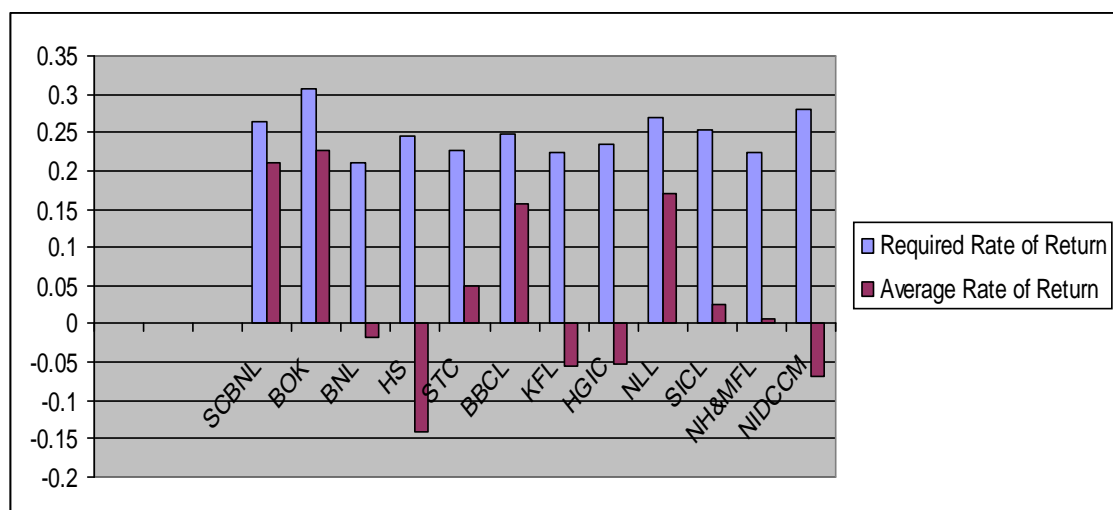
Table 4.1.5 – Price Situations of CS of listed companies

Stocks	S	\bar{R}_f (%)	\bar{R}_m (%)	Risk Premiu m ($\bar{R}_m - \bar{R}_f$)	Required Rate of Return	Average Rate of Return	Price Situations
SCBNL	0.74	22.6 %	27.86 %	5.26%	26.49%	21.04 %	Over priced
BOK	1.54				30.70%	22.71%	Over priced
BNL	-0.31				20.97%	-1.69%	Over priced
HS	0.35				24.44%	-14.09%	Over priced
STC	-0.01				22.55%	5.00%	Over priced
BBCL	0.43				24.86%	15.60%	Over priced
KFL	-0.05				22.34%	-5.50%	Over priced
HGIC	0.15				23.39%	-5.32%	Over priced
NLL	0.85				27.07%	16.93%	Over priced
SICL	0.52				25.34%	2.44%	Over priced
NH&MFL	-0.05				22.36%	0.79%	Over priced
NIDCCM	1.05				28.12%	-6.97%	Over priced

From Table 4.1.5, it has been observed that the overall average market return is 27.86 %. The Treasury bill rate is 22.6%. The risk premium for the stocks of all the companies in the market is the difference between risk free rate and market rate of return i.e. 5.26%. Based on the riskyness of the stocks, the required rate of returns for individual stocks are 26.49%, 30.7%, 20.97%,24.44%, 22.55%, 24.86%, 22.34%, 23.39%,27.07%, 25.34%, 22.36% and 28.12% for **SCBNL, BoK, BNL, HS, STC,**

BBCL, KFL, HGIC, NLL, SICL, NH&MFL and NIDCCM respectively. Higher the beta, higher will be the required rate of return and vice versa. Since the beta coefficients of the stocks of BOK is the highest among all i.e. 1.54, its required rate of return is also the highest among all. Higher systematic risk requires higher risk premium. Likewise, the beta coefficient of the stocks of SICL is the lowest among all i.e.0.52 having the risk premium 5.26% and requiring the return of 2.44%. Comparing the required rate of return and the expected rate of return of the stocks of listed companies, the required rates of return for all the companies are more than expected/average rates of return. Hence, all the stocks are over priced in the market. As a result, the shares of the all the companies given in the above table are not appear attractive to investors. (Ignoring the shares negative return) Hence, investors are advised not to purchase to sell the common stocks of the **SCBNL, BOK, BNL, HS, KFL, HGIC, NLL, SICL, BBCL NH&MFL and NIDCCM** in the market if they are holding. The investors are not required to take long position to gain from the stocks of **SCBNL, BOK, BNL, HS, KFL, HGIC, NLL, SICL,STC, BBCL NH&MFL and NIDCCM**.

Figure 4.1.7 – Required Rate of Return and Average Rate of Return of Stocks of Listed Companies



4.1.6 Portfolio Analysis

The objective 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 financial institutions have been shown in **Annex IX**.

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

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

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

Table 4.1.6: Portfolio between SCBNL, NNL and SICL (Set 1)

	SCBNL	NNL	SICL	$r_{SN}=0.91$ $r_{SS}=0.97$ $r_{NS}=0.82$		
Return	21.04%	16.93%	2.44%			
Risk	31.92%	38.59%	23.77%			
	X1	X2	X3	E(R _p)	SD _p	CV
A	0	0	1	2.44%	23.77%	9.74
B	0	0.5	0.5	9.69%	31.18%	3.22
C	0.34	0.33	0.33	13.55%	31.43%	2.32
D	1	0	0	21.04%	31.92%	1.52
E	0.5	0.5	0	18.99%	35.25%	1.86
F	0	1	0	16.93%	38.59%	2.28

From the different opportunity sets shown in Table 4.1.6, the highest portfolio return is derived from Set D and the least portfolio risk is from Set A. However, the total risk can be significantly reduced with a well diversified portfolio. If a person makes entire investment in stock NNL, the total risk is highest among all. But if an investor divides his investable funds into three stocks as per Set E, the return can be averaged and the

total risk can be reduced where the risk per unit of return is minimum. Since the stocks are nearly perfectly positively correlated, the total risk can not be significantly reduced.

Table 4.1.7 : Portfolio between SCBNL, NNL and BBCL (Set 2)

	SCBNL	NNL	BBCL	rSN=0.91 rSB=0.50 rNB=0.79		
Return	21.04%	16.93%	15.60%			
Risk	31.92%	38.59%	31.24%			
	X1	X2	X3	E(Rp)	SDp	CV
A	0	0	1	15.60%	31.24%	2.00
B	0	0.5	0.5	16.26%	34.92%	2.14
C	0.33	0.34	0.33	17.85%	33.96%	1.90
D	1	0	0	21.04%	31.92%	1.52
E	0.5	0.5	0	18.98%	35.25%	1.85
F	0	1	0	16.93%	38.59%	2.28

From the different opportunity sets shown in Table 4.1.7, the highest portfolio return is derived from Set D and the least portfolio risk is from Set A. However, the total risk can be significantly reduced with a well-diversified portfolio. If a investor makes entire investment in stock NNL, the total risk is highest among all. But if the investor divides his investible funds into two stocks as per Set E, the return can be averaged and the total risk can be reduced where the risk per unit of return is minimum. Since the stocks are nearly perfectly positively correlated, the total risk can not be significantly reduced.

Table 4.1.8 - Portfolio between SCBNL, NNL and NH&MFL (Set 3)

	SCBNL	NNL	NH&MFL	rSN=0.91 rSN=-0.35 rNN=-0.11		
Return	21.04%	16.93%	0.79%			
Risk	31.92%	38.59%	13.00%			
	X1	X2	X3	E(Rp)	SDp	CV
A	0	0	1	0.79%	13.00%	16.46
B	0	0.5	0.5	8.86%	25.79%	2.91
C	0.33	0.34	0.33	12.96%	27.94%	2.16
D	1	0	0	21.04%	31.92%	1.52
E	0.5	0.5	0	18.99%	35.25%	1.86
F	0	1	0	16.93%	38.59%	2.28

From the different opportunity sets shown in Table 4.1.8, the highest portfolio return is derived from Set D and the least portfolio risk is from Set A. However, the total risk can be significantly reduced with a well diversified portfolio. If an investor makes entire investment in stock NNL, the total risk is highest among all. But if the investor divides his investible funds into three stocks as per Set E, the return can be averaged

and the total risk can be reduced where the risk per unit of return is minimum. Since the stocks are nearly perfectly positively correlated, the total risk can not be significantly reduced.

Table 4.1.9 - Portfolio between SCBNL, BBCL and SICL (Set 4)

	SCBNL	BBCL	SICL	rSB=0.50 rBS=-0.41 rSS=0.97		
Return	21.04%	15.60%	2.44%			
Risk	31.92%	31.24%	23.77%			
	X1	X2	X3	E(Rp)	SDP	CV
A	0	0	1	2.44%	23.77%	9.74
B	0	0.5	0.5	9.02%	27.43%	3.04
C	0.33	0.34	0.33	13.05%	28.66%	2.20
D	1	0	0	21.04%	31.92%	1.52
E	0.5	0.5	0	18.32%	31.37%	1.71
F	0	1	0	15.60%	31.24%	2.00

From the different opportunity sets shown in Table 4.1.9 the highest portfolio return is derived from Set D and the least portfolio risk is from Set A. However, the total risk can be significantly reduced with a well diversified portfolio. If an investor makes entire investment in stock SCBL, the total risk is highest among all. But if the investor divides his investible funds into three stocks as per Set E, the return can be averaged and the total risk can be reduced where the risk per unit of return is minimum than that of Set B, E & F. Since the stocks are nearly perfectly positively correlated, the total risk can not be significantly reduced.

Table 4.1.10 - Portfolio between SCBNL, BBCL and NH&MFL (Set 5)

	SCBNL	BBCL	NH&MFL	rSB=0.50 rSN=-0.35 rBN=0.46		
Return	21.04%	15.60%	0.79%			
Risk	31.92%	31.24%	13.00%			
	X1	X2	X3	E(Rp)	SDP	CV
A	0	0	1	0.79%	13.00%	16.46
B	0	0.5	0.5	8.20%	21.91%	2.67
C	0.33	0.34	0.33	12.51%	25.44%	2.03
D	1	0	0	21.04%	31.92%	1.52
E	0.5	0.5	0	18.32%	31.58%	1.72
F	0	1	0	15.60%	31.24%	2.00

From the different opportunity sets shown in Table 4.1.10 the highest portfolio return is derived from Set D and the least portfolio risk is from Set A. However, the total risk can be significantly reduced with a well diversified portfolio. If an investor makes entire investment in stock SCBL, the total risk is highest among all. But if the investor

divides his investible funds into three stocks as per Set E, the return can be averaged and the total risk can be reduced where the risk per unit of return is minimal. Since the stocks are nearly perfectly positively correlated, the total risk can not be significantly reduced.

Tale 4.1.11 - Portfolio between SCBNL, SICL and NH&MFL (Set 6)

	SCBNL	SICL	NH&MFL	rSS=0.97 rSN=-0.35 rSN=0.29		
Return	21.04%	2.44%	0.79%			
Risk	31.92%	23.77%	13.00%			
	X1	X2	X3	E(Rp)	SDP	CV
A	0	0	1	0.79%	13.00%	16.46
B	0	0.5	0.5	1.62%	18.38%	11.38
C	0.33	0.34	0.33	8.03%	22.90%	2.85
D	1	0	0	21.04%	31.92%	1.52
E	0.5	0.5	0	11.74%	27.84%	2.37
F	0	1	0	2.44%	23.77%	9.74

From the different opportunity sets shown in Table 4.1.11 the highest portfolio return is derived from Set D and the least portfolio risk is from Set A. However, the total risk can be significantly reduced with a well diversified portfolio. If an investor makes entire investment in stock SCBL the total risk is highest among all. But if the investor divides his funds into two stocks as per Set E, the return can be averaged and the total risk can be reduced where the risk per unit of return is minimal. Since the stocks are nearly perfectly positively correlated, the total risk can not be significantly reduced.

Table 4.1.12 - Portfolio between NLL, SICL and BBCL (Set 7)

	NLL	SICL	BBCL	rNS=0.82 rNB=0.79 rNB=0.41		
Return	16.93%	2.44%	15.60%			
Risk	38.59%	23.77%	31.24%			
	X1	X2	X3	E(Rp)	SDP	CV
A	0	0	1	15.60%	31.24%	2.00
B	0	0.5	0.5	9.02%	27.50%	3.05
C	0.33	0.34	0.33	11.56%	31.12%	2.69
D	1	0	0	16.93%	38.59%	2.28
E	0.5	0.5	0	9.69%	31.18%	3.22
F	0	1	0	2.44%	23.77%	9.74

From the different opportunity sets shown in Table 4.1.12 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 entire

investment in stock NLL the total risk is highest among all. But if the investor divides his available funds into two stocks as per Set C, the return can be averaged and the total risk can be reduced where the risk per unit of return is minimal. Since the stocks are nearly perfectly positively correlated, the total risk can not be significantly reduced.

Table 4.1.13 - Portfolio between NLL, SICL and NH&MFL (Set 8)

	NLL	SICL	NH&MFL	rNS=0.82 rNN=-0.11 rSN=-0.29		
Return	16.93%	2.44%	0.79%			
Risk	38.59%	23.77%	13.00%			
	X1	X2	X3	E(Rp)	SDP	CV
A	0	0	1	0.79%	13.00%	16.46
B	0	0.5	0.5	1.62%	18.39%	11.38
C	0.33	0.34	0.33	6.68%	25.10%	3.76
D	1	0	0	16.93%	38.59%	2.28
E	0.5	0.5	0	9.69%	31.18%	3.22
F	0	1	0	2.44%	23.77%	9.74

From the different opportunity sets shown in Table 4.1.13 the highest portfolio return is derived from Set D and the least portfolio risk is from Set A. However, the total risk can be significantly reduced with a well diversified portfolio. If an investor makes entire investment in stock NLL the total risk is highest among all. But if the investor divides his investible funds into two stocks as per Set E, the return can be averaged and the total risk can be reduced where the risk per unit of return is minimal. Since the stocks are nearly perfectly positively correlated, the total risk can not be significantly reduced.

Table 4.1.14 - Portfolio between NLL, BBCL and NH&MFL (Set 9)

	NLL	BBCL	NH&MFL	rNB=0.79 rNN=-0.11 rBN=-0.46		
Return	16.93%	15.60%	0.79%			
Risk	38.59%	31.24%	13.00%			
	X1	X2	X3	E(Rp)	SDP	CV
A	0	0	1	0.79%	13.00%	16.46
B	0	0.5	0.5	8.20%	22.12%	2.70
C	0.33	0.34	0.33	11.15%	27.64%	2.48
D	1	0	0	16.93%	34.59%	2.04
E	0.5	0.5	0	16.27%	34.91%	2.15
F	0	1	0	15.60%	31.24%	2.00

From the different opportunity sets shown in Table 4.1.14, the highest portfolio return is derived from Set D and the least portfolio risk is from Set A. However, the total risk can be significantly reduced with a well diversified portfolio. If an investor makes

entire investment in stock NLL the total risk is highest among all. But if the investor divides his investible funds into two stocks as per Set E, the return can be averaged and the total risk can be reduced where the risk per unit of return is minimum. Since the stocks are nearly perfectly positively correlated, the total risk can not be significantly reduced.

Table 4.1.15 - Portfolio between SICL, BBCL and NH&MFL (Set 10)

	SICL	BBCL	NH&MFL	rSB=0.41 rSN=-0.29 rBN=0.46					
Return	2.44%	15.60%	0.79%						
Risk	23.77%	31.24%	13.00%	X1	X2	X3	E(Rp)	SDP	CV
A	0	0	1				0.79%	13.00%	16.46
B	0	0.5	0.5				8.20%	22.12%	2.70
C	0.33	0.34	0.33				6.37%	22.75%	3.57
D	1	0	0				2.44%	23.77%	9.74
E	0.5	0.5	0				9.02%	27.43%	3.04
F	0	1	0				15.60%	31.24%	2.00

From the different opportunity sets shown in Table 4.1.15, the highest portfolio return is derived from Set F and the least portfolio risk is from Set A. However, the total risk can be significantly reduced with a well diversified portfolio. If an investor makes entire investment in stock BBCL the total risk is highest among all. But if the investor divides his investible funds into two stocks as per Set B, the return can be averaged and the total risk can be reduced where the risk per unit of return is minimal. Since the stocks are nearly perfectly positively correlated, the total risk can not be significantly reduced.

Ranking of Portfolio Sets

Different sets of portfolios have been ranked based on their return, risk and coefficient of variation, which have been shown in Table 4.1.16.

Table 4.1.16 - Ranking based on portfolio return, risk and coefficient of variation

Set	Combination with weights			R_P	P	CV	Ranking Based on CV
4-E	SCBNL	BBCL	SICL				
	0.5	0.5	0	18.32%	31.58%	1.71	1
5-E	SCBNL	BBCL	NH&MFL				
	0.5	0.5	0	18.32%	31.58%	1.71	1
1-E	SCBNL	NLL	SICL				
	0.5	0.5	0	18.98%	35.25%	1.86	2
2-E	SCBNL	NLL	BBCL				
	0.5	0.5	0	18.98%	35.25%	1.86	2
3-E	SCBNL	NLL	NH&MFL				
	0.5	0.5	0	18.98%	35.25%	1.86	2
7-C	NLL	SICL	BBCL				
	0.33	0.34	0.33	11.56%	31.12%	2.69	4
10-B	SICL	BBCL	NH&MFL				
	0	0.50	0.50	8.19%	22.12%	2.7	5
9-E	NLL	BBCL	NH&MFL				
	0.5	0.5	0	16.27%	34.91%	2.15	3
6-E	SCBNL	SICL	NH&MFL				
	0.5	0.5	0	11.74%	27.84%	2.37	6
8-E	NLL	SICL	NH&MFL				
	0.5	0.5	0	9.68%	31.18%	3.2	7

From the different subsets of portfolio consisting of different weights, the best subset of each set has been summarized in Table 4.1.16. From those different opportunity sets, the best portfolio is set 4-E or 5-E consisting of the stocks of SCBNL and BBCL with the equal weights and it has been ranked as the 1st in terms of highest return and lowest risk. Likewise, the portfolio between the stocks of SCBNL and NLL with equal weights has been ranked as 2nd and that of NLL & BBCL with equal weights as 3rd. Furthermore, the portfolio between the stocks of NLL, SICL, and BBCL with the weights of 0.33, 0.34 and 0.33 respectively has been ranked as 4th, that of BBCL, and NH&MFL with the equal weights of 0.5 & 0.5 has been ranked as 5th, that of SCBNL, SICL with the weights of 0.5 and 0.5 respectively has been ranked as 6th, that of NLL, SICL with the weights of 0.5, and 0.5 respectively has been ranked as 7th i.e. last.

If the investors are required to create a well diversified portfolio between those stocks, they are recommended to create the portfolio between the stocks of SCBL and BBCL with the equal weights to maximize the return and minimize the risk. Similarly, they can make investment based on the ranking as shown in Table 4.1.16.

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 4.1.17.

Table 4.1.17 – SHARPE Index for the different portfolios

Stocks	\bar{R}_p	\bar{R}_f	σ_p	$S_p = \frac{\bar{R}_p - \bar{R}_f}{\sigma_p}$
NH &MFL	0.79	22.6	13	-1.68
KFL	-5.5	22.6	14	-2.00
BNL	-1.69	22.6	18.84	-1.29
SCBNL	21.04	22.6	31.92	-0.05
NIDCCM	-6.97	22.6	47.3	-0.63
HGIC	-5.32	22.6	16.31	-1.71
BOK	22.71	22.6	66.38	0.001
SICL	2.44	22.6	23.77	-0.85
HS	-14.09	22.6	16.34	-2.24
NLL	16.93	22.6	38.59	-0.15
BBCL	15.6	22.6	31.24	-0.22
STC	5	22.6	4.9	-3.59

From Table 4.1.17, it has been seen that the Sharpe index of portfolio performance measure of NH&MFL, KFL, SCBNL, NIDCCM, HGIC, BOK, BNL, SICL, HS, NLL, BBCL and STC seemed -1.68,-2.00,-1.29,-0.05,-0.63,-1.71,0.001,-0.85,-2.24,-0.15,-0.22 and -3.59 respectively. The portfolio performance-measuring index of BOK seemed positive .. On the basis of Sharpe index, the portfolio of BOK is the best

performer. Then after are KFL, SCBNL, NIDCCM, HGIC, NH&MFL, BNL, SICL, HS and NLL,STC ,BBCL 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 stock of BOK to maximize the return and minimize risk.

4.1.8 Optimum portfolio

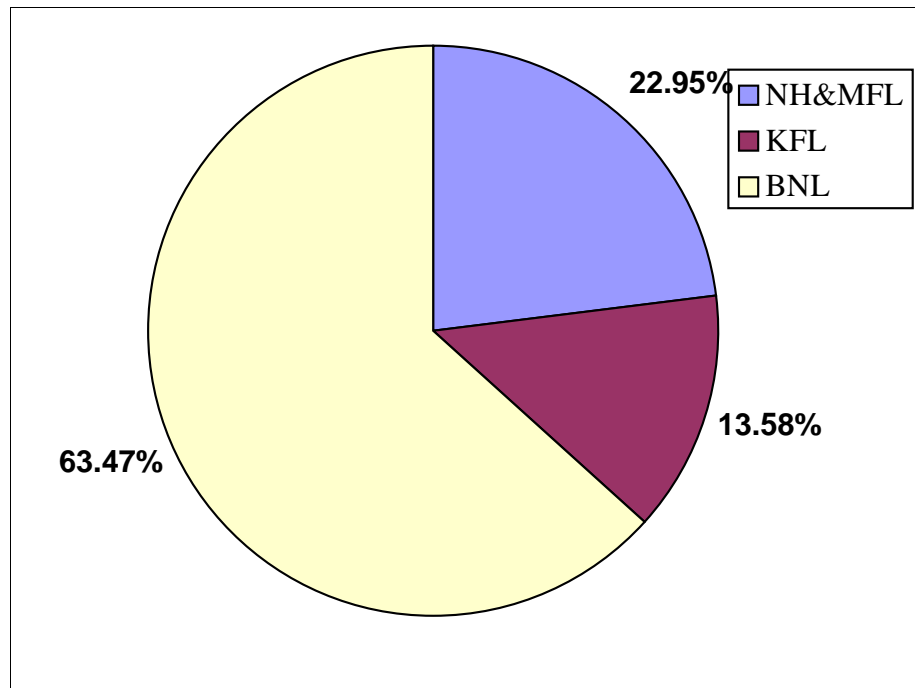
Based on Simple Sharpe Portfolio Optimization Model, an optimum portfolio has been created selecting different securities with different weights. The calculations are shown in **Annex X**.

Table 4.1.18 – Securities in an optimum portfolio and their weights

Stocks	$(\bar{R}_i - \bar{R}_F)/S$	C^*	S	Unsystematic risk	Zi	Weight (Xi)
NH&MFL	4.362	0.09747	-0.05	1.16%	-4.31	22.95%
KFL	5.62	0.169839	-0.05	1.96%	-2.55	13.58%
BNL	0.784	0.338431	-0.31	2.60%	-11.92	63.47%
					-18.78	

From the Table 4.1.18, only 3 securities i.e. NH&MFL, KFL, and BNL have been selected for an optimum portfolio from available alternatives as their excess return to beta ratios are greater than cutoff rate. The optimum weights are 22.95%, 13.58%, and 63.47% respectively. If an investor wants to create an optimum portfolio between the available stocks, it is advised to select those stocks with above weights. The optimum weights of the securities are depicted in Figure 4.1.8

Fig. 4.1.8 - Weights in Securities in an Optimum Portfolio



4.1.9 Hypothesis Testing

Return Characteristics

Null Hypothesis (H_0): $\bar{R}_i = \mu$ There is no significant difference between the portfolio return and market return.

Alternative Hypothesis (H_A): $\bar{R}_i < \mu$ Portfolio return is less than market return.

DECISION: Calculated value of t is (23.407) and critical value at 5% level of significance for one tail test is 1.796. Since, the calculated value is less than critical value, null hypothesis is rejected and alternative hypothesis is accepted which means that the portfolio return is lower than market return.

4.1.9.2 Risk Characteristics

Null Hypothesis (H_0): $S_p = 1$ There is no significant difference between the systematic risk of market and sample portfolio.

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

DECISION: **Calculated value of t is (3.27) and critical value at 5% level of significance for one tail test is 1.796. Since, the calculated value is less than critical value, alternative hypothesis is accepted which means that the systematic risk of the sample portfolio is less than the market i.e. 1.**

4.2 Primary Data Analysis

4.2.1 Preference of investors

The investors were asked about their preference in sectors. The responses of them are presented in Table 4.2.1.

Table 4.2.1 – Preference of investors – Sector wise

S. N.	Sectors	Respondents	Percentage (%)	Remarks
1.	Banking	13	65%	
2.	Finance Company	3	15%	
3.	Manufacturing	1	5%	
4.	Trading	1	5%	
5.	Hotel	0	0	
6.	Insurance	2	10%	
7.	Others	0	0	
	Total	20	100 %	

Source: Survey

Out of total respondents, 65% respondents replied that they make investment in Banking sector, 15% in Finance Companies and 5% in Manufacturing, Trading and 10% Insurance companies respectively. Larger numbers of investors have been found to be investing in financial sector.

4.2.2 Portfolio behavior of investors

In order to find out the portfolio behavior of investors, the respondents were asked whether they create portfolio consisting of different stocks. The responses regarding this are presented in Table 4.2.2

Table 4.2.2 – Portfolio creation

S. N.	Options	Respondents	Percentage (%)	Remarks
1.	Yes	3	15 %	
2.	No	17	85 %	
	Total	20	100 %	

Source: Survey

From Table 4.2.2, it has been seen that out of 20 respondents, 15% respondents replied that they create portfolio and rest do not create portfolio. It seems that most of the Nepalese investors do not create portfolio while investing large pool of funds.

4.2.3 Basis of selecting securities in the portfolio

The respondents were further asked about the basis of selecting the portfolio while making the investment decision. The responses regarding this are presented in Table 4.2.3

Table 4.2.3 – Basis of selecting securities in the portfolio

S. N.	Basis	Respondents	Percentage (%)	Remarks
1.	Return & Risk (Fundamental Analysis)	0	0	
2.	Heavy Trading (Technical Analysis)	1	33%	
3.	Share Price (Higher/Lower)	2	67%	
4.	Others	0	0	
	Total	3	100%	

Source: Survey

From the table 4.2.3, it has been seen that out of total number of respondent creating portfolio, 33% respondents create portfolio on the basis of heavy trading of the stocks and rest i.e., 67% create the portfolio on the basis of the share price fluctuation only if the price of the share is in increasing trend.

4.2.4 Diversification

In order to identify the diversification technique that Nepalese investors adopt, the respondents were asked what type of diversification techniques they were adopting in investing in securities. The responses regarding this are presented in Table 4.2.4

Table 4.2.4 – Diversification

S. N.	Technique	Respondents	Percentage (%)	Remarks
1.	Simple diversification	3	100%	
2.	Superfluous diversification	0	0	
3.	Diversification across industries	0	0	
4.	Simple diversification across quality rating categories	0	0	
5.	Markowitz diversification	0	0	
6.	Don't know	0	0	
	Total	3	100%	

Source: Survey

From Table 4.2.4, it has been seen that all the respondents replied that they adopt simple diversification while making investments in securities.

Investment strategies adopted by investors

In order to identify the investment strategies adopted by Nepalese investors, the respondents were asked what type of investment strategies they were adopting while investing in securities. The responses regarding this are presented in Table 4.2.5

Table 4.2.5 – Investment strategies adopted by investors

S. N.	Strategies	Respondents	Percentage (%)	Remarks
1.	Active Strategy (frequent transaction based on price situation)	0	0%	
2.	Passive Strategy (Just buy & hold)	20	100%	
3.	Don't know	0	0	
	Total	20	100%	

Source: Survey

From the table 4.2.5, it has been seen that out of the total number of respondents, none of the respondents replied in favors of active strategy rather replied in favors of passive strategy.

4.2.6 Objectives of portfolio

The respondents were asked about the objective of portfolio. The responses of them are presented in Table 4.2.6.

Table 4.2.6 – Objectives of portfolio

S. N.	Strategies	Respondents	Percentage (%)	Remarks
1.	Minimize risk	0	0	
2.	Maximize return	3	100%	
3.	Liquidity	0	0	
	Total	3	100%	

Source: Survey

Out of total respondents who create portfolio, all of them i.e. 100% replied that they create portfolio in order to maximize the return.

4.2.7 Satisfaction from portfolio return

The respondents were asked whether they are satisfied with portfolio return or not. The responses are presented in Table 4.2.7.

Table 4.2.7 – Satisfaction from portfolio return

S. N.	Strategies	Respondents	Percentage (%)	Remarks
1.	Yes	3	100%	
2.	No	0	0	
3.	Don't Know	0	0	
	Total	3	100%	

Source: Survey

From Table 4.2.7, it has been observed that all of them are satisfied from portfolio return.

4.2.8 Difficulties faced by Nepalese investors

The respondents were also requested to express their views and opinions regarding the difficulties/obstacles that they are facing in making investment and/or creating portfolio. The major and specific difficulties are given below:

- ❑ In Nepal, there are few investment instruments and alternatives. The area of investment is very limited.
- ❑ Initial public offerings (IPO) of Nepalese companies are rare. Some companies have also been found to be delisted in NEPSE. Consequently, there is a problem of creating portfolio due to the fact that the price of those stocks can not be ascertained.
- ❑ The price fluctuations of stocks of individual companies are large. Hence, the fundamental analysis does not work in such a situation.
- ❑ There are no investment consultants in Nepalese stock market. The brokers and traders do not give right guidance and advice. Even the companies issuing securities do not disseminate exact information to the public.
- ❑ The market prices of the stocks available in the market differ significantly. Stock prices of some of the companies 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.

4.3 Major Findings of the Study

4.3.1 Based on Secondary Data Analysis

4.3.1.1 Return and Risk Characteristic

The share of **Bank of Kathmandu** offers the highest average rate of return where as the share of HS,BNL,KFL,HGFL,NIDCCM offers the negative rate of return and Nepal Housing & Merchant Finance Ltd offers the lowest average rate of return. The different shares have different rates of return with in the range of -14.09% to 22.71%. On the basis of average rate of return, the share of **BOK** seems to be the best for investment.

Observing the standard deviation of returns of the companies, Salt Trading Corporation has the lowest i.e. 4.90% and **Bank of Kathmandu has the highest i.e. 66.38%.NIDCCM,NLL,SCBL,BBCL,SICL,BNL,HS,HGFL,KFL,NH&MFL** have standard deviation of **47.30%, 38.59%, 31.92%, 31.24%, 23.77%, 18.84%, 16.34%, 16.31%, 14.00%,and 13.00%** 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 STC seem attractive among all with CV of 0.98 and NH&MFL offers the highest risk per unit of return with CV of 16.46. So, investors retaining the stocks of NH&MFL should assume more risk than any others.

4.3.1.2 Market Risk and Return

Average rate of return of market is only 27.86% with a standard deviation of 32.63%. The return might be regarded as attractive with respect to risk point of view. Coefficient of variation, which measures the risk per unit of return, is 1.17.

4.3.1.3 Market Sensitivity

The stocks of SCBL, HS, BBCL, HGIC, NLL, SICL, BNL, STC, KFL and NH&MFL 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 BOK, and NIDCCM is 1.54 and 1.05 respectively and are aggressive stock which indicates that the stocks are riskier and volatile than market. Among them stock of BOK is more risky as its beta coefficient is highest among all other stocks and the stocks of HGIC is least risky among all.

4.3.1.4 Systematic and Unsystematic Risk

The stocks of SCBNL, BOK, BNL, HS, STC, BBCL, KFL, HGIC, NLL, SICL, NH&MFL and NIDCCM have the systematic risks of 5.85%, 25.24%, 0.96%, 1.28%, 0.00%, 1.91%, 0.00%, 0.21%, 7.67%, 2.88%, 0.00% 11.72% respectively. Comparing each other, the share of **BOK** has the highest systematic risk i.e. 25.24% where as the share of BBCL has the least systematic risk. On the basis of systematic risk, the stock of the BBCL is more attractive than others. The stock of BOK appears most risky.

Comparing the proportion of systematic risks of **SCBNL, BOK, BNL, HS, STC, BBCL, KFL, HGIC, NLL, SICL, NH&MFL and NIDCCM** are 57.48%, 57.29%, 27.00%, 47.86%, 0.00%, 19.64%, 0.00%, 8.00%, 51.50%, 50.89%, 0.00% and 52.37% respectively. It seems that 57.48% variability of returns of the common stocks of SCBNL is systematic or caused by market factors

Considering the unsystematic risks, the unsystematic risks of **SCBNL, BOK, BNL, HS, STC, BBCL, KFL, HGIC, NLL, SICL, NH&MFL and NIDCCM** are 4.33%, 18.82%, 2.60%, 1.39%, 0.24%, 7.84%, 1.96%, 2.44%, 7.22%, 2.77%, 1.16% and 10.65% respectively. Among them, the stock of BOK has the greatest unsystematic risk and STC has the least unsystematic risk.(Ignoring the systematic risk of BNL,HS,KFL,HGIC & NIDCCM due to its negative return) Out of total risks of **SCBNL, BOK, BNL, HS, STC, BBCL, KFL, HGIC, NLL, SICL, NH&MFL and NIDCCM** 42.51%, 42.71%,73.00%, 52.13%, 100.00%, 80.36%, 100.00%, 92.00%, 48.50%, 49.10%, 100.00% and 47.63% are unsystematic or company specific risks which can be diversified away with an optimal portfolio construction. There is the highest company specific risk of the stocks of BBCL i.e. 80.36% (Ignoring the systematic risk of BNL,HS,KFL,HGIC & NIDCCM due to its negative return).

4.3.1.5 Price Situations

Comparing the required rate of return and the expected rate of return of the stocks of listed companies, the required rates of return for all the companies are more than expected/average rates of return. Hence, all the stocks are over priced in the market. As a result, the shares of the all the companies given in the above table are not appear attractive to investors. (Ignoring the shares negative return) Hence, investors are advised not to purchase to sell the common stocks of the **SCBNL, BOK, BNL, HS, KFL, HGIC, NLL, SICL, BBCL NH&MFL and NIDCCM** in the market if they are holding. The investors are not required to take long position to gain from the stocks of **SCBNL, BOK, BNL, HS, KFL, HGIC, NLL, SICL,STC,BBCL NH&MFL and NIDCCM**.

4.3.1.6 Portfolio Analysis

From the different opportunity sets, the best portfolio consisting of the stocks of SCBNL and BBCL with the equal weights and it has been ranked as the 1st in terms of highest return and lowest risk. Likewise, the portfolio between the stocks of SCBNL and NLL with equal weights has been ranked as 2nd and that of NLL & BBCL with equal weights as 3rd. Furthermore, the portfolio between the stocks of NLL, SICL, and BBCL with the weights of 0.33, 0.34 and 0.33 respectively has been ranked as 4th, that of BBCL, and NH&MFL with the equal weights of 0.5 & 0.5 has been ranked as 5th, that of SCBNL, SICL with the weights of 0.5 and 0.5 respectively has been ranked as 6th, that of NLL, SICL with the weights of 0.5, and 0.5 respectively has been ranked as 7th i.e. last.

If the investors are required to create a well diversified portfolio between those stocks, they are recommended to create the portfolio between the stocks of SCBNL and BBCL with the equal weights to maximize the return and minimize the risk.

4.3.1.7 Portfolio Performance Evaluation

the Sharpe index of portfolio performance measure of NH&MFL, KFL, SCBNL, NIDCCM, HGIC, BOK, BNL, SICL, HS, NLL, BBCL and STC seemed -1.68,-2.00,-1.29,-0.05,-0.63,-1.71,0.001,-0.85,-2.24,-0.15,-0.22 and -3.59 respectively. The portfolio performance-measuring index of BOK seemed positive .. On the basis of Sharpe index, the portfolio of BOK is the best performer. Then after are KFL, SCBNL, NIDCCM, HGIC, NH&MFL, BNL, SICL, HS and NLL,STC ,BBCL 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 stock of BOK to maximize the return and minimize risk.

4.3.1.8 Optimum Portfolio

Only 3 securities i.e. NH&MFL, KFL, and BNL have been selected for an optimum portfolio from available alternatives as their excess return to beta ratios are greater than cutoff rate. The optimum weights are 22.95%, 13.58%, and 63.47% respectively.

4.3.2 Based on Primary Data Analysis

- Nepalese investors prefer the stocks of banking sector. And most of them do not create portfolio.
- Most of the investors trade the stocks based on stock price fluctuations. They do not undertake any kind of fundamental analysis. They just purchase the stocks whose prices are increasing.
- Most of the investors who create portfolio or purchase shares of different companies adopt simple diversification and passive strategy. They just buy the stocks and hold for a longer period.
- The major objective of the portfolio creation is maximizing return.
- Most of the investors who have created portfolio are satisfied from the return of portfolio. They are getting good return from the stocks in which they are making investment.
- In Nepal, there are few investment instruments and alternatives. The area of investment is very limited.
- Initial public offerings (IPO) of Nepalese companies are rare. Some companies have also been found to be delisted in NEPSE. Consequently, there is a problem of creating portfolio due to the fact that the price of those stocks can not be ascertained.
- The price fluctuations of stocks of individual companies are large. Hence, the fundamental analysis does not work in such a situation.
- There are no investment consultants in Nepalese stock market. The brokers and traders do not give right guidance and advice. Even the companies issuing securities do not disseminate exact information to the public.

- The market prices of the stocks available in the market differ significantly. Stock prices of some of the companies 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.

CHAPTER - V

SUMMARY, CONCLUSION AND RECOMMENDATIONS

This chapter is concerned with the summary of the study, conclusion and recommendation on the basis of the study findings. Logically, this chapter is divided into three sections: (i) Summary, (ii) Conclusion and (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 resources 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 13 January 1994 through its licensed members. Currently it has 27 member brokers and 2 market makers operating on its trading floor. Altogether 110 companies have listed their shares to make them eligible for trading in the secondary market.

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 holding 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 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).

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 2000/01 to 2005/06 have been taken to analyze.

5.2 Conclusion

The share of **Bank of Kathmandu** offers the highest average rate of return where as the share of HS,BNL,KFL,HGFL,NIDCCM offers the negative rate of return and Nepal Housing & Merchant Finance Ltd offers the lowest average rate of return.

Observing the standard deviation of returns of the companies, Salt Trading Corporation has the lowest i.e. 4.90% and **Bank of Kathmandu has the highest i.e. 66.38%** 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 STC seem attractive among all with CV of 0.98 and NH&MFL offers the highest risk per unit of return with CV of 16.46. So, investors retaining the stocks of NH&MFL 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 stocks of SCBL,HS,BBCL,HGIC,NLL,SICL,BNL, STC, KFL and NH&MFL 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 BOK, and NIDCCM is 1.54 and 1.05 respectively and are aggressive stock which indicates that the stocks are riskier and volatile than market. Among them stock of BOK is more risky as its beta coefficient is highest among all other stocks and the stocks of HGIC is least risky among all.

Comparing each other, the share of **BOK** has the highest systematic risk i.e. 25.24% where as the share of BBCL has the least systematic risk. On the basis of systematic risk, the stock of the BBCL is more attractive than others. The stock of BOK appears most risky.

The stock of **BOK** has the greatest unsystematic as well as systematic risk and STC has the least unsystematic risk.

In Nepalese stock market, almost all stocks have been over priced . Hence, investors are advised to sell rather than to purchase the over 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 the portfolio return could not be reduced 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 SCBNL and BBCL with the equal weights to maximize the return and minimize the risk.

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 stock of BOK to maximize the return and minimize risk.

Only 3 securities i.e. NH&MFL, KFL, and BNL have been selected for an optimum portfolio from available alternatives as their excess return to beta ratios are greater than cutoff rate. The optimum weights are 22.95%, 13.58%, and 63.47% respectively.

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 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 prices of the stocks available in the market differ significantly. Stock prices of some of the companies 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 secondary and primary 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 NH&MFL, KFL, and BNL with the weights of 22.95%, 13.58%, and 63.47% respectively has been found to be the best and optimum portfolio from 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. 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 samples, the best portfolio is between SCBNL and BBCL 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 statements 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 statements should be published.
- ⊕ Academicians are undertaking no sufficient studies regarding risk-return analysis and behavior of investors of forming well-diversified portfolios. Hence, the researcher strongly recommends the future researchers to conduct studies related to portfolio management.

Annex - I

Share Price Information of different Companies

Standard Chartered Bank Ltd.				
Year	Closing Price (P)	Dividend Paid	Market Capitalization in million	Remarks
2000/01	2144	100	7279.95	
2001/02	1550	100	5263.03	
2002/03	1640	110	5568.62	
2003/04	1745	110	6537.47	
2004/05	2345	120	8785.32	
2005/06	3775	0	14142.68	
Bank of Kathmandu				
2000/01	850	0	1986.03	Right Share
2001/02	254	10	1177.49	
2002/03	198	5	917.89	
2003/04	295	10	1367.56	
2004/05	430	15	1993.40	
2005/06	850	0	3940.44	
Bottlers Nepal Ltd. Balaju, Kathmandu				
2000/01	600	10	1169.34	
2001/02	700	10	1364.22	
2002/03	700	5	1364.22	
2003/04	554	0	1079.68	
2004/05	635	0	1237.54	
2005/06	500	0	974.44	
Hotel Soltee				
2000/01	130	10	847.99	Bonus Share 33.33
2001/02	100	0	652.29	
2002/03	75	0	652.29	
2003/04	65	0	565.32	
2004/05	50	0	434.86	
2005/06	57	0	495.74	
Salt Trading Corporation				
2000/01	330	25.02	81.77	
2001/02	300	30	74.33	
2002/03	300	20	74.33	
2003/04	315	20	78.05	
2004/05	315	20	78.05	
2005/06	316	0	78.30	
Bishal Bazar Company Ltd.				
2000/01	1700	50	461.1	
2001/02	1550	65	423.15	
2002/03	1045	75	383.57	
2003/04	1400	85	522.2	
2004/05	1930	90	719.89	
2005/06	2400	0	655.20	

Kathmandu Finance Ltd.				
2000/01	321	23	64.2	
2001/02	305	12	61	
2002/03	235	0	47	Bonus Share 50%
2003/04	205	0	61.5	
2004/05	138	0.527	41.40	Bonus Share 10%
2005/06	140	0	46.20	
Himalayan General Insurance Company Ltd.				
2000/01	285	15	85.5	
2001/02	190	Interim 5 + cash 10	57	
2002/03	190	0	57	
2003/04	175	0	52.5	
2004/05	205	0	61.5	
2005/06	189	0	56.70	
Nepal Lever Ltd.				
2000/01	2200	55	2025.54	
2001/02	1350	40	322.25	
2002/03	1130	90	1040.39	
2003/04	1400	100	1694	
2004/05	1631	400	1973.51	
2005/06	2500	0	2301.75	
Sagarmatha Insurance Company Ltd.				
2000/01	236	7	53.1	
2001/02	170	8	86.7	
2002/03	150	10%	76.5	Bonus Share
2003/04	131	0	73.49	
2004/05	158	0	88.64	
2005/06	210	0	117.81	
Nepal Housing & Merchant Finance Ltd.				
2000/01	280	15	84	
2001/02	310	15	93	
2002/03	240	10	108	
2003/04	230	10%	103.5	Bonus
2004/05	214	5div 10%	96.3	Bonus
2005/06	210	0	114.35	
NIDC Capital Market				
2000/01	600	15	120	
2001/02	175	0	35	
2002/03	125	0	75	
2003/04	107	0	64.2	
2004/05	145	0	87	
2005/06	208	0	124.80	

(Source: <http://www.nepalstock.com> & various publication of SEBO/N)

Annex - II

Risk and Return of different Companies

Standard Chartered Bank Ltd.							
Year	Price (P)	Dividend Paid	Stock Dividend	Total Dividend	Return (Ri)	$R_i - \bar{R}_i$	$(R_i - \bar{R}_i)^2$
2000/01	2144	100		100	-		
2001/02	1550	100		100	-23.04%	-44.08%	19.43%
2002/03	1640	110		110	12.90%	-8.14%	0.66%
2003/04	1745	110		110	13.11%	-7.93%	0.63%
2004/05	2345	120		120	41.26%	20.22%	4.09%
2005/06	3775	0		0	60.98%	39.94%	15.95%
					105.2%	0.00%	40.76%
				Mean	21.04%	Var	10.19%
						SD	31.92%
Bank of Kathmandu Ltd.							
2000/01	850	0		0			
2001/02	254	10		10	-68.94%	-91.65%	84.00%
2002/03	198	5		5	-20.08%	-42.79%	18.31%
2003/04	295	10		10	54.04%	31.33%	9.82%
2004/05	430	15		15	50.84%	28.13%	7.91%
2005/06	850	0		0	97.67%	74.96%	56.20%
					113.53%	0.00%	176.24%
				Mean	22.71%	Var	44.06%
						SD	66.38%
Bottlers Nepal Ltd. Balaju, Kath.							
2000/01	600						
2001/02	700	10		10	18.33%	20.02%	4.00%
2002/03	700	5		5	0.71%	2.40%	0.05%
2003/04	554	0		0	-20.85%	-19.16%	3.67%
2004/05	635	0		0	14.62%	16.31%	2.66%
2005/06	500	0		0	-21.26%	-19.57%	3.83%
					-8.45%	0.00%	14.21%
				Mean	-1.69%	Var	3.55%
						SD	18.84%
Hotel soaltee							
2000/01	130	10	33.33%	43.33			
2001/02	100	0		0	-23.07%	-8.98%	0.806%
2002/03	75	0		0	-25.00%	-10.91%	1.19%
2003/04	65	0		0	-13.33%	0.76%	0.005%
2004/05	50	0		0	-23.07%	-8.98%	0.806%
2005/06	57	0		0	14.00%	28.09%	7.89%
					-70.47%	0.00%	10.69%
				Mean	-14.09%	Var	2.67%
						SD	16.34%
Salt Trading Corporation							
2000/01	330	25.02		25.02			
2001/02	300	30		30	0.00%	-5.00%	0.25%
2002/03	300	20		20	6.67%	1.67%	0.03%

2003/04	315	20		20	11.67%	6.67%	0.44%
2004/05	315	20		20	6.35%	1.35%	0.02%
2005/06	316	0		0	0.32%	-4.68%	0.22%
					25.01%	0.00%	0.96%
				Mean	5.00%	Var	0.24%
						SD	4.90%
Bishal Bazar Company Limited							
2000/01	1700	50					
2001/02	1550	65		65	-5.00%	-20.60%	4.24%
2002/03	1045	75		75	-27.74%	-43.34%	18.78%
2003/04	1400	85		85	42.11%	26.51%	7.03%
2004/05	1930	90		90	44.29%	28.69%	8.23%
2005/06	2400	0		0	24.35%	8.75%	0.77%
					78.01%	0.00%	39.05%
				Mean	15.60%	Var	9.76%
						SD	31.24%
Kathmandu Finance Limited							
2000/01	321	23		23			
2001/02	305	12		12	-1.25%	4.25%	0.18%
2002/03	235	0	50%	102.5	10.66%	16.16%	2.61%
2003/04	205	0		0	-12.77%	-7.27%	0.53%
2004/05	138	0.527	10%	14.527	-25.60%	-20.1%	4.04%
2005/06	140	0		0	1.45%	6.95%	0.48%
					-27.51%	0.00%	7.84%
				Mean	-5.50%	Var	1.96%
						SD	14.00%
Himalaya General Insurance Company							
2000/01	285	15		15			
2001/02	190	15		15	-28.07%	-22.75%	5.18%
2002/03	190	0		0	0.00%	5.32%	0.28%
2003/04	175	0		0	-7.89%	-2.57%	0.07%
2004/05	205	0		0	17.14%	22.46%	5.04%
2005/06	189	0		0	-7.80%	-2.48%	0.06%
					-26.62%	0.00%	10.63%
				Mean	-5.32%	Var	2.66%
						SD	16.31%
Nepal Lever Limited							
2000/01	2200	55		55			
2001/02	1350	40		40	-36.82%	-53.75%	28.89%
2002/03	1130	90		90	-9.63%	-26.56%	7.05%
2003/04	1400	100		100	32.74%	15.81%	2.50%
2004/05	1631	400		400	45.07%	28.14%	7.92%
2005/06	2500	0		0	53.28%	36.35%	13.21%
					84.64%	0.00%	59.57%
				Mean	16.93%	Var	14.89%
						SD	38.59%
Sagarmatha Insurance Company Ltd.							
2000/01	236	7	0	7			
2001/02	170	8	0	8	-24.58%	-27.02%	7.30%
2002/03	150	-	10%	13.1	-4.06%	-6.50%	0.42%
2003/04	131	0	0	0	-12.67%	-15.11%	2.28%

2004/05	158	0	0	0	20.61%	18.17%	3.30%
2005/06	210	0	0	0	32.91%	30.47%	9.28%
					12.21%	0.00%	22.58%
				Mean	2.44%	Var	5.65%
						SD	23.77%
Nepal Housing & Merchant Finance Ltd.							
2000/01	280	15	0	15			
2001/02	310	15	0	15	16.07%	15.28%	2.33%
2002/03	240	10	0	10	-19.35%	-20.14%	4.06%
2003/04	230	-	10%	21.4	4.75%	3.96%	0.16%
2004/05	214	5	10%	26	4.35%	3.56%	0.13%
2005/06	210	0	0	0	-1.87%	-2.66%	0.07%
					3.95%	0.00%	6.75%
				Mean	0.79%	Var	1.16%
						SD	13.00%
NIDC Capital Market							
2000/01	600	15		15			
2001/02	175	0		0	-70.83%	-63.86%	40.78%
2002/03	125	0		0	-28.57%	-21.60%	4.67%
2003/04	107	0		0	-14.40%	-7.43%	0.55%
2004/05	145	0		0	35.51%	42.48%	18.04%
2005/06	208	0		0	43.45%	50.42%	25.42%
					-34.84%	0.00%	89.46%
				Mean	-6.97%	Var	22.37%
						SD	47.30%

(Source: <http://www.nepalstock.com> & various publication of SEBO/N)

$$\text{Annual Realized Rate of Returns} = (P_{t+1} - P_t + \text{Div.}) / P_t$$

$$\text{Total Dividend} = \text{Cash Div.} + \text{Stock Dividend Ratio} \times \text{Next Year MPS}$$

Annex - III

Risk and Return of Market (NEPSE Index)

Year	NEPSE Index (NI)	R_m	$R_m - \bar{R}_m$	$(R_m - \bar{R}_m)^2$
2000/01	227.54			
2001/02	204.86	-9.97%	-37.83%	14.31%
2002/03	222.04	8.39%	-19.47%	3.79%
2003/04	286.67	29.11%	1.25%	0.02%
2004/05	386.83	34.94%	7.08%	0.50%
2005/06	683.95	76.81%	48.95%	23.96%
	Sum	139.28%	0.00	42.58%
	Mean	27.86%	VAR	10.65%
			SD	32.63%
			CV	1.17

$$R_m = \frac{NI_{t+1} - NI_t}{NI_t} \quad \text{where, } NI_{t+1} = \text{NEPSE Index at year } t+1, \text{ and } NI_t = \text{NEPSE Index at year } t$$

$$\bar{R}_m = \frac{\sum R_m}{N} = 139.28\% / 5 = 27.86\% \quad \text{Var}(R_m) = \frac{\sum (R_m - \bar{R}_m)^2}{N - 1} = 42.58\% / 4 = 10.65\%$$

$$\sigma_m = \sqrt{\text{Var}(R_m)} = \sqrt{10.65\%} = 32.63\%$$

Annex - IV

Covariance between the return of stocks and return of Market

Standard Chartered Bank Ltd.					
Year	Ri	Std Deviation (1)	Rm	Std Deviation (2)	1X2
2001/02	-23.04%	-44.08%	-9.97%	-37.83%	16.68%
2002/03	12.90%	-8.14%	8.39%	-19.47%	1.58%
2003/04	13.11%	-7.93%	29.11%	1.25%	-0.10%
2004/05	41.26%	20.22%	34.94%	7.08%	1.43%
2005/06	60.98%	39.94%	76.81%	48.95%	19.55%
	105.2%		139.28%		39.14%
	21.04%		27.86%	Cov(Ri,Rm)	7.83%
Bank of Kathmandu					
2001/02	-68.94%	-91.65%	-9.97%	-37.83%	34.67%
2002/03	-20.08%	-42.79%	8.39%	-19.47%	8.33%
2003/04	54.04%	31.33%	29.11%	1.25%	0.39%
2004/05	50.84%	28.13%	34.94%	7.08%	1.99%
2005/06	97.67%	74.96%	76.81%	48.95%	36.69%
	113.53%		139.28%		82.07%
	22.71%		27.86%	Cov(Ri,Rm)	16.41%
Bottlers Nepal Ltd,Balaju,Ktm					
2001/02	18.33%	20.02%	-9.97%	-37.83%	-7.57%
2002/03	0.71%	2.40%	8.39%	-19.47%	-0.47%
2003/04	-20.85%	-19.16%	29.11%	1.25%	-0.24%
2004/05	14.62%	16.31%	34.94%	7.08%	1.15%
2005/06	-21.26%	-19.57%	76.81%	48.95%	-9.58%
	-8.45%		139.28%		-16.71%
	-1.69%		27.86%	Cov(Ri,Rm)	-3.34%
Hotel Soltee					
2001/02	-23.07%	-8.98%	-9.97%	-37.83%	3.40%
2002/03	-25.00%	-10.91%	8.39%	-19.47%	2.12%
2003/04	-13.33%	0.76%	29.11%	1.25%	0.01%
2004/05	-23.07%	-8.98%	34.94%	7.08%	-0.64%
2005/06	14.00%	28.09%	76.81%	48.95%	13.75%
	-70.47%		139.28%		18.64%
	-14.09%		27.86%	Cov(Ri,Rm)	3.73%
Salt Trading Corporation					
2001/02	0.00%	-5.00%	-9.97%	-37.83%	1.89%
2002/03	6.67%	1.67%	8.39%	-19.47%	-0.33%
2003/04	11.67%	6.67%	29.11%	1.25%	0.08%
2004/05	6.35%	1.35%	34.94%	7.08%	0.10%
2005/06	0.32%	-4.68%	76.81%	48.95%	-2.29%
	25.01%		139.28%		-0.55%
	5.00%		27.86%	Cov(Ri,Rm)	-0.11%
Bishal Bazar Company					
2001/02	-5.00%	-20.60%	-9.97%	-37.83%	7.79%
2002/03	-27.74%	-43.34%	8.39%	-19.47%	8.44%
2003/04	42.11%	26.51%	29.11%	1.25%	0.33%

2004/05	44.29%	28.69%	34.94%	7.08%	2.03%
2005/06	24.35%	8.75%	76.81%	48.95%	4.28%
	78.01%		139.28%		22.87%
	15.60%		27.86%	Cov(Ri,Rm)	4.57%
Kathmandu Finance Limited					
2001/02	-1.25%	4.25%	-9.97%	-37.83%	-1.61%
2002/03	10.66%	16.16%	8.39%	-19.47%	-3.15%
2003/04	-12.77%	-7.27%	29.11%	1.25%	-0.09%
2004/05	-25.60%	-20.1%	34.94%	7.08%	-1.42%
2005/06	1.45%	6.95%	76.81%	48.95%	3.40%
	-27.51%		139.28%		-2.87%
	-5.50%		27.86%	Cov(Ri,Rm)	-0.57%
Himalayan General Insurance Company					
2001/02	-28.07%	-22.75%	-9.97%	-37.83%	8.61%
2002/03	0.00%	5.32%	8.39%	-19.47%	-1.04%
2003/04	-7.89%	-2.57%	29.11%	1.25%	-0.03%
2004/05	17.14%	22.46%	34.94%	7.08%	1.59%
2005/06	-7.80%	-2.48%	76.81%	48.95%	-1.21%
	-26.62%		139.28%		7.92%
	-5.32%		27.86%	Cov(Ri,Rm)	1.58%
Nepal Lever Ltd.					
2001/02	-36.82%	-53.75%	-9.97%	-37.83%	20.33%
2002/03	-9.63%	-26.56%	8.39%	-19.47%	5.17%
2003/04	32.74%	15.81%	29.11%	1.25%	0.20%
2004/05	45.07%	28.14%	34.94%	7.08%	1.99%
2005/06	53.28%	36.35%	76.81%	48.95%	17.79%
	84.64%		139.28%		45.48%
	16.93%		27.86%	Cov(Ri,Rm)	9.1%
Sagarmatha Insurance Company					
2001/02	-24.58%	-27.02%	-9.97%	-37.83%	10.22%
2002/03	-4.06%	-6.50%	8.39%	-19.47%	1.27%
2003/04	-12.67%	-15.11%	29.11%	1.25%	-0.19%
2004/05	20.61%	18.17%	34.94%	7.08%	1.29%
2005/06	32.91%	30.47%	76.81%	48.95%	14.92%
	12.21%		139.28%		27.51%
	2.44%		27.86%	Cov(Ri,Rm)	5.50%
Nepal Housing & Merchant Finance Ltd					
2001/02	16.07%	15.28%	-9.97%	-37.83%	-5.78%
2002/03	-19.35%	-20.14%	8.39%	-19.47%	3.92%
2003/04	4.75%	3.96%	29.11%	1.25%	0.05%
2004/05	4.35%	3.56%	34.94%	7.08%	0.25%
2005/06	-1.87%	-2.66%	76.81%	48.95%	-1.30%
	3.95%		139.28%		-2.86%
	0.79%		27.86%	Cov(Ri,Rm)	-0.57%
NIDC Capital Market					
2001/02	-70.83%	-63.86%	-9.97%	-37.83%	24.16%
2002/03	-28.57%	-21.60%	8.39%	-19.47%	4.21%
2003/04	-14.40%	-7.43%	29.11%	1.25%	-0.09%
2004/05	35.51%	42.48%	34.94%	7.08%	3.00%
2005/06	43.45%	50.42%	76.81%	48.95%	24.68%
	-34.84%		139.28%		55.96%
	-6.97%		27.86%	Cov(Ri,Rm)	11.19%

(Source: <http://www.nepalstock.com> & various publication of SEBO/N)

Annual Realized Rate of Returns = $(P_{t+1} - P_t + \text{Div.}) / P_t$

Total Dividend = **Cash Div. + Stock Dividend Ratio x Next Year MPS**

Annex - V

Correlation and Beta Coefficients of different Companies with Market Return

Companies	Cov(Ri,Rm)	Sdi	Sdm	Corr(Ri,Rm)	Var(Rm)	Beta
SCBL	7.83%	31.92%	32.63%	0.76	10.65%	0.74
BOK	16.41%	66.38%	32.63%	0.76	10.65%	1.54
BNL	-3.34%	18.84%	32.63%	-0.54	10.65%	-0.31
HS	3.73%	16.34%	32.63%	0.70	10.65%	0.35
STC	-0.11%	4.90%	32.63%	-0.07	10.65%	-0.01
BBCL	4.57%	31.24%	32.63%	0.45	10.65%	0.43
KFL	-0.57%	14.00%	32.63%	-0.12	10.65%	-0.05
HGIC	1.58%	16.31%	32.63%	0.30	10.65%	0.15
NLL	9.1%	38.59%	32.63%	0.72	10.65%	0.85
SICL	5.50%	23.77%	32.63%	0.71	10.65%	0.52
NH&MFL	-0.57%	13.00%	32.63%	-0.13	10.65%	-0.05
NIDCCM	11.19%	47.30%	32.63%	0.72	10.65%	1.05

Annex - VI

Total Systematic and Unsystematic Risk of Companies

Companies	Total Risk	Systematic Risk	Propn of sys. risk	Unsystematic risk	Prop of Unsys risk	B*B	Va (Rr
SCBNL	10.19%	5.85%	57.48%	4.33%	42.51%	0.55	10.6
BOK	44.06%	25.24%	57.29%	18.82%	42.71%	2.37	10.6
BNL	3.55%	0.96%	27.00%	2.60%	73.00%	0.09	10.6
HS	2.67%	1.28%	47.86%	1.39%	52.13%	0.12	10.6
STC	0.24%	0.00%	0.00%	0.24%	100.00%	0.00	10.6
BBCL	9.76%	1.91%	19.64%	7.84%	80.36%	0.18	10.6
KFL	1.96%	0.00%	0.00%	1.96%	100.00%	0.00	10.6
HGIC	2.66%	0.21%	8.00%	2.44%	92.00%	0.02	10.6
NLL	14.89%	7.67%	51.50%	7.22%	48.50%	0.72	10.6
SICL	5.65%	2.88%	50.89%	2.77%	49.10%	0.27	10.6
NH&MFL	1.16%	0.00%	0.00%	1.16%	100.00%	0.00	10.6
NIDCCM	22.37%	11.72%	52.37%	10.65%	47.63%	1.10	10.6

Annex - VIII

Price Situation of Stocks

Stocks	S	\bar{R}_f (%)	\bar{R}_m (%)	Risk Premiu m ($\bar{R}_m - \bar{R}_f$)	Required Rate of Return	Average Rate of Return	Price Situations
SCBNL	0.74	22.6 %	27.86 %	5.26%	26.49%	21.04 %	Over priced
BOK	1.54				30.70%	22.71%	Over priced
BNL	-0.31				20.97%	-1.69%	Over priced
HS	0.35				24.44%	-14.09%	Over priced
STC	-0.01				22.55%	5.00%	Over priced
BBCL	0.43				24.86%	15.60%	Over priced
KFL	-0.05				22.34%	-5.50%	Over priced
HGIC	0.15				23.39%	-5.32%	Over priced
NLL	0.85				27.07%	16.93%	Over priced
SICL	0.52				25.34%	2.44%	Over priced
NH&MFL	-0.05				22.36%	0.79%	Over priced
NIDCCM	1.05				28.12%	-6.97%	Over priced

ANNEXES

Annex	Heading
I	Share Price Information of different Companies
II	Risk and Return of different Companies
III	Risk and Return of Market (NEPSE Index)
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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