

CHAPTER I

INTRODUCTION

1.1 General Background

Investment means the sacrifice of money to increase future money. Without investment the whole economy market don't progress fund. Thus, investment decision depend upon two factors i.e. risk and returns done at the fluctuation of actual returns and expected return. Sacrifice is uncertain.

Portfolio investment refers to minimize the risk and maximize the return by investing in two or more securities. No one is ready to accept the risk so; to minimize the risk portfolio diversification is necessary. With the use of maximum resources and applying two or more securities the loss or risk can be reduced. Harry M. Markowitz put one solution to this problem forth in 1952 A.D. in a landmark paper that is generally consider as the origin of modern investment theory (Alexander, Sharp and Bailey, 2003;119).

According to Oxford Advance Learners Dictionary the meaning of investment is “an act of buying property shares in a company etc in the hope of making profit or “A set of investment owned by person, bank etc” (Oxford Advance Learners Dictionary 2005).

According to western and Brigham, “A portfolio simply represents the practice among the investor of having their fund in more than one asset. The combination of investment assets is called portfolio” (Western and Brigham: 1992).

Likewise, portfolio management can be also defined as aggregation and management of diverse portfolio of supply resources which will act as a hedge against various risks that they may affect specific resource. Under a more market driven power sector with a power pool or wholesale market structure, a portfolio manager would aggregate and manage a diverse and other market heading type contract and mechanism ([www.naruc.org /resource/glossary.shtml](http://www.naruc.org/resource/glossary.shtml))

The term “portfolio “simply means collection of investment .For an investor through the stock exchange the portfolio will be collection of shareholding in different

company's .For a property investor portfolio will be the collection of building and for a financial manager it will be of an industrial company

Portfolio will be a collection of real capital projects. It will be apparent that the actual nature of the component of a portfolio depends on the population of opportunities from which the selection has been made (Brockington, 1990:148)

To win the stock market, a systematic investment process should be followed which is based on making right decision. These five steps are the procedure for making these decisions from the basis of investment process.

- a. Set investment policy
- b. Perform security analysis
- c. Construct a portfolio
- d. Revise the portfolio
- e. Evaluation the performance of portfolio (sharp, Garden and Bailey 1995)

This research focuses on security analysis and portfolio selection. Security analysis examines the individual or group securities with in the broad categories of financial assets. Investment is done under the certain securities and the place of investment is another selection to invest the capital. Determining the right sector and determining the right securities for the investors' means maximizing the wealth and capital and return losing the risks

Thus, investment in two or more assets is called portfolio. It means holding the securities and selecting the process for the investment. It gives direction to the investors. Portfolio process motivates the investor to invest funds in more than one asset. For an investor through the stock exchange the portfolio will be a collection of shareholding in different companies. It has two types of objectives.

1. Primary objectives

- a.To minimize risk
- b. To maximize return

2. Secondary objectives

- a. Regular returns
- b. Stable income
- c. Safety of investment

- d. Tax benefit
- e. appreciation

Hence, the focus of primary objectives is to minimize the risk and to maximize the return. While on the other hand, secondary objectives focus on regular return of the investment. It focuses for the stable income, also provides securities for the safety of investment. It also researches for the appreciation of the investment for tax benefit.

1.2 Statement of the Problem

Commercial banks play vital role in the progress of Nepalese economy. Its investment ranges from small scale cottage industries to large industries. Nobody is ready to bear risk without any return but to have return, one must be ready to face risk. To minimize the risk at the concept of portfolio diversification is necessary. Risk is on the one hand and on the other hand flexible laws and rules has been affecting in the investment of commercial banks.

The major problem of the commercial bank is on capital formation and utilization. And on the other side, the customers are unknown about the risk and reward system with stocks or shares market. Due to the lack of proper knowledge they even don't know the stocks can be the best alternative to maximize their wealth. The risk has happened because of the customer's investment in unproductive sectors. To avoid the risk commercial banks have played vital role by accepting deposits and providing various types of loans in productive sectors.

To the commercial banks which are contributing to progress Nepalese economy market, are also affected by the instruction and guidelines of Nepal Rastra Bank. Sometimes these commercial banks do have less clear vision towards investment portfolio. Because of the lack of proper co-operation between the banks and the customers, and also by the unclear laws of Nepal Rastra Bank investors are facing risks. There is no certainty whether high risk promotes to high return or not. In this context NEPSE which is the only market of providing information should pay attention to the investors. There should be strong portfolio management along with which the rate of risk and securities are associated. Unhealthy market competition, due to lack of proper awareness commercial banks are facing many problems. Due to low investment rate whole economy and overall development of the national is affected, for this government should observe on it.

Present study focuses on portfolio management of commercial banks in Nepal. Basically the study aims to resolve the following issues of portfolio investment analysis.

1. What is the level of risk and return in commercial banks in Nepal?
2. What is the market risk of banking sector measured in terms of beta?
3. Which bank has the largest degree of financial risk measured in terms of portfolio risk?
4. Is investment portfolio directed towards objectives of profit maximization?
5. What is the relationship of investment with total deposits, loan and advances, net income etc?
6. Do the risk and return of sample commercial banks fluctuate with markets risk and return?
7. Which bank has the optimal portfolio?
8. What is the cut of rate of different banking securities for optimal portfolio construction?

1.3 Objective of the Study:

The main objective of the study is to, examine and analyze portfolio technique followed by investor on their investment in various securities. This study focuses whether the investor properly followed portfolio concept to take investment decisions or not.

The specific objectives of the study are as follows:

- a) To analyze risk and return of banking securities.
- b) To compute portion of systematic and unsystematic risk in banking industry.
- c) To compute the different portfolio of commercial banks for an investor.
- d) To find out the optimal portfolio of securities of sample banks.

1.4 Focus of the study

Banking history in the Nepal began the establishment of Nepal bank Ltd. in 1936. In 1956 Nepal Rastra Bank started to work as a central bank of our country. The focus of the study is on portfolio analysis on investment of selected commercial Banks in Nepal. This research helps to finding the process to minimize risk and minimizes

return. By combining securities of low risk with securities of high risk, success can be achieved by a focus to making a choice of information to make decision on investment and share market. It also focuses on the challenges of the commercial Banks. The main focus of the research is:

1. To find out available best alternative and best portfolio, which will increase wealth position of the investors?
2. To analyze risk and return of commercial banks in Nepal.

1.5 Significance of the Study

Nepal is a developing country and in this context the commercial banks and other financial institutions play vital role for economic development of the country. The main objective of commercial banks is to earn profit by proper mobilization of resources. The research actually attempts' to display the fact of today's situation of Nepal. This research helps to return the funds of investors' by reducing the risks.

Nepalese commercial banks do not have clear vision towards effective investment. These banks are investing only on short-term basis. There is hesitation to invest in long-term projects because they are much more safety minded. Even there are various ways to minimize risk, they are not aware and do not take any attention towards such field i.e. they do not think about portfolio management. Hence the main significance of this study of investment portfolio analysis of Nepalese commercial banks is to help how to minimize risk on investment and maximize return through portfolio analysis. This research is important to acknowledge them and to expose how important risk and return calculation and motivate them for rational investment. (They can compare market risk and individual risk to conclusion whether the security is as risky as market risk and individual risk to conclusion whether the security is as risky as market or not.) This type of research provides filtered information. This research will inform them about valuation of stock whether it is over-priced or under priced.

This research is also significant for the reason; firstly it examines the existing situation of portfolio Management of Nepalese commercial Bank. Secondly, it examines the investment and loan and advance portfolio of commercial Banks. So, this research helps to reduce risk and to increase returns. It also analyzes existing rules and laws which hinder for the healthy progress of commercial Banks.

1.6 Limitations of the study

This research is conducted for the partial fulfillment of the requirements for the degree of Masters' Business Studies. On the one hand it has limitation that the research should be submitted within restricted time; on the other hand, this research is based on data provided by different sources. So, according to the need and for the better conclusion simple technique is applied. Therefore, it possesses some limitations, which are as follows:

1. This research includes secondary data published and collected from selected banks.
2. This research is basically concerned with portfolio analysis of commercial Banks. It doesn't expand its study on other sectors.
3. This study should be submitted within restricted period so that it can't include all the banks and subject matter also becomes restricted.
4. The accuracy of the research work will be dependent on data provided by concerned organization.
5. Risk and return measurement is taken as the tools of the methodology.
6. Among the various commercial Banks, only four banks are taken under study.

1.7 Organization of the study

This study has been organized over altogether five chapters. Starting from Introduction, Review of literature, Research methodology, Presentation and Analysis of data and summary, conclusion and recommendation as part of the entire study. A brief outline of this chapter has been outlined as under.

Chapter I “ **Introduction** ” :The first chapter includes general background of the study, meaning of commercial banks, Function of commercial bank ,Focus of the study, statement of the problem, objectives of the study, significance of the study, Limitation of the study.

Chapter II “**Review of Literature**”: This chapter includes theoretical reviews, review of related studies and review of thesis.

Chapter III “**Research Methodology**”: This chapter includes research design, data collection procedure, sample, tools and techniques for analysis.

Chapter IV “**Presentation and Analysis of data**”: This chapter includes data of mentioned banks, analysis of market risk and return, analysis of systematic and unsystematic risk analysis of required and expected return of portfolio risk and return, and calculation of portfolio composition.

Chapter V “**summary, conclusion and recommendation**”: This chapter includes summary of the whole research. It also includes finding in the research and gives further suggestion too.

CHAPTER -TWO

REVIEW OF LITERATURE

This chapter deals with the theoretical aspect of the topics on portfolio management of commercial banks. It also includes the related review of literature on the topics. This research includes basic academic course books, journals, articles, annual reports of commercial banks and some reviews from the internet sources. Therefore, this chapter is arranged in the following ways:

- 1) Theoretical Framework
- 2) Review of Related Studies.

2.1 Theoretical Framework:

It provides the fundamental theoretical framework and foundation on the present study.

2.1.1 Investment:

An investment involves the sacrifice of current rupees for future rupees. The sacrifice takes place in the present and certain while the reward comes later and uncertain. Investment involves long-term commitment and waiting for a reward. It involves the commitment of resources that have been saved or put away from current consumption in the hope that some benefit will occur in future.

Investment brings forth vision of profit, risk, speculation and wealth. They briefly described the categories and types of investment alternatives. They describes that the basic investment objectives, the expected rate of return, the expected risk, taxes, the investment horizon and investment strategies are the factors to be considered in choosing among investment alternatives. (Cheney and Moses, 1992)

According to Gitman J.Lawrence (2000), "Investment in any vehicle into which funds can be placed with the expectation that will preserve or increase in value and generated positive return."

In The words of Frank and Reilly "An investment is the current commitment of funds for a period of time to derive a future flow of funds that will compensate the investing

unit for the time funds are committed for the expected rate of inflation and also for the uncertainty involved in the future flow of the funds."

2.1.2 Investment process

The investment process describes how an investor makes decision about what securities to invest in, how extensive this investment should be and when they should be made. The investment process involves these steps:

1) Set Investment Policy: The first step of the investment process is to set the investment policy. It determines the objectives and the amount of his/her investment fund. Investor objective should be stated in terms of both risk and return. This step involves the identification of the potential categories of financial assets for consideration in the ultimate portfolio. This identification will be based on the investment objectives, amount of invest able wealth and tax status of the investor.

2) Perform Securities Analysis: In this step, securities analysis involves examining a number of individual securities/group of securities within the broad categories of financial assets. The investor will evaluate them in term of their price whether they are under priced or overpriced, risk associated with that specific security; his/her expected return and real return and so on. There are two main securities:

- i) Technical analysis
- ii) Fundamental analysis

3) Construct a portfolio: Construction of portfolio involves identification of specific securities in which to invest, along with the proportion of invest able wealth to be put into each security. The investor may construct portfolio according to his/her interest either he/she wants active or passive strategy to manage his/her investment. There should be clear vision of strategy, risk bearing capacity and required rate of return before deciding the alternatives of investment.

4) Revise the Portfolio: This step involves both realizing that the currently held portfolio is not optimal and specifying another portfolio to hold with superior risk-return characteristic. The investor must balance the cost of moving to the new portfolio against the benefit of the revision.

5) Evaluation Portfolio Performance: Evaluation of portfolio performance involves determination of the actual performance of a portfolio in terms of risk and

return and compares the performance with that of an appropriate “benchmark” portfolio.

2.1.3 Investment alternatives:

A wide range of investment alternative is available to individual investors and institutional investors. (Cheney and Moses, 1992) The financial manager decides on a suitable maturity pattern for the holdings on the basis of how long the funds are to be held. If the funds are wrongly invested without any financial risk, business risk and other various types of risk and facts, the bank cannot obtain profitable return as well as it should sometimes lose its principle. Therefore the suitable alternative can be selected and balanced in such a way those maturities and risk appropriate to the financial situation of the firm is obtained. There are various alternatives, which are as follows:

1. Equity Securities:

Equity securities represent ownership shares in a corporation. Equity securities are traded in organized exchanges OTC market.

- a. Common Stock:** Common stock is an ownership share in a corporation
- b. Preferred Stock:** Preferred stock is a fixed income security. Preference shareholder does not have voting rights. It is suitable for that investor who does not want to bear high risk but wants fixed return.

2. Debt Securities:

Debt securities are those on which interest has to pay and they have certain maturity period. Debt securities can be divided into two parts. They are as follows:

a) Short Term Debt Securities: It is the obligation that matures in one year or less. Short term debt securities are traded in to money market. They are as follows:

- 1. Negotiable certificates of deposit
- 2. Commercial paper
- 3. Bankers acceptance
- 4. Treasury bills

b) **Intermediate and long-term debt securities:** It is the obligation that matures in more than one year. Intermediate and long-term debt securities are traded in OTC market. They are as follows:

a. **Government Securities:** Government securities are fixed income securities issued by the government. These securities are among the safest of all investment as the government is unlikely to default on interest or on principle repayments. They are as follows:

i Treasury Notes

ii Treasury Bonds

iii Saving Bonds

b. **Agency Securities:** Agency securities are traded in the OTC market.

i. Government national mortgage association

ii. Federal home loan mortgage corporation

iii. Federal National mortgage association

c. **Municipal Securities:** Municipal bonds are debt obligation issued by state or local government and agency.

i. Revenue Bonds

ii. General obligation Bonds

d. **Corporate Bonds:** It is traded in organized exchanges and the OTC market.

3. **Hybrid Securities:**

Securities that have characteristics of both equity and debt are called hybrid securities.

1. Convertible preferred stock

2. Convertible bonds

4. **Derivative securities:**

Securities that derive their value from the value of an underlying assets.

1. Option
2. Commodity futures
3. Financial futures
4. Option on futures
5. Rights
6. Warrant

5. Real assets:

Real assets are the non-financial assets

1. Precious Metal
2. Real Estate
3. Collectibles

6. International Investment:

International investments are the investment by individual in debt or equity securities issued by organizations outside country of residence of the investor.

1. Multinational corporations
2. Foreign stocks traded on a local exchange
3. American depository receipts

7. Other Investment Alternatives:

1. Pension funds
2. Mutual funds
3. Closed-end companies.

2.1.4 Risk and Return

A major purpose of investment is to get a return or income on the funds invested. Each assets expect return and risk, along with the expected return and risk for other assets and their inter relationships, are important inputs in portfolio selection. In order

to construct efficient portfolios the investor must be able to build the quantity of portfolio's expected return and risk.

Risk:

Risk and uncertainty are real in life. Everyone encounters uncertainty in every day's life. Risk and uncertainty are an integral part of an investment decision. Risk can be defined as a situation where the possible consequence of the decision that is to be taken is known 'Uncertainty' is generally defined to apply to situations where the probabilities cannot be estimated. (Cheney and Moses, 1992)

Risk is uncertainty of whether the money investors lend will be returned. They have regarded such risk as bankruptcy risk. They said that stockholders of the firm should not only consider bankruptcy risk but also the risk that the firm will yield a rate of return below some targeted rate. They have given range, variance, standard deviation, coefficient of variation and beta as parameters for the measurement of risk. They describes beta as a parameter for the measurement of the systematic risk. Systematic risk has been defined as undiversifiable risk, which is beyond the control of the organization. Apart from this they describe unsystematic risk as diversifiable risk, which can be reduced through the portfolio effect.

Causes of the Risk:

These Risks are caused by the following factors

1. Wrong decision of what to invest in.
2. Wrong timing of investment.
3. Maturity period or the length of investment: The larger the period, the more risky is the investment normally.
4. Method of investment, namely, secured by collateral or not.
5. Nature of the industry or business in which the company is operating.
6. National and International factors, acts of god.

Risk are classified in to major categories

i) Systematic Risk

Systematic risk is that part of total risk, which cannot be eliminated. Systematic risk or undiversifiable risk is a function of its covariance with market portfolio of all assets divided by the variance of the market portfolio.

The portions of the total risk of an individual security caused by market factors that simultaneously affect the prices of all securities. It can't be diversified away. Systematic risk is the market risk, which could not be avoidable. It is also called market risk or unavoidable or non-diversifiable risk or beta risk. The beta of the stocks is the slope of the characteristics line between return for the stock and those for the market. Beta depicts the sensitivity of the security's excess return to that of the market portfolio. This type of stock often called aggressive stock and slope having less than one called defensive stock.

Thus un-diversifiable risk is caused by such factors, which systematically affect all firms such as:

1. War
2. Inflation
3. Recession
4. Interest rates policy
5. Corporate tax rate policy

Since all securities will tend to be negatively affected by these factors systematic risk cannot be eliminated by diversification therefore, and investor will expect a compensation for bearing this risk.

ii) Unsystematic risk

The portion of the total risk that can be diversified away. It is also called non-market risk or avoidable or company-specific risk or diversifiable risk. Such unsystematic risk can be totally reduced through costless diversification. This risk is related at a decreasing rate toward zero as more randomly selected securities are added to the portfolio. Various studies suggest that 15-20 stocks selected randomly are sufficient to eliminate most of the unsystematic risk of portfolio.(Van Horne, 2002). It is caused by

events particular to the firm. Event such as labour strikes, management errors, inventories, advertising campaigns, shift in consumer taste and lawsuits cause unsystematic variability in the value of market assets. Since unsystematic changes affect one firm, or at most few firm, they must be forecasted separately for each firm and for each individual incident. Unsystematic security prices movement are statistically dependent from each other. Some sources of unsystematic risk are:

1. Labor strike
2. Management errors
3. Inventions
4. Advertising campaigns
5. Shift in consumer taste
6. Successful and unsuccessful marketing programs
7. The winning and losing of major contracts
8. Other events those are unique to a particular firm.

Since these events are essentially random, their effects on a portfolio can be eliminated by diversification i.e. bad events in one firm will be offset by good events in another

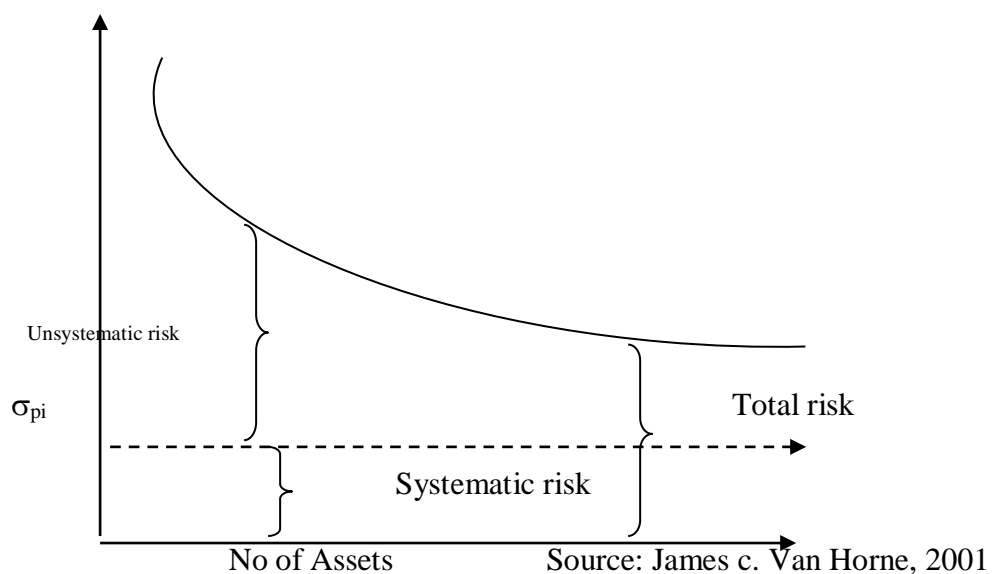


Figure No.2.1 Risk and diversification

Measurement of Risk

Standard Deviation: Standard deviation is a statistically concept and is widely used to measure risk from holding a single assets. A high standard deviation represents a large dispersion of return and is a high risk, a low deviation is a small dispersion and represents low risk. It provides more information about the risk of the assets.

Coefficient of variation: Risk is measured by the standard deviation, and then risk per unit of expected return can be measured by the coefficient of variation (c.v.). High C.V. represents the higher risk of the investment. The C.V. shows the risk per unit of return and it provides a more meaningful basis for comparison when the expected return and risk on two alternatives is not the same. (Weston and Brigham, 1993).

Beta: "The beta is simply the slope of the characteristic line. It depicts the sensitivity of the security's excess return to that of the marker portfolio if the slope is one, it means that excess return for the stock vary proportionally with excess return 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 one means that the stock's excess return varies more than proportionally with the excess return of the marker portfolio." (Van Horne and Wachowicz , 1997)

"Beta measures non diversifiable risk. Beta shows how the price of a security responds to market forces. In effect, the more responsive the price of a security is to changes in the market, the higher will be its beta is calculated by relating the returns on a security with the returns for the market. Beta can be positive or negative. But nearby all betas are positive". (Fisher and Jordan, 6th edition)

Capital assets pricing model: The CAPM is sometimes used to estimate the required rate of return for any firm with publicly traded stocks. The CAPM is based in the premise that the only important risk of a firm is systematic risk, or the risk that results from exposure to general stock market movements, The CAPM is not concerned with so called unsystematic risk, which is specific to an individual firm, because investors can avoids that type of risk by holding diversified portfolios.

The CAPM states that the expected risk premium on each investment is proportional to its beta, this mean that each investment should lie on the slopping security market line connecting treasury bills and market portfolio. (Brealey and Myers, 2000).

Return

Return is reward for investment. A major purpose of investment is to get a return or income on the invested. On a bond an investor expect to receive interest and on a stock dividends may be anticipated. So return from investment has different meaning to different investors. Some companies seek near term cash inflow and give less value to more distant returns. Other investors are concerned primarily with growth. Still others measure return using financial ratios. They might seek to invest in a company that has a high return on investment.

All the investor wants to maximize expected returns subject to their tolerance for risk. Return is the motivating force and it is the key method available to investors in comparing alternative investments. Realized return and expected returns are two terms which is often used in the language of investment. Realized return is after the fact return, return that was earned or it is history. Expected return is the return from an asset that investor will earn over some future period. It is a predicted return, which may not occur.

2.1.5 Portfolio Analysis

In Nepalese context many Nepalese private investors placed their entire wealth in a single investment. It is because of proper awareness about portfolio. A portfolio is a bundle of or combination of individual assets or securities (Pandey, 1997).

If investor holds a well-diversified portfolio, then his concern should be the expected return and risk of portfolio rather than individual assets or securities. The portfolio theory provides a normative approach to the investor decision to investment in assets or securities under risk. The main objective of the portfolio analysis is to develop a portfolio that has the maximum return at specified degree of risk. Therefore analyzing risk and return on portfolio context is necessary.

Harry M. Markowitz originally proposed portfolio theory in 1952 (Markowitz, 1952). It is concerned with selecting optimal portfolio by risk averse investors. Risk averse investors selects efficient portfolio that maximizes return at a given level of risk or maximizes risk at a given level of return.

"While the portfolio expected return is a straight forward weighted average of return on the individual securities, the portfolio standard deviation is not the simple

weighted average of individual security standard deviation. To take a weighted average of individual security, standard deviation would be to ignore the relationship or covariance between the return on securities. This covariance however doesn't affect the portfolio expected return". (Van Horne et. al, 1995)

2.1.6 Portfolio Analysis and Diversification

Investment risk can be reduced by including more than one alternative of assets in the portfolios and by including more than one asset from each category. Hence diversification is essential to creation of an efficient investment because it can reduce the Variability of returns around the expected return. This diversification may significantly reduce risk without a corresponding reduction in the expected rate of return on the portfolio". (Francis, 2000).

Diversification is the one important means that control portfolio risk. Investments are made in a wide variety of assets so that exposure to the risk of any particular security is limited. By placing one's eggs in many baskets, overall portfolio risk actually may be less than the risk of any component security considered in isolation.(Bodie et. al, 2002)

If the investors diversify funds into many more securities that continue to spread out firm specific factor and portfolio volatility should continue to fall. Ultimately, however even with a large number of stocks investors cannot avoid risk altogether. Since all securities are factors when all risk is firm specific diversification can reduce risk to a negligible level. When common sources of risk affect all firms however even extensive diversification cannot eliminate risk that is due to market risk or systematic risk on average portfolio risk does fall with diversification to reduce risk is limited by systematic or common sources of risk.

Here are some different diversification techniques for reducing a portfolio's risk:

1. Simple Diversification:

Simple diversification can be defined as "not putting all the eggs in one basket" or spreading a risk. They made the portfolio from randomly selected securities and allocated equal weights. "Spreading the portfolio's assets randomly over two or three times as many stocks cannot be expected to reduce risk any further". It is the random selection of securities that are to be added to portfolio. Simple diversification reduces

a portfolio's total diversification risk to zero and only the un-diversification risk remains.

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 select all the securities in a portfolio from one industry. Since all the industries are highly correlated with one another, diversification across industries is not much better than simply selecting securities randomly.

3. Superfluous Diversification:

Such portfolio diversification that has excess no. of assets (more than 15) known as superfluous diversification. It refers to the investors spreading himself in so many investments on his portfolio. It may lower the net return to the portfolios owners after the portfolio's management expenses are deducted even though their will most likely be no concurrent improvement in the portfolio's performance. In this context, Clarke's adds that superfluous diversification usually result in the following portfolio management problems:

1. Impossibility of good portfolio management
2. High transactions costs
3. High search costs

He describes that although more money is spent to manage a superfluous diversified portfolio; there will most likely to be no concurrent improvement in the portfolios performance. Thus superfluous diversification may lower the net return to the portfolios owners after the portfolios management expenses are deducted.

4. Markowitz Diversification:

Markowitz diversification may be defined as combining assets that are less than perfectly positive risk correlated in order to reduce portfolio risk without sacrificing portfolios returns. It can sometimes reduce risk below the non-diversification level.

Markowitz diversification is more analytical than simple diversification and considers assets correlation. The lower correlation between assets the more that Markowitz

diversification will be able to reduce the portfolio's risk. Markowitz diversification can lower risk below undiversification level if the securities analyst find securities, whose rates of return have low enough correlations. Unfortunately there are only a few securities that have low correlation. Therefore, using Markowitz diversification requires a data bank of financial statistics for many securities a computer and some economic analysis.

Markowitz paper is the first mathematical formalization of the idea of diversification of investment; the financial version of "the whole is greater than the sum of its parts" through diversification, risk can be reduced without changing expected portfolio return. The decision to hold a security should not be made simply comparing its expected return and variance to others, but rather the decision to hold any security would depend on what other securities the investors wants to hold. Securities could be properly evaluated in isolation, but only as a group.

2.1.7 Portfolio Selection

1) Opportunity set: - opportunity set is that area which is occupied by the curve connecting both efficient and inefficient portfolio. Opportunity is also called attainable set.

1. Without bearing risk no return can be gained. So opportunity set does not lie under the than E, F, G in the following figure.
2. High risk gives high return but return is limited so opportunity set does not lies upper than A, B, C, and D.

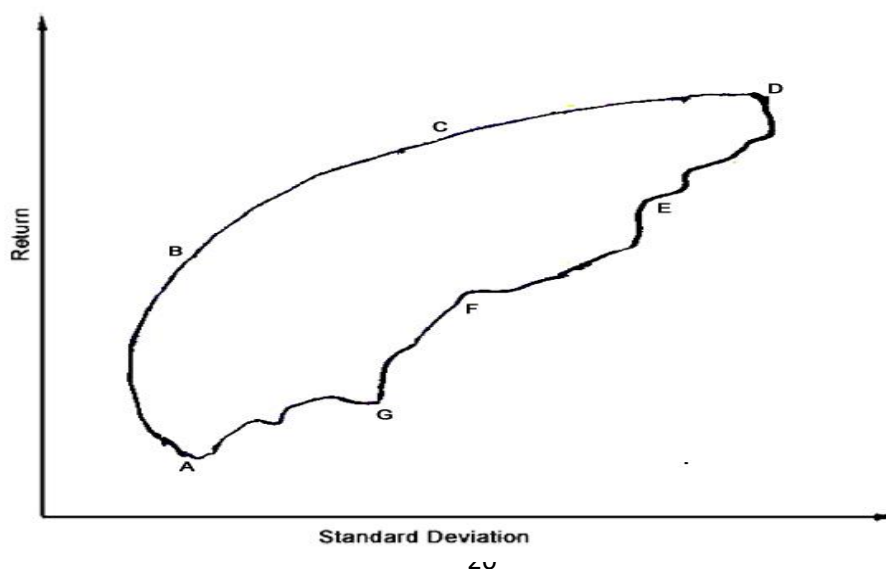


Figure No 2.2 Portfolio opportunity set

Source: - Joshi PR (2004) "Fundamentals of Financial Management"

Thus on the basis of risk and return points circle of A, B, C, D, E, F and G is the opportunity set.

2. Efficient frontier: - The line connecting a portfolio having the higher return in the same level of risk is known as efficient frontier the efficient frontier is the positively sloped portion of the opportunity set that offers the highest expected return for a given level of risk. Consent of efficient frontier can be clear from the following figure.

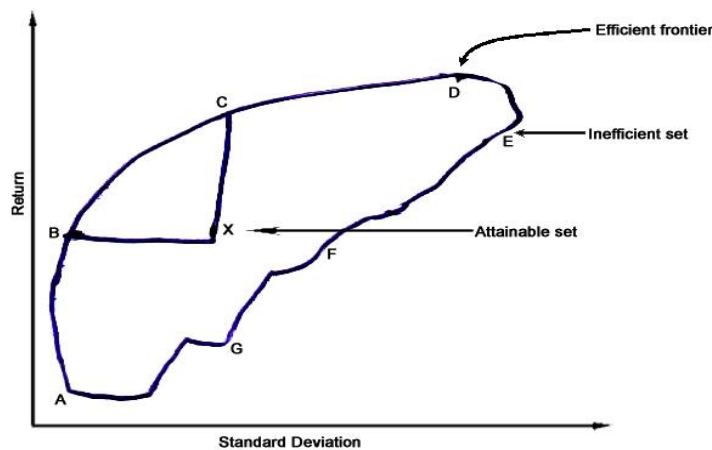


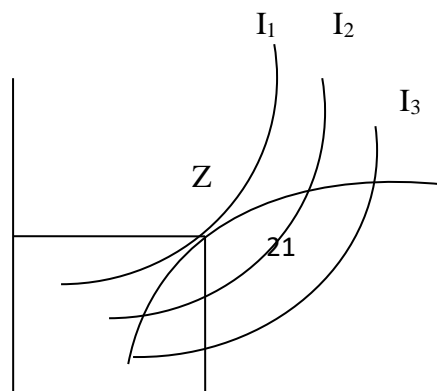
Figure no 2.3 Efficient set

Source: - Joshi PR (2004) "Fundamentals of Financial Management"

Thus any investors select higher return yielding portfolio or select the portfolio of the points which lie in point A,B,C,D but does not choose the portfolio E, F, G, and X another feature of efficient frontier is concaved structure because and investor able to return to risk ration with the help of investment diversification.

2. Selection of optimal portfolio

After finding the efficient frontier, select the optimal portfolio, which maximizes the utility of investors with the help of indifference curve.



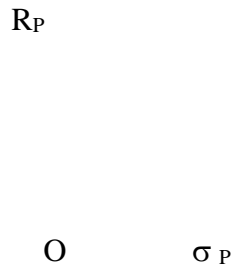


Figure No. 2.4 optimal portfolio

Source: - Joshi PR (2004) “Fundamentals of Financial Management”

In the above figure, Indifference curve I_1 has higher utility than that of I_2 and I_3 . An investor selects that portfolio which lies in the efficient frontier of the opportunity set which is tangent to the indifference curve of the investor and the portfolio becomes optimal for him. The indifference curve I_1 tangent with efficient frontier at the point Z. Here investor's optimal portfolio is z. Therefore, this point z makes a higher level of satisfaction an investor can achieve.

2.1.8 - Review of popular Model of Portfolio:

2.1.8.1-Harry M. Markowitz and Portfolio Selection Model

Harry M. Markowitz originally proposed portfolio theory "portfolio selection" in 1952. Markowitz diversification is the combining of assets, which are less than perfectly correlated in order to reduce portfolio's risk. It can sometimes reduce risk below the un-diversifiable level. Markowitz diversification is more analytical than simple diversification and considers assets correlation. Risk averse investors select efficient portfolio that maximizes return at a given level of risk or minimizes risk at a given level of return. With the collection of those efficient portfolios the optimal portfolios can be obtained for given investors. A theory, which evolved into a foundation for further research in financial economics Markowitz, showed that under certain given conditions, an investor's portfolio choice reduced to balancing two dimensions, i.e. the expected return of the portfolio and its variance. Portfolio is the combination of the various securities. To choose the combination of the securities, it is really a challenge to the investor to choose the combination. By combining securities of low risk with securities of high risk, success can be achieved by an investor in making a choice of investment outlets.

Markowitz diversification may be defined as combining assets, which are less than perfectly correlated in order to reduce portfolio risk without sacrificing portfolio return. It is more analytical than simple diversification and considers assets correlation or covariance in portfolio formation it shows that lower the correlation between assets. More no. of security will be able to reduce the portfolio risk. Markowitz used the variance of return as the measure of risk. The portfolio model developed by Markowitz is based on the following assumption:

1. This theory assumes for the same holding period return for all securities.
2. The risk of an individual assets or portfolio is based in the variability of returns.
3. Investor prefers high return to lower return for a given level of risk. Similarly, for a given level of expected return, investor prefers less risk. (Cheney and Moses, 1992)
4. Investor makes investment rationally.

2.1.8.2-Capital Assets Pricing Model

The relevant risk for an individual asset is systematic risk because undiversifiable risk can be eliminated by diversification. The relationship between an assets return and its systematic risk can be expressed by the CAPM, which is also called the security market lime (SML). "It is the model that describes the relationship between risk and expected return. The CAPM provides a framework for basis risk and return offs in portfolio management. It explains the behavior of security prices and provides a mechanism to assets the impact a proposed security investment on investor's overall portfolio risk and return. It enables drawing certain implications about risk and the size of risk premium necessary to compensate for bearing risk. (Khan and Jain, 1992)

The equation for the CAPM is

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

Where,

$E(R_j)$ = the expected return on the J^{th} risky assets.

R_f = the rate of return on a risk less assets.

$E (R_m)$ = the expected return on the market portfolio.

$$\beta_j = \text{cov}(R_j, R_m) / \text{var } R_m$$

The CAPM based on the following assumption:

1. Individuals are risk reverse.
2. Individuals have homogeneous expectations; they have identical subjective estimates of the means, variance, and covariance among the returns.
3. Individual can borrow and lend freely at a risk less rate of interest.
4. The market is perfect there are no taxes; there are no transaction costs; securities are completely divisible; the market is competitive.
5. The quantity of risky securities in the market is given.

2.1.8.3 The single index model

The simplification of Markowitz model has come to be known as the market model of single index model (Valla, 1994). The single index model provides that the desirability of any stock is directly related to its excess return to beta ratio. Single index model for optimal portfolio enable to find out the no. of security to be in optimal portfolio. In this case the desirability of including a stock directly related to its excess return to beta ratio. If stocks ranked by excess return to beta for highest to lowest, the ranking represents the desirability of any stocks inclusion

in a portfolio. The number of stocks with selected depends on a unique cut of rate such that all stocks with higher ratios will be included and all stocks with lower ratios excluded.

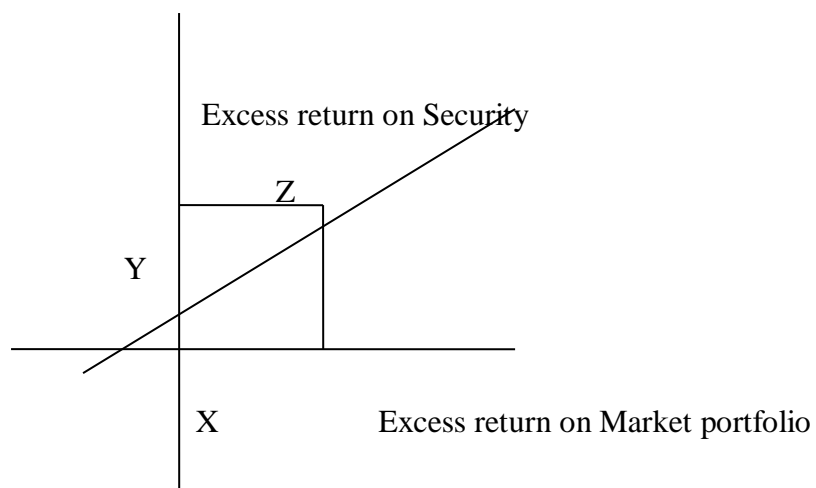


Figure No. 2.5 Single Index Model

The beta of security represents the market linearity of the stock. The market influences each stock. Negative beta defines that security is not linear to market. The security having negative beta coefficient is rejected as investment alternatives. In the same way security that provides lower rate of return than risk free rate of return rejected as investment alternatives. To determine which securities are to be included in the optimum portfolio, investors have to find out cut off rate. We can calculate c_j using following formula:-

$$C_j = \frac{\sigma_m^2 \sum_{j=1}^i \frac{(R_j - R_f) \beta_j}{\sigma_{ei}^2}}{1 + \sigma_m^2 \sum_{j=1}^i \frac{\beta_j^2}{\sigma_{ei}^2}}$$

Where,

σ_m^2 = Variance of the market index.

R_j = Expected return of stock j.

R_f = Risk free rate of return.

σ_{ei}^2 = Unsystematic risk of stock j

β_j = Beta of stock j.

Investor selects highest C_j value; that is C^* (selected cut of rate). The value of C^* is used in calculation of Z_j .

$$\text{Weight of security (Z)} = \frac{Z_j}{N}$$

$$\text{Where, (Z)} = \frac{\beta}{\sigma_{ei}} \left(\frac{R_j - R_f}{\beta_j} - C^* \right)$$

Where,

C^* = Selected Cut of rate.

R_j = Expected return of Stock J

R_f = Risk free rate of Return.

β_j = Beta of stock J.

σ_{ei} = Unsystematic risk of stock J.

2.2 Review of Related Studies:

2. 2. 1) Review of journals and articles:

Kane and Buser, (1979) deals with how a firm performs a useful function by holding a portfolio of efficiently priced securities.

According to them, it is rational for a firm to engage in prior found of assets diversification of behalf of its shareholder even when all assets are priced efficiently and available for direct purchase by shareholders. As a way of testing their perceptive empirically, they estimated regression model designed to explain the no. of distinct of U.S. treasury and federal agency debt held in a time series of cross section of large US commercial banks. They interpret the systematic pattern of diversification observed for large US commercial banks as evidence that bank stockholder for a relatively uniform diversification clientele. For firm, marginal benefits from diversification take reductions in the cost equity funds offered by its specific clientele of stockholders. To maximize the value of the firm, these benefits must be weighed against the explicit and implicit marginal cost of diversification.

The Edward J. Kane and Stephen A Buser drawn following concluding remarks:

1. Even wealthy investors should be sensitive to administrative costs associated with selection, evaluation, managing, and continually keeping track of a large number of securities.
2. Either homemade or firm produced diversification, reduces the variance of shareholders portfolio return. If homemade diversification bears in ordinary high levels of information risk, some benefit of form-produced diversification might not be reproduce able by individual investors acting on their own.
3. Investors with even modest resources, the stock of financial institutions should be relatively less attractive than the stock of that avoided extensive diversification costs by engaging in specialized activities.

Mr. Shiva Raj Shrestha, (1998) conducted a study on “*Portfolio management in commercial bank, theory and practice*”. According to him, the portfolio management becomes very important for both individuals as well as institutional investors. Investors would like to select a best mix of investment assets subject to following aspects:

- a. Higher return which is comparable with alternative opportunities available according to the risk class of investors.
- b. Certain capital gain.
- c. Flexible investment.
- d. Good liquidity with adequate safety of investment.
- e. Maximum tax concession.
- f. Economic, efficient & effective investment mix.

Following findings have been pointed out from the research:

- a. To find out the investible assets having some for better returns depending upon individual characteristics like age, health, need, disposition etc.
- b. To find out the risk of the securities depending upon the attitude of investors towards risk.
- c. To develop alternative investment strategies for selecting a better portfolio.
- d. To identify securities for investment to refuse volatility of return and risk.

Mr. Shrestha has expressed his view that the portfolio management activities of Nepalese commercial bank at present are in growing stage. However most of the banks are not doing such activities so far because of following reason:

- a. Unawareness of the clients about the service available.
- b. Hesitation of taking risk
- c. Lack of proper technique to run such activities in the best and successful manner
- d. Less developed capital market and availability of few financial instruments the financial market.

Conclusion:

The survival of the banks depends upon its own financial health and various activities.

- a. The portfolio manager could enhance the opportunity for each investor to each superior return over times.
- b. Do not hold any single security.
- c. Try to have a diversified investment.
- d. Choose such type of portfolio securities, which ensure maximum return with minimum risk.

Pagano's (2001) conducted a study on "*Financial Intermediation of Corporate Risk-Management Influence Bank Risk-Taking Behavior*". This paper has based on the relation for the risk taking and risk management behavior from a both corporate finance and banking perspective. That data set covers the period from 1986-94, 1986-90 and 1991-94 but overall time of the study is 9 year period. In this study, the research scholar has used mathematical tools that are the model beta, standard deviation, total risk (systematic and unsystematic risk), and interest rate risk. The main objective of the study is to examine the relation for risk taking and risk management behavior for both corporate financial and a banking perspective. After combining the theoretical insights from the corporate finance and banking literatures related to hedging and risk taking the paper reviewed empirical tests based on these theories to determine which of these theories are best supportive by the data.

Management incentives appear to be must consistently supported rational for the describing how bank manage risk. In particular, moderate/high levels of equity ownership reduce bank risk while positive amount of stock option grants increase bank risk-taking behavior. The empirical tests of theory of corporate risk management need to consider individual subcomponents of total risk and the bank ability to trade these risks in a component financial market.

Berkowitz and Brien's (2002) conducted a study on "*How Accurate are Value-At-Risk Models at Commercial Banks*" has focused on first direct evidence on the performance of value at risk model for trading firms. The result shows that VAR forecasts for six large commercial banks have exceed nominal coverage levels over

the past two years and for the some banks, VARs we substantially removed from the lower range of trading P & I. While such conservative estimates imply higher levels of capital coverage for trading risk, the reported VARs are less useful as a measure of actual portfolio risk.

They have used standard deviation, means, correlation coefficient VAR correlation coefficient, and Beach Mark and Portfolio model. To a certain extent, the study is limited by the fact that banks only forecast a single percentile of the portfolio distribution significant more could be learned about the empirical performance of internal valuation models of density forecast were recorded. Density forecast evaluation techniques described in Disbold, Gunther and Tay (1998) and Berkowitz (2001) provide researchers with substantially more information to asses the dimension in which models need improvement and those in which models do well.

Sunity Shrestha (2002) conducted the study in the *title "Portfolio behavior of commercial banks in Nepal"*. In this research five commercial banks are taken under study. They are Nepal bank Ltd., Rastriya Banijjya Bank, Nabil bank ltd., Nepal Indosuez bank and Nepal Grindlays Bank. Data are collected from various sources from 1975 to 1990 A.D. The objective of the research was to evaluate the financial performance of the commercial banks, to analyze the investment pattern of commercial banks on securities and loans, to observe the relationship of bank portfolio variables with national income and other fiscal variables. Among these objectives financial performances of the commercial banks and observe bank portfolio variables are somehow related to this research.

From the analysis of commercial banks, the researcher has made following conclusions:

- a. The general trend of commercial banks asset holding is growing.
- b. Spread of foreign banks is relatively higher than that of Nepalese banks.
- c. The relationship of banks portfolio variables is found to be best explained by log linear equations.
- d. Borrowing of commercial banks from the central bank has been found to be positively affected by the cash reserve requirement, bank rate and Treasury bill rate.

Following suggestions have been point out from the research:

1. The evaluation of the performance of the commercial banks can be made only with reference to the government policy and regulation framework of the central bank.
2. Some of the problems of resource mobilization and resource deployment by the commercial banks in Nepal can be directly traced to the fiscal policy of the government and heavy regulatory procedures of the central bank.

The joint venture between foreign banks and Nepalese banks should be encouraged in Nepal, especially in merchant and investment banking, leasing and other new creative financial services. The entry of foreign joint venture banks hopefully will bring healthy competition in the environment that will improve work and services efficiency of Nepalese banks too.

Thapa, C. (2003) has published an article on The Kathmandu Post daily of 9th march 2003 entitled “*Managing Banking Risk*”, in his article ha has accomplished the subsequent issues. Banking and financial service are among the fastest growing industries in developed world and are also emerging as cornerstones in other developing and undeveloped nations as well. Bank primary function is to trade risk. Risk cannot be avoided by the bank but can only be managed. There exist two types of risk. The first is the diversifiable risk or the firm specific risk which can be mitigated by maintaining an optimum and diversified portfolio. This is due to the fact that when one sector does not do well the growth in another might offset the risk. Thus, depositor must have the knowledge of the sectors in which there banks have make the lending. The second is undiversifiable risk and it is correlated across borrower, countries, and industries. Such risk is not under control of the firm and bank.

On the basis of his article risk management of the banks is not only crucial for optimum tradeoff between risk and profitability but is also one of the deciding factors for overall business investment lending to growth of economy. Managing risk not only needs sheer professionalism at the organizational level but appropriate environments also need to develop. Some of the major environmental problems of Nepalese banking sector are under government intervention, relatively weak regulatory fame, if we consider the international standard, meager corporate

governance and the biggest of all is lack of professionalism. The only solution to mitigate the banking risk is to develop the badly needed commitment eradication of corrupt environment especially in the disbursement of lending, and formulate prudent and conducive regulatory frame work.

Mahat, L.D. (2004) has published an article on The Kathmandu Post daily of 28th April 2004 entitled "*Efficient Banking*", in his article he has accomplished, the efficiency of banks can be measured using different parameters. The concept of productivity and profitability can be applied while evaluating efficiency of banks. The term productivity refers to the relationship between the quantity of inputs employed and the quantity of outputs produced. An increase in productivity means that more output can be produced from the same inputs or the same outputs can be produced from fewer inputs. Interest expense to interest income ratio shows the efficiency of banks in mobilizing resource at lower cost and investing in high yielding asset. In other words, it reflects the efficiency in use of funds.

The analysis of operational efficiency of banks will help one in understanding the extant of vulnerability of banks under the changed scenario and deciding whom to bank upon. This may also help the inefficient banks to upgrade their efficiency and be winner in the situations developing due to slowdown in the economy. The regulators should also be concerned on the fact that the banks with unfavorable ratio may bring catastrophe in the banking industry.

The article in web page www.investopedia.com "*Are you over diversified*" mentioned that many individual investors could not tolerate the short-term fluctuations in the stock market. Diversifying your portfolio is the best way to smooth out the ride. Diversification is a risk management technique that mixes a wide variety of investments within a portfolio in order to minimize the impact that any one security will have on the overall performance of the portfolio. Diversification lowers the risk of your portfolio. Academics have complex formulas to demonstrate how this works.

2.2.2) Review of Thesis:

Gopal P. Bhatta's (1995) study on "*Assessment of the performance of listed companies in Nepal*", this research is based on the data of ten listed companies from 1990 to 1995. One of the major objectives of this study is to analyze the performance of listed

companies in terms of risk and return and internal rate of return, systematic risk and diversification of risk through portfolio context. The objectives of the research were to analyze the performance of listed companies in the terms of expected return and company specific risk, required rate of return, systematic risk and diversification of risk through portfolio concept. His research methodology was descriptive and analytical. Mr. Bhatta concluded that Nepali investors had not yet practiced to invest in portfolio of securities. An analysis of the two securities portfolio shows that the risk can be totally minimized if the correlation is perfectly negative. In the situation, the risk can totally be diversified, but when there is perfectly positive correlation ship between the returns of the two securities, the risk is not diversifiable. The analysis shows some has negative correlation and some has positive. Negative correlation between securities returns is preferred for diversification of risk. Nepalese capital market is not efficient one. So the stock price doesn't contain all the information relating to market and company itself. Neither investor analyzes the overall relevant information of the stock nor does the member of stock exchange try to disseminate the information. Today's market trend has changed from bull market to bear market. Investors are being rational.

Roopak Joshi's (2003) conducted study on *"Investors problem in choice of optimum portfolio of stock in Nepal stock exchange"*. Mr. Joshi used data of twelve months, fiscal year 2000/2001. The study is based on secondary data published in NEPSE trading report and bank. The objectives of the research were to find out and analyze the major problems of investor facing in the selection of optimum portfolio of security trading in NEPSE. He tries to suggest the major for the improvement of the stock market as well as for better meet of investors and try to find out the best portfolio of NEPSE. He found that portfolio is new concept in Nepal. The stock market is only in growth stage. The only one stock exchange located in Katmandu. Limited no of security broker, lack of opportunity to invest, traditional cry system, which is acting as barrier of development of NEPSE. Researcher had taken data of only one fiscal year. He has taken selected and short-listed all companies which are categories in "grade A" by NEPSE as his sample size. Due to a lack of financial tools, only three stock portfolios were constructed and analyzed researcher took only three assets portfolio. Mr. Joshi mentioned that due to the lack of sufficient information proper investment was not possible. Proper investment needed huge information internal as

well as external. So investor does not know which stock to invest, how to portfolio constructed. Many stockholders do not give the information to the investors; in the pressure of broker investors are purchasing and selling their stock. Small change in stock investment may change the risk and return in very large scale. So investor should have special knowledge and adequate skills. The researcher conclusion is valid only for risk averter investors rather than risk lover investor.

In the words Kalpana Khania, (2003) entitled "*Investment portfolio Analysis of Joint venture banks*". The study is based on five joint venture banks and they are NABIL, SCBNL, HBL, NBBL and EBL. The general study of the present study is to identify the current situation of investment portfolio of joint venture banks in Nepal. The objective is to analyze the risk and return ratio of commercial banks, to evaluate the financial performance of joint venture banks and portfolio structure of Nabil bank for investment between loan investment, investment in real fixed assets and investment in financial assets. The major finding of the analysis is Nabil is investing the highest amount of funds on NRB bond as compare to other joint venture banks i.e. 3% beta coefficient HBL is lowest among all the banks so the systematic risk of HBL is low. The coefficient of correlation between loans and advances in private sector and portfolio return of joint venture banks come out to be $r_{xy} = -0.6$ therefore it indicates that there is negative correlation between loans and advances in private sector and portfolio return of five joint venture bank in Nepal.

Hari Pati Lal Shrestha's (2004) study on "*Optimum portfolio investment in Nepal*", the main theme of the study is to analyze rationalities of portfolio theory in context Nepalese security market. Always investor tries best to make sure return, return is not cent percent sure or investment will not ruin. The study mainly focused on the specific sector of market i.e. currently listing in NEPSE for last 6 years and this study mainly based on the companies listed in NEPSE and applies the different categories. His analysis is based on secondary data as well as primary data of 6 years collected by small survey of 25 investors main objectives of this study are to find out and analyze the major problem of investor regarding selection of optimal portfolio. He tries to analyze the risk and return, market sensitivity, composition of risk and pricing status of securities. And to suggest the measure for the improvement of investment rationalities. Investor should be aware of risk and return. This research helps them to

find out the degree of risk associated with the stock, systematic and unsystematic risk estimation of stock.

Paudyal, Bhavishor (2006) conduct a study on “*A study on Portfolio Analysis of Commercial Banks in Nepal*” with the objective of

- a. To evaluate financial performance of commercial banks of Nepal.
- b. To examine the existing situation of portfolio management of Nepalese commercial bank.
- c. To analyze risk and return of commercial banks.
- d. To analyze the investment and loans and advance portfolio of commercial banks.
- e. To show the present position trend of loan and advance and investment to total deposit and forecast it.

Using common financial tools like ratios, portfolio returns, portfolio risk, systematic and unsystematic risks, and researcher tried to give up the insights of financial performance. To process the financial data, some common statistics tools like correlation, covariance, and coefficient of determinant are used to find the relevance and significance of the samples.

Major Findings:

1. The industrial mean ratio of investment to total deposit is 21.86%. The only EBL has a greater ratio above industrial mean ratio i.e. $24.77 > 21.8$. But other banks have lower investment to total deposit ratio than industrial mean ratio. It shows that EBL has effective mobilization its deposit on investment to generate the return. But other banks are investing its deposits in lower ratio than average industry ratio. Similarly, the CV of EBL is the lowest i.e. 19.9%. Lower ratio indicates that cost consistent which is better than high consistent. The industry CV ratio is 32.37%. The EBL and HBL have the lesser CV ratio to the comparison with industrial CV ratio. It shows variability of ratio of EBL and HBL is the most consistent.
2. Among four commercial banks HBL has invested its more funds on government securities (i.e. risk free assets) and lesser fund on share and debenture (i.e. risky assets). All banks have invested more than 83% amount in government securities.

Only BOKL has invested its 0.63% on non-resident sector. None of the banks have invested any amount on NRB bond.

3. All of the selected commercial banks are granting very high amount its loan and advances to private sector. NIBL and HBL have given second priority to government enterprise and EBL and BOKL give second priority to foreign bills purchase and discount. EBL and BOKL have granted very low (less than 1%) loan and advance to government enterprises.
4. BOKL stock has the highest expected return i.e. 8.34% and HBL has the lowest expected return i.e. -8.82%. NIBL has also negative return i.e. -7.71%. The market expected return is -6.47%. The risk of BOKL is the highest i.e. 57.14% and HBL has the lower risk i.e. 15.26%. NIBL and EBL have risk 19.41% and 36.03% respectively. The market risk is 15.68%. In conclusion we can say that higher the risk higher the return and vice versa.
5. Total risk of BOKL stock is highest and total risk of HBL stock is lowest among four commercial banks.
6. HBL has the highest portfolio return i.e. 4.85%, NIBL stock has lowest (i.e. negative -1.19%) portfolio return and it has the highest portfolio risk i.e. 8.46%. It means NIBL invest its amount in risky assets so it become in loss. EBL and BOKL have a portfolio return of 4.79% and 4.80% respectively and portfolio risk is 0.28% and 5.77% respectively. It shows that the portfolio return of three banks is not so different but risk of BOKL is higher than HBL and EBL.
7. EBL is utilizing its more collected fund on loan and advances and investment which mean percentage ratio is 95.85%. It is the highest average ratio among four commercial banks. HBL is in lost position on its 67.36%. Other banks NIBL and BOKL are utilizing their deposit in loan and investment is 83.59% and 94.73% respectively.

Thapa (2007) conducted a study on *"Risk and Return in Stock Market Investment in Nepal: Issue and Challenges."* Her major objectives of the study were to find out and analyze the risk and return as well as to examine the trend of risk, return, total paid up value, annual turnover and capitalization of twenty three companies out of listed companies. Five companies of each sector from Banking, Finance and Insurance sector; two of each from Hotel, Trading, Manufacturing and Processing and other companies, are included in this study. Her research has been based on the collected data from secondary source as well as some information primary source (2054/55 to

2062/63). For analyzing data, she has applied various statistical tools in her study to find out the risk and return. She has concluded with findings which are as follows:

1. Most of the investors are found to be risk averters. They are investing in portfolio having more than four securities.
2. Most preferable sector for investors is banking and finance sectors.
3. Stock brokers are major source of information to the investors which show they have a remarkable role in share market.
4. Increasing trends of share price and surplus money for investors are the influencing factors to buy share by investors.
5. Profitability and marketability has equal influence for motivation to invest.
6. The level of investor's satisfaction towards the present trading system (open-out cry system) has found low. Most investors are not satisfied with it, because whim and rumors influenced every time. Thus, most of investors wish to have automation trading system.
7. The expected return of securities market as a whole by using NEPSE index is 11.72 percent. Banking and other sectors stand higher expected return than market, while Manufacturing and Processing, Finance, Insurance, Hotel and Trading sectors have lower the expected return compared to the market return.
8. In terms of CV, market has 2.70 CV. All sectors have found highest CV in comparison with market relative risk.
9. In comparison of market portfolio and average return of selected companies shows that there is no difference significantly.
10. The total paid of value of the all sectors expects trading is likely to decreasing in trends. The annual turnover of the all sectors is increasing trends. Likewise, the market capitalization of all sectors expected trading is likely to increasing trends.

Shrestha (2008) conducted a study on "*Risk and Return Behavior of listed Commercial Banks in NEPSE.*" His major objectives of the study were to find out and analyse the risk and return behavior. His research has been based on the collected data from secondary source as well as some information primary source. For analyzing data, he has applied various statistical tools in her study to find out the risk and return. He has concluded with findings which are as follows:

1. Risk and Return of the selected commercial banks are not consistent. The average risk of selected commercial banks is 40.07% whereas return is only 9.23%. The highest risk is 67.61% of Bank of Kathmandu Ltd. whereas higher return is 23.49% of NABIL Bank Ltd.
2. The selected commercial bank having higher risk pose fewer rates of return and Bank having low risk have higher return.
3. The portfolio analysis provides empirical evidence of disparity between risk and return of selected commercial banks.
4. The average risk of the commercial bank combination under portfolio analysis is 28.21% but return is -0.23%.
5. Among 28 combinations, 4 combinations have higher risk and higher return, 11 combinations have higher risk but low rate of return and 13 combinations have higher risk whereas negative return.
6. Most of the selected commercial banks have sensitive stock with market. Among 8 selected commercial banks, 5 of the banks have value of beta greater than 1 and 3 of them have value of beta is less than 1.
7. Bank of Kathmandu Ltd has the higher value of beta (2.25). Similarly it has the highest risk of 67.61% and return is 22.04%.
8. In comparison of overall market return of NEPSE and average return of selected commercial banks shown that there is no significant difference.

Mr. Rabindra Rijal (2009) research entitled "*Portfolio analysis of investment pattern of commercial banks in Nepal*" is attempt to present data of eight years from 2000-2008AD. The objective of the research was to find out the concept to investment loans and advances portfolio. To highlight the relationship of investment with total deposit, loan, and advances, net income etc. to evaluate the financial performance of commercial banks in term of investment strategies. To analyze the risk and return ratio of commercial banks. Mr. Rijal summarized the findings as EBL, SCBL, NABIL, and HBL was investing very high amount of its fund in government securities. HBL has invested highest amount of funds on government enterprises but NIBL, EBL and NABIL has invested highest amount of fund on private sector. He analyzed portfolio by only banking industries using secondary data provided by banks.

2.3 Research Gap:

The research on portfolio management of commercial bank shows the risk and return of commercial bank providing securities and selecting the proper sector for the investment. This research on portfolio management is done by bringing review and literature, and other references from the reliable sources. Previous researchers haven't done sufficient study to analyze the portfolio management. This project analyzes the dates from cross sectional method. Hence, this research has been trying to show the real portfolio management of sampled banks with the help of simple sharp portfolio optimization. Besides the risk and return, market, sensitivity, composition of risk and status of security, Cut of rate and Z value are also analyzed in this study.

CHAPTER -THREE

RESEARCH METHODOLOGY

Research methodology is the process of reaching to the solution following various procedures. It is the process of arriving to the solution of the problem through planned and systematic process through the collection of facts and figures during research period. Research is a systematic method of finding out solution to a problem where as research methodology refers to the various steps to adopt by a researcher in studying problems with certain objectives in view. To find out such solution various statistical and financial tools and techniques are applied which help the researcher to find out what the real problem is.

Research methodology is a way to systematically solve the research problem. It may be understood as a science of studying how research is done systematically. In it we study the various steps that are generally adopted by a researcher in studying his research problem along with the logic behind them (Kothari; 1990).

3.1 Research Design:

This research applies descriptive cum analytical research design. It is based on recent historical data of last five years of selected commercial banks. It focuses on an expected risk and return and portfolio risk and return management of the listed banks in NEPSE.

3.2 Data Collection Procedure:

This research contains the data from secondary sources i.e. published /unpublished written document, e.g. books, journals and annual reports of selected banks, trading reports of NEPSE, website of NEPSE, NRB and other banks are used as a secondary data.

3.3 Population and sample

This study includes sample commercial banks from Nepal stock exchange which have highest market capitalization. At present, 31 commercial banks are operating in Nepalese financial market, they are as follows;

S. No.	Commercial Banks	Operation Date (B.S.)	Paid up Capital (Rs. In Million)
1	Nepal Bank Ltd.	1937/11/15	380.40
2	Rastriya Banijya Bank	1966/01/23	1172.30
3	Agriculture Development Bank	1968/01/02	9437.50
4	NABIL Bank Ltd.	1984/07/16	2029.80
5	Nepal Investment Bank Ltd.	1986/02/27	2409.10
6	Standard Chartered Bank Ltd.	1987/01/30	1398.50
7	Himalayan Bank Ltd.	1993/07/07	1600.00
8	Nepal SBI Ltd.	1994/06/05	1653.60
9	Nepal Bangladesh Bank Ltd.	1994/10/18	1860.30
10	Everest Bank Ltd.	1994/10/18	1079.60
11	Bank of Kathmandu Ltd.	1995/03/12	1359.50
12	Nepal Credit and Commercial Bank Ltd.	1996/10/14	1399.60
13	Lumbini Bank Ltd.	1998/07/17	1294.50
14	N I C Bank Ltd.	1998/07/21	1311.50
15	Machha Puchhre Bank Ltd.	2000/10/03	1627.20
16	Kumari Bank Ltd.	2001/04/03	1306.00

17	Laxmi Bank Limited	2002/04/03	1613.50
18	Siddhartha Bank Ltd.	2002/12/24	1561.00
19	Global Bank Ltd.	2007/01/02	1473.40
20	Citizens Bank Int. Limited	2007/06/21	1207.00
21	Prime Commercial Bank Ltd	2007/09/24	1210.00
22	Sunrise Bank Ltd.	2007/10/12	1625.00
23	Bank of Asia Nepal Ltd.	2007/10/12	1500.00
24	DCBL Bank Ltd.	2008/05/25	1920.90
25	NMB Bank Ltd.	2008/06/05	1651.60
26	Kist Bank Ltd.	2009/05/07	2000.00
27	Janta Bank Nepal Ltd.	2010/04/05	1400.00
28	Mega Bank Nepal Ltd.	2010/07/23	1631.50
29	Commerz & Trust Bank Nepal	2010/09/20	1400.00
30	Civil Bank ltd.	2010/11/26	1200.00
31	Century Bank Ltd.	2011/01/23	1120.00

(Source: NRB)

Until 2040 B.S., there were only two commercial banks. but after “financial sector reforms” in Nepal which gave permission for the establishment of private and joint venture banks with up to a maximum of fifty percentage equity participation. After the political reform 2046 B.S., the number of commercial banks has been increasing, since then various financial institution like Development Banks, Domestic

Commercial Banks, Joint venture Banks, financial companies, cooperatives have been contributing in the overall banking process.

After the announcement of liberal and free market economic based policy, these commercial banks have greater network and access in nation and international market. These banks are providing many schemes like insurance to depositor, credit card system; vehicle, housing and education loan also. Not only providing services to individual or industry commercial banks has play a catalytic role in the economic growth of the nation to large industries.

3.3.1 Bank profile under the study

1. Nabil Bank Ltd.

NABIL bank is the first foreign joint venture bank established on 12th July 1984. At the initial stage it had a technical service agreement with Dubai Bank Limited which was later merged with Emirates Bank limited. NABIL is the first major joint venture bank in the country and it is managed by a team of qualified and highly experienced professionals. Their core objective was to support the nation with introduction of modern banking services. The bank provides a complete range of consumer, retail, SME and corporate banking services through its offices spread across the country. It is the largest private bank in the country in terms of branch and ATM network. The bank has also adopted modern technologies and has provided an array of card products and Internet/Tele banking facilities besides ATM and Any Branch Banking Service. The current structure of equity is share by four parties. 50% of the shares are owned by foreign entity, 10% of the shares are owned by other licensed institution, 10% of the shares are owned by other entity and 30% of the shares are owned by general public. Its paid up capital is 2029.80 million and 42 branches are providing the banking facility to the public. Current configuration is given as follows:

National Bank Ltd. Bangladesh 50%

Nepal industrial Development Corporation (NIDC) 10%

Rastriya Beema sansthan 9.66%

Nepal stock Exchange (NEPSE) 0.34%

Nepalese public 30%

2. Standard Chartered Bank Ltd.

Earlier known as Nepal Grindlays Bank Ltd. Came into existence in 1987 as a Joint venture between ANZ Grindlays and Nepal Bank Ltd. After a requiring of the ANZ operation in the region by the standard chartered, it has become a subsidiary of SC Grindlays, which holds 50% of shareholdings in the bank. Now from the date July 2001, it has named as standard charter. Its paid up capital is 1398.50 million. At present 14 branches are providing the banking facility to the public. Current configuration is given as follows:

Standard chartered Grindlays Bank 50%

Nepal Bank Ltd 33%

Nepalese public 17%

3. Nepal Investment Bank Ltd.

Nepal investment Bank ltd., previously Nepal Indosuez Bank Ltd., was established in 1986 as a joint venture between Nepalese and French partners and later Nepalese group of companies holding its 50% stake. It is listed in NEPSE in 1987 A.D. Its paid up capital is 2409.10 million. At present, 39 branches are providing the facility to the public. Current configuration is given as follows:

A group of companies holding 50% of the capital.

Rastriya Banijya Bank holding 15% of the capital.

Rastriya Beema sansthan holding 15% of the capital.

The remaining 20% being held by the General public (which listed on the Nepal Stock Exchange).

4. Himalayan Bank Ltd. (HBL)

Himalayan Bank is a Joint venture Bank with Habib Bank Ltd. of Pakistan . which was stablished in 1992 under the company act1964.This is the first Joint venture Bank with maximum share holding by the Nepalese private sector, which is managed by choice executive. The main objective of the bank is to provide modern banking facility and loan to agriculture, commerce and industrial sector. It's paid up capital is

1600.0 million. At present, 33 branches are providing the facility to the public. Current configuration is given as follows.

Promoter shareholders 50%

Habib Bank Ltd.20%

Karmachari sanchaya shareholders 15%

Nepalese public shareholders 15%

3.4 Tools and Techniques for analysis:

3.4.1 Market Price of Stock (MPS):

There are mainly three types of MPS available in NEPSE annual report. They are high MPS, low MPS and closing MPS. Closing MPS is not an average price of high and low MPS but rather it is calculated by considering the whole years MPS. For the closing MPS trading report is followed.

3.4.2 Dividend (D):

Dividend can be given in the form of cash or shares. If the company declare dividend in cash then there is no difficulty in calculation. But if the company declares stock dividend or bonus share then shareholders get shares as dividend instead of cash. So, there are little difficulties to calculate the exact amount in cash. In case of stock dividend the formula for total dividend amount is considered as follows:

$$\text{Total dividend} = \text{DPS} + \text{next year's closing price} * \text{stock dividend\%}$$

3.4.3 Single Period Rate of Return(R):

This is the annual realized return received on an investment and any change in market price, usually expressed in a percent at the beginning price of the investment. It is the summation of the dividend yield and the capital gain yield.

Symbolically,

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

i

Where,

R= Actual realized return on common stock at time t.

D_t= Cash dividend received at time t.

P_t = Price of a stock at time t.

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

3.4.4 Expected rate of return on common stock:

Expected return is simply arithmetic mean of the past years return. This is an average return on common stock.

Symbolically,

$$\bar{R} = \frac{\sum R_j}{N} \quad \text{ii}$$

Where,

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

N = No. of years.

3.4.5 Standard Deviation (σ):

Standard Deviation is a statistical measure and is widely used to measure risk from holding a single asset. The standard deviation represents a large dispersion of return and is a high risk and vice versa.

Symbolically,

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

3.4.5 Coefficient of Variation (C.V.):

It is as the standard deviation divided by the mean of expected return. It is used to standardize the risk per unit of return i: e measure the risk per rupee. The Coefficient of variation should be used to compare investments when both the standard deviations and the expected values differ.

Symbolically,

$$\text{Coefficient of variance (C.V.)} = \frac{\sigma}{\bar{R}} \quad \text{iv}$$

3.4.6 Covariance (cov.):

Covariance is a measure of the degree in which two variables “move together” over time. A co-variance between the rate return for the assets that is positive indicates that the rate of return tend to move in the same direction at the same time. If covariance is negative the rate of return of the assets tend to move in opposite direction and zero value of covariance means there is no relationship between two assets at all.

Symbolically,

$$\text{Cov}_{j\ m} = \frac{(R_j - \bar{R}_j) * (R_m - \bar{R}_m)}{n - 1} \quad \text{v}$$

Where,

$\text{Cov}_{j\ m}$ =covariance between security j and m.

3.4.7 Beta coefficient (β_j):

It is an index undiversifiable proportion of the total risk. It measure sensitivity or volatility of return of the particular stock with respect to market return. It can be calculated by using the following equation.

Symbolically,

$$\beta = \frac{\text{Cov}(R_j, R_m)}{\text{Var}(R_m)} \quad \text{vi}$$

Where,

β_j =Beta coefficient of stock j.

$\text{Cov}(R_j, R_m)$ = covariance between stock j and market return.

Beta of market return equals to 1. If beta is greater than 1, then the assets is more volatile then market and is called aggressive beta. If the beta is less than 1, the asset is called defensive beta and its price fluctuation is less volatile then market.

3.4.8 Capital Assets Pricing Model (CAPM):

Capital assets pricing model describes the relationship between risk and required return. A security's expected return is the risk free rate plus a premium based on the systematic risk of the security.

Symbolically,

$$(\bar{R}_j) = R_f + [(R_m) - R_f] \beta_j \quad \text{vii}$$

Where,

R_f = the rate of return on a risk less assets.

R_m = the expected return on the market portfolio.

$$\beta_j = \text{cov}(R_j, R_m) / \text{Var } R_m$$

3.4.9 Systematic Risk:

Systematic risk is the portion of the total risk of an individual security caused by market factor that simultaneously affects the prices of all securities. It can't be diversified away. It is called market risk or unavoidable risk or non-diversifiable risk or beta risk. It stems from factors, which systematically affect all firms, such as war, inflation, recession, high interest rate, depression, and long term changes in consumption in the economy. It can be calculated by using the following equation.

Symbolically,

$$\text{Systematic risk} = \beta_{jm}^2 \times \sigma_m^2 \quad \text{viii}$$

Where,

β_{jm}^2 = Beta coefficient of security.

σ_m^2 = Variance of market.

3.4.10-Unsystematic Risk:

The portion of the total risk that's can be diversified away. It is also called non-market risk or company specific risk or unsystematic risk. It is caused by events particular to the firm .For example labour strikes, management errors etc. It can be calculated by using the following equation.

Symbolically,

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

Or

$$\text{Var}(e) = \sigma_j^2 - \beta_{jm}^2 \sigma_m^2$$

Where,

Var(e) = variance of standard error.

3. 4.11- Portfolio Return (R_p)

It is the weighted average rate of return for the individual assets and can be calculated by using the following equation.

Symbolically,

$$R_p = W_1 \bar{R}_1 + \dots + W_n \bar{R}_n \quad \text{ix}$$

Where,

\bar{R} =return of the portfolio

W_1 = weight of stock 1

\bar{R}_1 = Expected return of stock 1

W_n =weight of stock n

R_n =expected return of stock n.

3.4.12 Portfolio Standard Deviation (σ_p)

It is the combined standard deviation of the individual stocks return in the portfolio of two or more securities.

Symbolically,

$$\sigma_p^2 = (W_1^2 \sigma_1^2 + W_2^2 \sigma_2^2 + 2W_1W_2Cov_{12}) \quad \text{x}$$

Where,

σ_p^2 = variance of the portfolio returns of stock.

W_1^2 = weight of return of stock 1.

σ_1^2 = variance of return of stock 1.

W_2^2 = weight of return of stock 2.

σ_2^2 = variance of return of stock.

Cov_{12} = covariance between returns of stock 1 and 2.

3.4.13- Cut of Rate

The cut of rate gives the number of securities that can be added to construct the optimal portfolio.

Symbolically,

$$C_j = \frac{\sigma_m^2 \sum_{j=1}^j \frac{(R_j - R_f) \beta_j}{\sigma_{ei}^2}}{1 + \sigma_m^2 \sum_{j=1}^j \frac{\beta_j^2}{\sigma_{ei}^2}} \quad \text{(xi)}$$

Where,

σ_m^2 = variance of the market index.

R_j = expected return of stock j.

R_f = risk free rate of return.

σ_{ei}^2 = unsystematic risk of stock j.

β_j = beta of stock j.

CHAPTER -FOUR

ANALYSIS AND PRESENTATION OF DATA

This chapter includes analysis of data and their presentation. Financial data of each bank and data of NEPSE index is presented and their interpretation and analysis has been conducted to fulfill the study objective. Most of the data are presented in a tabular form with appropriate figures where necessary.

4.1- Risk and Return Analysis:

A major purpose of investment is to get a return or income on the funds invested. The expected rate of return or holding period return is based upon the expected revenue receipts over the holding period and the expected ending value of the assets. The possible rates of return estimated by the investor are summarized in an expected rate of return. The expected rate of return must be equal or greater to the required rate of return. For any investor to maximize the value of investment. Standard deviation is used to measure an associated risk of the securities. The high standard deviation represents high risk and low standard deviation represents a low risk.

Coefficient of variation is also calculated to measure the risk. when Standard deviation is divided by the mean of expected return. It is used to standardize the risk per unit of return i.e. measure the risk per rupee. The coefficient of variation should be used to compare investment. When both the standard deviation and expected values are different. Low CV has less risky than high CV.

Table No 4.1 Expected Risk and Return of Banks

Fiscal Year	NABIL	NIBL	HBL	SCBL	Total	\bar{R}	σ	C.V.
062/63	0.54	1.37	0.32	0.92	3.15	0.79	0.46	0.58
063/64	2.24	0.86	1.05	1.49	5.64	1.41	0.61	0.43
064/65	0.44	0.69	0.35	0.68	2.16	0.54	0.17	0.31
065/66	0.16	-0.43	0.03	0.13	-0.11	-0.03	0.12	4.14
066/67	-0.40	-0.47	-0.44	-0.40	-1.71	-0.43	0.034	0.08
Total	2.98	2.02	1.31	2.82				
\bar{R}	0.60	0.40	0.26	0.56				
σ	0.99	0.82	0.54	0.73				
C.V.	1.65	2.05	2.08	1.30				

(Source: Appendix2)

The above table 4.1 shows that the expected return, standard deviation and coefficient of variance of the concerned banks from the fiscal year 2062/63 to 2066/67. The expected rate of return of banks Nabil, NIBL, HBL and SCBL were 0.60, 0.40, 0.26, and 0.56 respectively for the study period. Investors expect to get highest return from Nabil (i.e. 60%) and lowest return from HBL (i.e.26%). Nabil stock is profitable among the stock. Standard deviation of Nabil is highest and standard deviation of HBL is lowest. The same result is also shown in figure no 4.1.

The risk and returns of the sample banks are also presented in figure no 4.1. It indicates that the Nabil has highest return in comparison of other banks but the risk of Nabil is also highest among the sample banks.

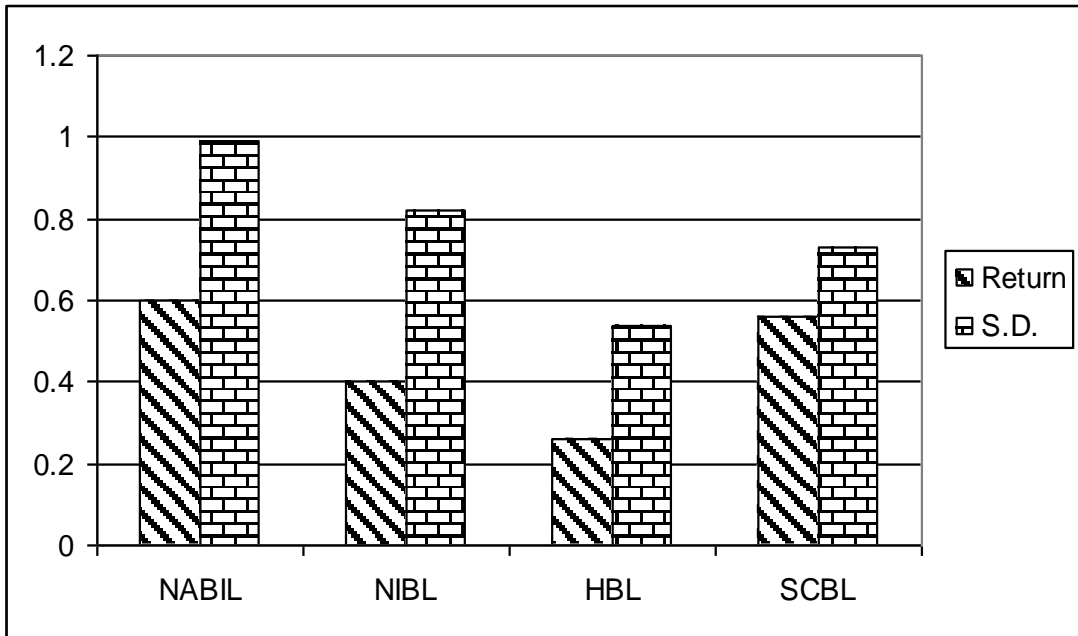


Figure No 4.1: Risk and Return of Bank

Coefficient of variation (C.V.) reveals risk per unit of return and provides better possible values for risk. It is computed to measure risk in relative term. Higher C.V. exposes higher risk and lower C.V. exposes lower risk. C.V. defines that one unit change in risk will change 1.65, 2.05, 2.08 and 1.30 unit change in the return of Nabil, NIBL, HBL and SCBL respectively. SCBL is the best security on the base of coefficient of variation.

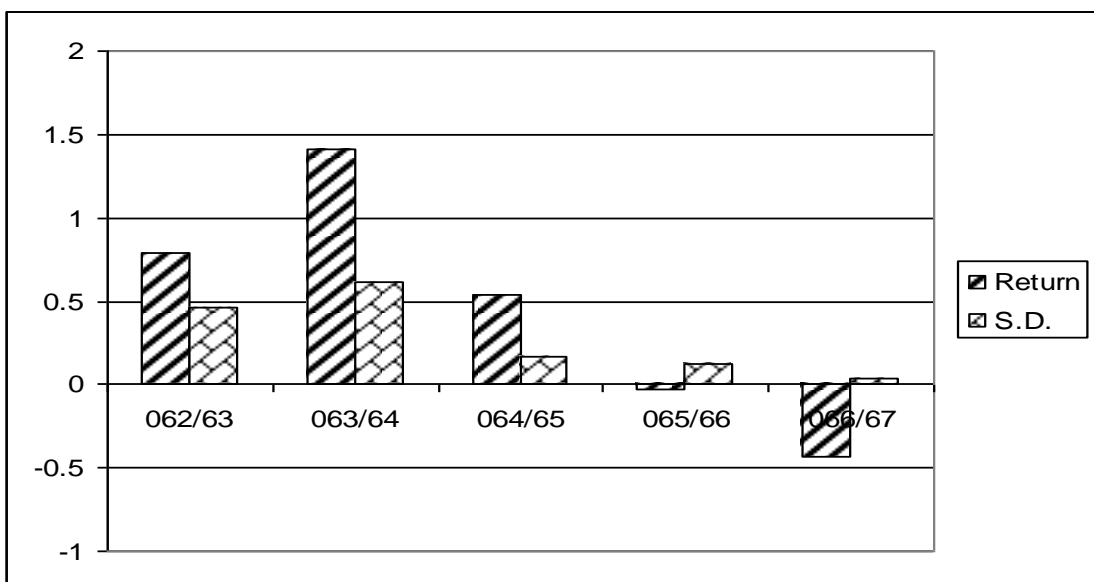


Figure No 4.2 Expected Risk and Return by year for all sample banks.

In the comparison of fiscal year, the expected rate of return ranged from -0.43 to 1.41 . Figure No 4.2 presents that highest expected rate of return (1.41) in the year 063/64. In the year 065/66 and 066/67 has negative return. On the base of return 063/64 year is the best year.

4.2- Analysis of Market Risk and Return:

Nepal Stock Exchange (NEPSE) is the only secondary stock market in Nepal and overall market index is represented by NEPSE. Market risk and return are the most important factors to analyze the risk and return of individual stocks. Following is the calculation of market return, standard deviation and coefficient of variation of NEPSE from 2062/63 to 2066/67.

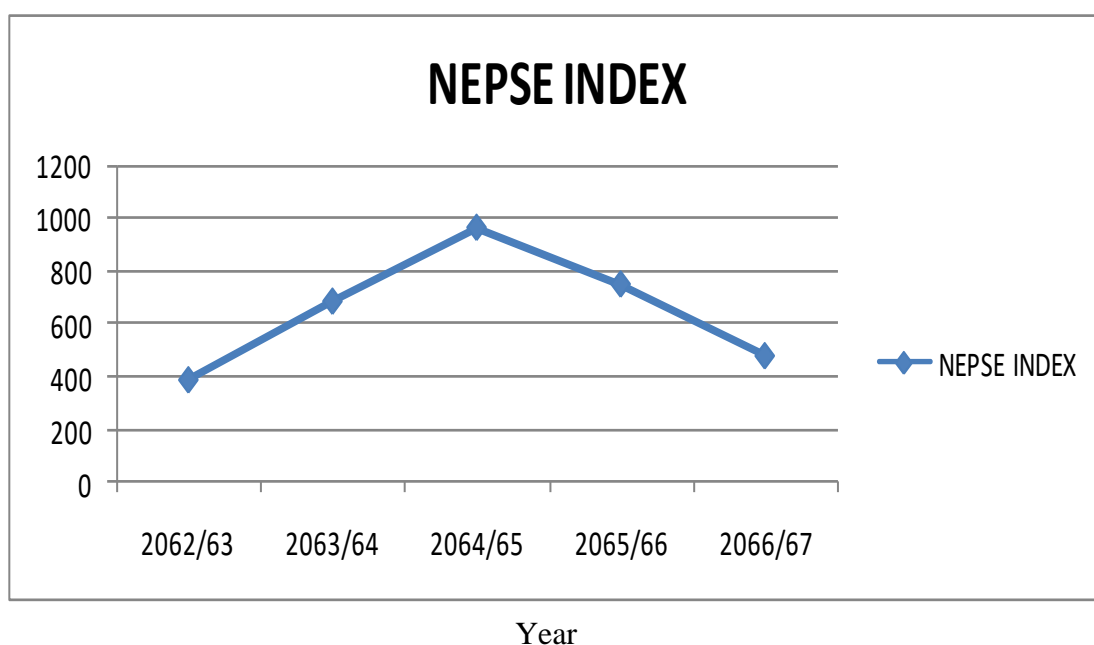


Figure No 4.3 Nepse Index of study period

Figure No 4.3 shows that the NEPSE index from the fiscal year 2062/63 to 2066/67. In the year 2064/65 has highest index 963 and 2062/63 was lowest index 387. NEPSE index have increasing trend from 2062/63 to 2064/67. But in the year 2065/66 to 2066/67 it has decreasing trend.

Table No 4.2 Calculation of NEPSE return

Fiscal Year	NEPSE Index	$R_m = \frac{NI_t - NI_{t-1}}{NI_{t-1}}$	$R_m - \bar{R}_m$	$(R_m - \bar{R}_m)^2$
2061/62	287	-	-	-
2062/63	387	0.35	0.16	0.0256
2063/64	684	0.77	0.58	0.3364
2064/65	963	0.41	0.22	0.0484
2065/66	749	-0.22	-0.41	0.1681
2066/67	478	-0.36	-0.55	0.3025
Total		0.95		0.881
\bar{R}_m		0.19		
σ		0.47		
σ^2		0.22		
C.V.		2.47		

(Source: NEPSE)

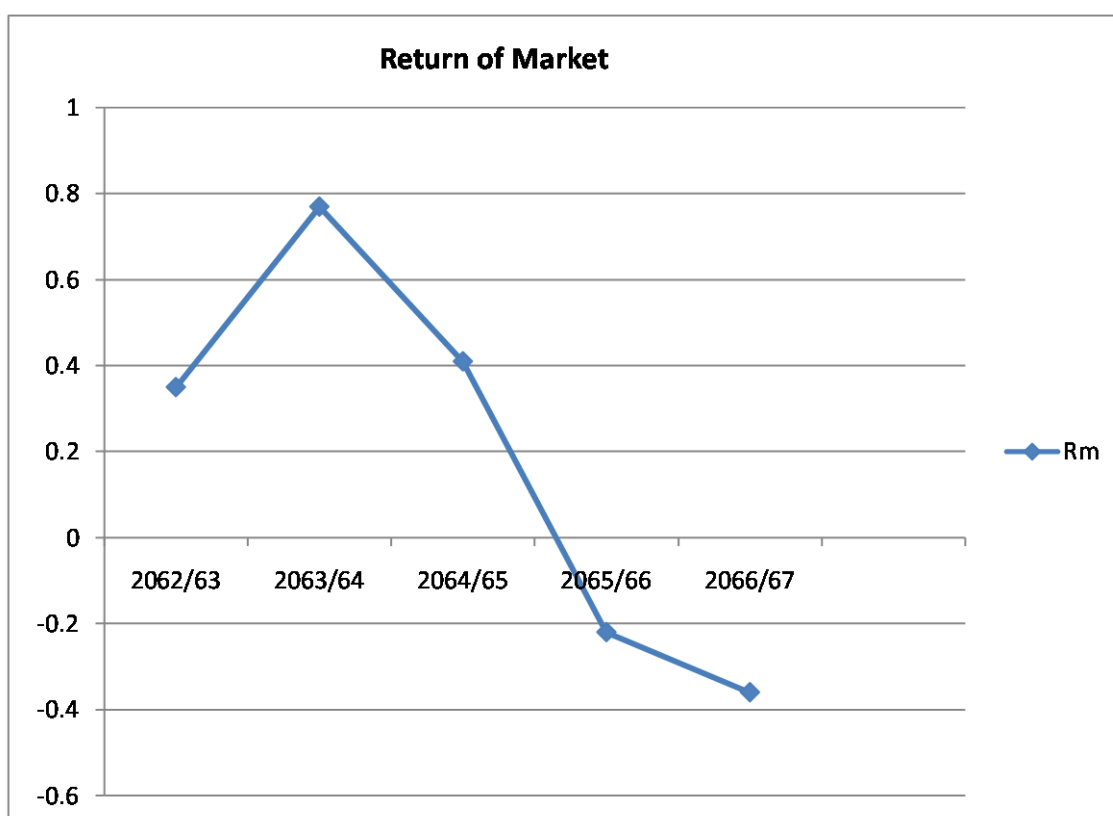


Figure No 4.4: Return of Market

The above table and figure the shows that the return of market from fiscal year 2062/63 to 2066/67. The return of market is positive up to 2064/65 and then negative in fiscal year 2066/67 by 0.22 and 0.36 respectively. The table shows expected return is 19% and its standard deviation is 47% and coefficient of variation is 2.47 times.

4.3- Analysis of Market sensitivity:

In this research beta coefficient is taken as the measurement of market sensitivity. Higher the beta higher will be the market sensitivity and higher will be the reaction to the market movement. Beta coefficient represents systematic risk of particular assets relative to the market. It is the key element of the CAPM. Beta measures non-diversifiable risk. Beta shows how the price of a security responds to market forces. Market sensitivity looks how sensitive are stocks return to the average market returns by looking at the percentage change in stock and market return during the same period. The following table shows the beta coefficient of each bank.

Table No 4.3 Beta Coefficient of banks:

S.N.	Name of Banks	Beta(β)
1	Nabil	1.86
2	NIBL	1.48
3	HBL	1.04
4	SCBL	1.51

(Source: Appendix 4)

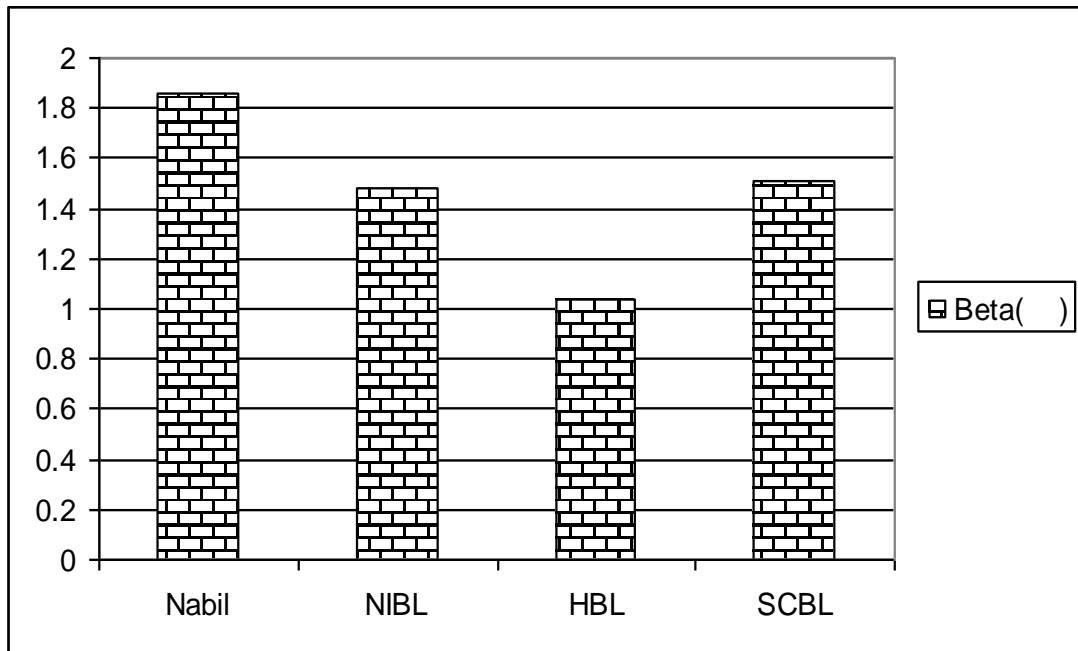


Figure No 4.5 Beta Coefficient

The above table no 4.3 shown that the beta coefficient of the concerned banks. The beta of Nabil, NIBL, HBL and SCBL were 1.86, 1.48, 1.04 and 1.51 respectively. All the beta coefficient of banks is positive. Beta of all banks greater than 1. Beta of Nabil is the highest 1.86 which means the stock of Nabil is highly sensitive with the market return. The same result is also shown in figure no 4.5.

4.4-Systematic and Unsystematic Risk:

Systematic risk is the portion of the total risk of an individual security caused by market factor that simultaneously affects the prices of all securities. It can't be diversified away. It is also called market risk or unavoidable risk or beta risk.

Unsystematic risk is the portion of total risk that can be diversified away. It is also called non-market risk or avoidable risk or diversifiable risk.

Table No 4.4 Calculation of systematic and unsystematic risk

Banks	Total Risk	Systematic Risk	Proportion	Unsystematic Risk	Proportion
Nabil	0.9781	0.761	0.78	0.2171	0.22
NIBL	0.6706	0.482	0.72	0.1886	0.28
HBL	0.2947	0.238	0.81	0.0567	0.19
SCBL	0.53	0.502	0.95	0.028	0.05

(Source: Appendix 5)

$$\text{Systematic Risk} = \sigma_m^2 * \beta_j^2$$

$$\sigma^2 = \frac{\sum (R_j - \bar{R})^2}{n-1}$$

The above table no 4.4 shown that the systematic risk and unsystematic risk of the concerned banks. The systematic risk of Nabil, NIBL, HBL and SCBL 0.761, 0.482, 0.238, and 0.502 and unsystematic risk are 0.2071, 0.1886, 0.0567, 0.028 Nabil has highest systematic risk. It is shown in figure no 4.6.

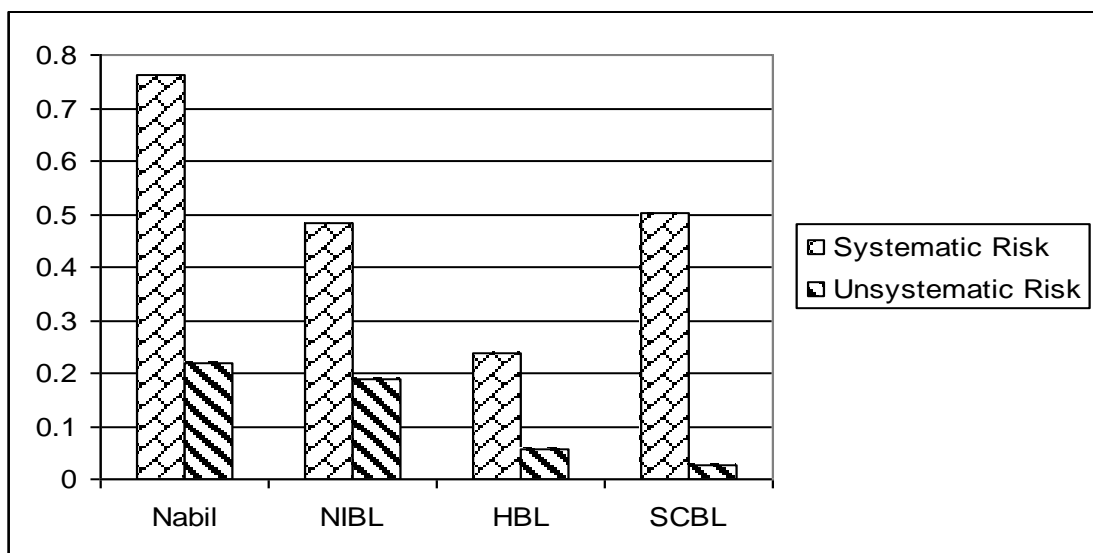


Figure No 4.6 Proportion of unsystematic and systematic risk

4.5-Analysis of Required Return:

Investors should know whether the capital they are investing is safe or not. Study of required rate of return is necessary for investors before investing. The following table shows the required return of each bank.

Table No 4.5 Analysis of Required Return

Banks	R_m	R_f	$R_m - R_f$	Beta(β)	Required Return
Nabil	0.19	0.094	0.096	1.86	0.27
NIBL	0.19	0.094	0.096	1.48	0.24
HBL	0.19	0.094	0.096	1.04	0.19
SCBL	0.19	0.094	0.096	1.51	0.24

The table no 4.5 shows the required rate of return Nabil, HBL, NIBL and SCBL 0.27, 0.24, 0.19 and 0.24 respectively. Higher the risk higher will be the return. Nabil bank has higher return than other banks.

4.6- Comparison of Required Return with Expected Return:

Table No 4.6 Comparison of Required Return with Expected Return

Banks	Beta	Expected Return	Required Return	Remarks
Nabil	1.86	0.60	0.27	Undervalued
NIBL	1.48	0.40	0.24	Undervalued
HBL	1.04	0.26	0.19	Undervalued
SCBL	1.51	0.56	0.24	Undervalued

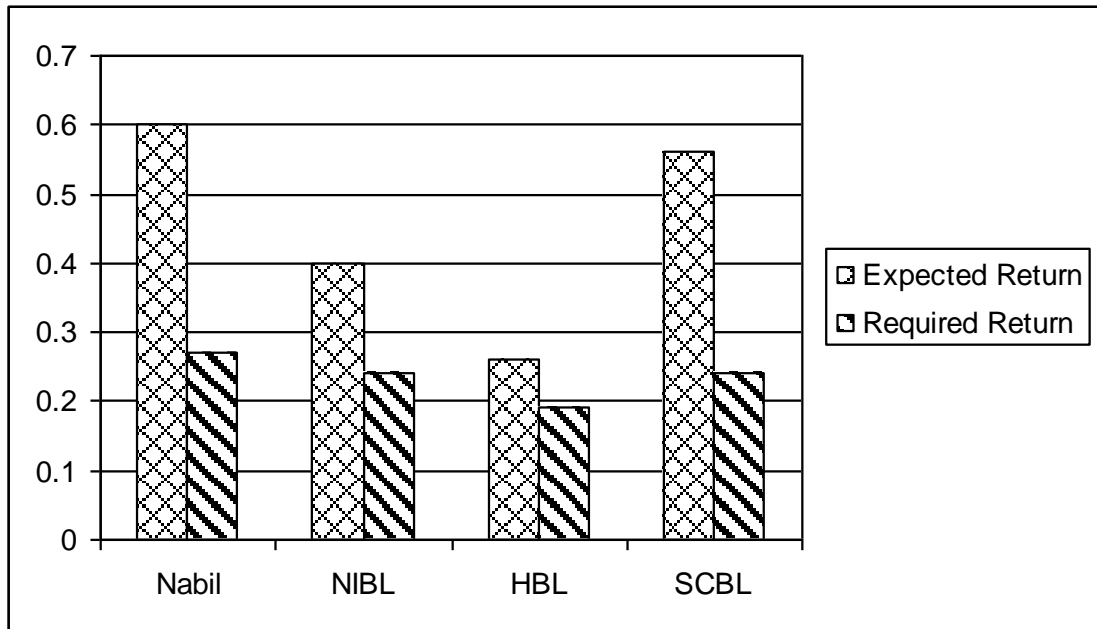


Figure-4.7 Comparison of Required Return with Expected Return

The above table and figures shows that the expected rate of return and required rate of return of the concerned banks. The required rate of return Nabil, NIBL, HBL and SCBL 0.27, 0.24, 0.19, and 0.24 respectively. And expected rate of return 0.60, 0.40, 0.26, and 0.56. The required rate of return is less than expected rate of return is known as undervalued. Where undervalued stock should be buy. It is shown in figure no 4.7.

4.7- Portfolio Risk and Return:

Risk and return are based on the investment of single assets. Investor had construct a portfolio to minimize risk and increase its return. The analysis of risk and return made up was only as a point of view on individual investors, that if he/she should invest in which banks securities? Which banks securities is more risky to comparing with each other? Constructing of portfolio or making an investment in more than one asset, which are negatively correlated, can reduce unsystematic risk without losing any return.

Table No 4.7 Calculation of Portfolio Risk and Return

Proportion		Proportion		R_p	σ_p
(Nabil)	1	(NIBL)	0	0.60	0.99
	0.75		0.25	0.55	0.86
	0.50		0.50	0.50	0.78
	0.25		0.75	0.45	0.76
	0.0		1	0.40	0.82
(EBL)	1	(SCBL)	0	0.26	0.54
	0.75		0.25	0.335	0.55
	0.50		0.50	0.41	0.59
	0.25		0.75	0.485	0.65
	0		1	0.56	0.73
(NIBL)	1	(HBL)	0	0.40	0.82
	0.75		0.25	0.365	0.70
	0.50		0.50	0.33	0.60
	0.25		0.75	0.295	0.54
	0		1	0.26	0.54
(NIBL)	1	(SCBL)	0	0.40	0.82
	0.75		0.25	0.44	0.75
	0.50		0.50	0.48	0.71
	0.25		0.75	0.52	0.70
	0		1	0.56	0.73
(Nabil)	1	(HBL)	0	0.60	0.99
	0.75		0.25	0.515	0.85
	0.50		0.50	0.43	0.71
	0.25		0.75	0.345	0.72
	0		1	0.26	0.54
(Nabil)	1	(SCBI)	0	0.60	0.99
	0.75		0.25	0.59	0.88
	0.50		0.50	0.58	0.73
	0.25		0.75	0.57	0.75
	0		1	0.56	0.73

If investor interested to invest in two bank portfolios, the top four portfolios will be:

25% of SCBL and 75% of Nabil	88%
75% of Nabil and 25% of NIBL	86%
75% of Nabil and 25% of HBL	85%
25% of SCBL and 75% of NIBL	75%

4.8 - Single Index model:

4.8.1 Simple Sharpe Portfolio Optimization:

Table No 4.8 Calculation of Cut of Rate

Banks	Cut of Rate	Z value
Nabil	1.0303	2
NIBL	0.0045	1.30
HBL	0.0056	2.18
SCBL	0.041	14.43

The above table no 4.8 shown that the cut of rate and Z value of concerned banks. The cut of rate of NABIL, NIBL, HBL, and SCBL were 1.0303, 0.0045, 0.0056 and 0.041 respectively. To determine which securities are to be included in the optimum portfolio, investors have to find out cut of rate. NABIL bank has highest cut of rate.

Table No 4.9 Calculation of z value and Weight

Bank	Z value	Weight
Nabil	2	0.10
NIBL	1.30	0.06
HBL	2.18	0.11
SCBL	14.43	0.73
Total	19.91	

The above table no 4.9 shown that a rational investor should choose to invest in different banks in the proportion of 0.10, 0.06, 0.11 and 0.73 to NABIL, NIBL, HBL and SCBL respectively. To construct the optimum portfolio, the percentage invested for each security in the optimum portfolio is to be calculated. To find out the weight of selected securities in portfolio, z value is calculated. Weight is the proportion of z value on the base of total z value of portfolio.

4.8.2 Optimum Portfolio Composition

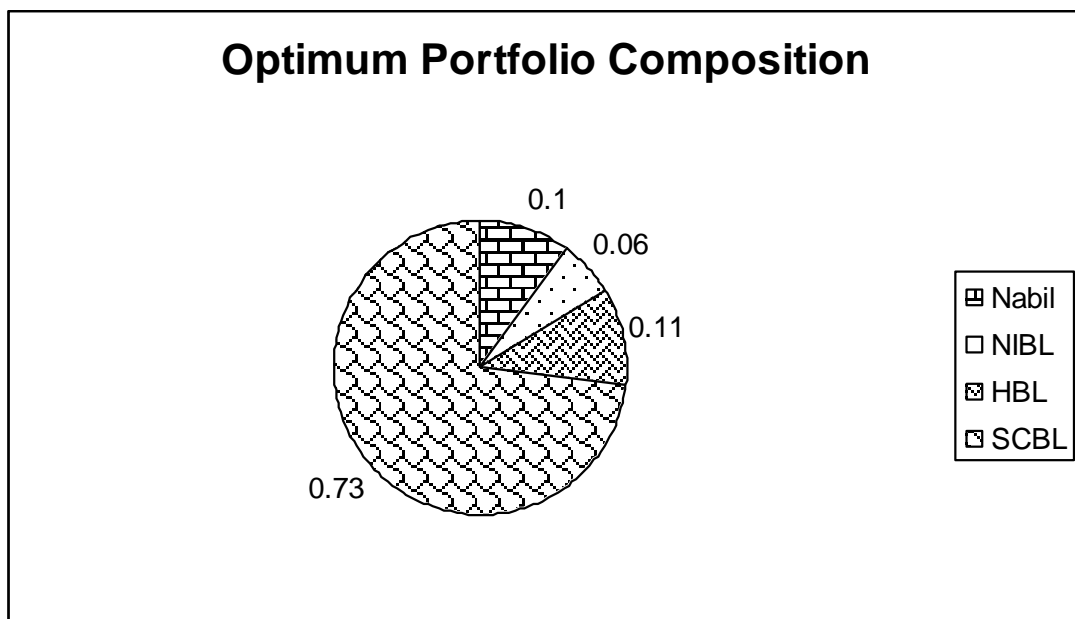


Figure No 4.8 Optimum Portfolio Compositions

The above chart shows that the optimum portfolio composition of the concerned bank. This study helps us to invest our found 73% in SCBL, 11% in HBL, 10% in Nabil and 6% in NIBL. By analysis the single index model, we can construct optimum portfolio which will be give us minimum risk and maximum return. SCBL has maximum return.

4.9 Major findings:

The major findings and conclusion of the study from different analysis are as follows:

1. The expected return is an average return of the investment of the banks. Nabil Bank has highest return i.e. 60%. The expected return of all the banks are above the 25%.
2. Risk is the variability of Returns, which is measured in terms of S.D. of return. Nabil has highest S.D and HBL has lowest S.D.
3. Co- efficient of variation measures the risk per unit of return; and in the present project analysis the CV of SCBL seems to be lowest that is 1.3.
4. Market Return of NEPSE is 19%, Standard deviation is 47% and Coefficient of variation is 2.47 times.
5. Beta coefficient represents systematic risk of particular assets relative to the market. According to the calculation Nabil has highest beta that is 1.86 and HBL has lowest beta i.e. 1.04 and all has greater than it indicates all sample banks have aggressive stock.
6. Investors are risk lover and risk avoider. Risk lover investor ready to bear risk for higher rate of return and risk avoider investor try to avoid facing high risk and became ready to be satisfied in low return.
7. The cut of rate of NABIL, NIBL, HBL, and SCBL were 1.0303, 0.0045, 0.0056 and 0.041 respectively. To determine which securities are to be included in the optimum portfolio, investors have to find out cut of rate. NABIL bank has highest cut of rate.
8. The portfolio risk on investment is less than that of risk on individual investment that shows that portfolio analysis is useful to reduce risk. The

portfolio risk and return analysis shows that higher risk shows higher return and lower risk shows lower return.

9. Optimum portfolio in different proportion of security are found as follows:-

Proportion	Risk
25% of SCBL and 75% of Nabil	88%
75% of Nabil and 25% of NIBL	86%
75% of Nabil and 25% of HBL	85%
25% of SCBL and 75% of NIBL	75%

10. Sharpe shingle index model helps to find out the optimum portfolio of NEPSE. The proportion of optimum portfolio security to invest 73% in SCBL, 11% in HBL, 10% in Nabil and 6% in NIBL.

CHAPTER FIVE

SUMMARY, CONCLUSION AND SUGGESTIONS

The study has been organized in four chapters. The subject of the study has been briefly introduced in the first chapter, chapter two deals with the literature review along with the theories and earlier finding in the area. The third chapter deals with the methodology. Source of data, tools and process of data collection are mentioned. Chapter four deals with the analysis and interpretation of data. A brief description regarding portfolio management and practice of commercial banks has been presented. This chapter deals with analysis shows that the portfolio management in the commercial banks needs some improvements. So some suggestions have been made for the improvement on the performance of the financial institutions.

5.1 Summary:

Investment portfolio refers to an investment that combines several assets. Investment portfolio is one with which the income or profit of the banks depend upon directly. Investment portfolio usually offers the advantage of reducing risk through diversification of risk from risky investment to less risky investment. The objective of portfolio is to develop a portfolio that has the maximum return at minimum given level of risk. The investment portfolio is the tool which helps to reduce risk and maximize return. The banks should never invest its funds in those securities; difference may cause a great loss. The bank should accept that type of securities which are commercial, durable, marketable stable, transferable and high market price.

Risk and Return is the key factor to analyze the financial condition of the company for investor. Risk and return move together. No one can guess what turn the rate of return will take in the future. No investor will be ready to invest their capital on risky assets unless they are not assured of adequate compensation for accepting the risk. Portfolio is a bundle or combination of individual assets or securities. The investment portfolio usually offers the advantage of reducing risk through diversification of risk from risky investment to less risky investment. The objective of portfolio analyze is to develop a portfolio that has the maximum return at whatever level of risk the investor deems appropriate if the investor diversify funds into many more securities, that

continue to spread out firm specific factor and portfolio volatility should continue to fall. Therefore portfolio analysis considers the determination of future risk and return. The main issues raised by the study were, What is the market risk of banking sector measured in terms of beta? Which bank has the largest degree of financial risk measured in terms of portfolio risk? Is investment portfolio directed towards objectives of profit maximization? What is the relationship of investment with total deposits, loan and advances, net income etc? Do the risk and return of sample commercial banks fluctuate with markets risk and return? Which bank has the optimal portfolio? What is the cut of rate of different banking securities for optimal portfolio construction? The present study aimed to find out risk and return analysis of stock to find out the portfolio of investment for an investor to find out optimal portfolio among the security trading in NEPSE. The data used in this study are mainly secondary data. Four listed commercial banks in NEPSE are taken as a sample. Cross sectional data were used to analyzed risk and return. With the help of expected rate of return standard deviation, variance and coefficient of variation, market sensitivity expected risk and return of commercial banks are analyzed. With the help of beta of the stocks, covariance with the market, systematic and unsystematic risk, the required rate of return of commercial banks is evaluated.

Sharpe's optimum portfolio model/single index model was used to find out the optimum portfolio among the sample securities. To make the analysis easy to understand some related studies are reviewed. Tables and diagrams are used to present the data and results from the analysis. The findings indicate the NABIL bank has highest expected return than other sample banks, NABIL has highest SD and HBL has lowest SD, NABIL has highest beta coefficient and HBL has lowest beta coefficient but sample banks have aggressive stock and NABIL bank has highest cut of rate among all samples banks.

5.2 Conclusion:

All the banks are able to attract the investors because of their performance. The expected returns of all the banks are above market index. The banks are providing good return to the investors and able to achieve the trust of people. All the banks has beta of greater than 1 that means all the banks has aggressive stock. In the same way it is concluded that S.D. of the four banks is noticed indifferent levels showing the

varying level of risk. Nabil has the highest S.D. whereas HBL has lowest S.D. likewise; coefficient of Variation of these banks falls in the different rang. The CV of SCBL is least among the banks so it can be taken as less risky. The analysis shows that the portfolio risk of SCBL and NIBL is comparatively less than others. By the analysis of single index model, one can construct optimum portfolio and invest on that portfolio giving minimum risk and maximum return.

5.3 Suggestions:

From the analysis of the study, the following recommendation and suggestions can be drawn

1. Investment in single assets is not a possible to minimize risk, diversification of investments makes possible to minimize risk.
2. Nepalese investors have not well known about the portfolios theory and investment strategies; they should have well known to achieve highest return with low risk.
3. NEPSE is the only market of providing information; it is not sufficient and reliable for making investment decision. So NEPSE needs to flow properly information about stock market.
4. Government can play important role to provide information to investors and also launch aware program about stock market through government broadcasting and publishing.
5. All the bank required rate of return are greater than expected rate of return, stock are overpriced. So, investor points of view suggest sells the securities.
6. To reduce risk in future, over priced stock should be sold, when market price will low, purchase the under priced securities.
7. Investor always wants to minimize risk or maximum return. By analysis of different tools and techniques and watching the stock market closely will provide which stock to purchase and when.
8. Investors can also evaluate the risk of the concerned companies by its beta. If beta is greater than 1, that share is risky. If beta is less than 1, that security is less risky.

9. People have liquidity but they are unproductive. Investment in common stock is very risky job. There is not any guarantee in return. So try to find out available best alternative or various investment strategies and best portfolio, which will increase wealth position of the investor and indirectly contribute to the economic growth of nation.
10. With the help of single index model, optimum portfolio to invest 73% in SCBL, 11% in HBL, 10% in Nabil and 6% in NIBL.
11. Last decade, political instability affects the economy of the nation. Now the country is going to the peace process, and we can hope the better economic condition of the nation. This will develop the securities market and its transaction.

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APPENDIX -1

Calculation of Total Dividend

Nabil

Fiscal Year	Closing MPS	DPS	Stock Dividend%	Total Dividend	EPS
061/62	1505	-	-	-	-
062/63	2240	85	-	85	129.21
063/64	5050	100	40 %	2210	137.08
064/65	5275	60	40 %	2019.60	108.31
065/66	4899	35	50 %	1227	106.76
066/67	2384	30	40 %	558	78.61

Total Dividend= DPS + Next years MPS * Stock Dividend%

- $100 + 5275 * 40\% = 2210$
- $30 + 1320 * 40\% = 558$

NIB

Fiscal Year	Closing MPS	DPS	Stock Dividend%	Total Dividend	EPS
061/62	800	-	-	-	-
062/63	1260	20	35.46 %	633.10	59.35
063/64	1729	5	25 %	617.50	62.57
064/65	2450	7.50	33.33 %	470.12	57.87

065/66	1388	20	-	20	37.42
066/67	705	25	-	25	52.55

HBL

Fiscal Year	Closing MPS	DPS	Stock Dividend%	Total Dividend	EPS
061/62	920	-	-	-	-
062/63	1100	30	5 %	117	59.24
063/64	1740	15	25 %	510	60.66
064/65	1980	25	20 %	377	62.74
065/66	1760	12	31.56 %	269.53	61.90
066/67	816	11.84	25 %	165.84	31.80

SCBL

Fiscal Year	Closing MPS	DPS	Stock Dividend%	Total Dividend	EPS
061/62	2345	-	-	-	-
062/63	3775	130	10 %	720	175.84
063/64	5900	80	50 %	3495	167.37
064/65	6830	80	50 %	3085	131.92
065/66	6010	50	50 %	1689.50	109.99
066/67	3279	55	15 %	334.90	77.65

APPENDIX -2

Single Year Holding Period Return

Nabil

Fiscal Year	Closing MPS	Total Dividend	$R = \frac{D_t + (P_t - P_{t-1})}{P_{t-1}}$
061/62	1505	-	-
062/63	2240	85	0.54
063/64	5050	2210	2.24
064/65	5275	2019.60	0.44
065/66	4899	1227	0.16
066/67	2384	558	-0.44

NIBL

Fiscal Year	Closing MPS	Total Dividend	$R = \frac{D_t + (P_t - P_{t-1})}{P_{t-1}}$
061/62	800	-	-
062/63	1260	633.10	1.37
063/64	1729	617.50	0.86
064/65	2450	470.12	0.69

065/66	1388	20	-0.43
066/67	705	25	-0.47

HBL

Fiscal Year	Closing MPS	Total Dividend	$R = \frac{D_t + (P_t - P_{t-1})}{P_{t-1}}$
061/62	920	-	-
062/63	1100	117	0.32
063/64	1740	510	1.05
064/65	1980	377	0.35
065/66	1760	269.53	0.03
066/67	816	165.84	-0.44

SCBL

Fiscal Year	Closing MPS	Total Dividend	$R = \frac{D_t + (P_t - P_{t-1})}{P_{t-1}}$
061/62	2345	-	-
062/63	3775	720	0.92
063/64	5900	3495	1.49
064/65	6830	3085	0.68
065/66	6010	1689.50	0.13
066/67	3279	334.90	-0.40

APPENDIX -3

Standard Deviation and Variance

Nabil

Year	R_j	$R_j - \bar{R}$	$(R_j - \bar{R})^2$
062/63	0.54	-0.06	0.0036
063/64	2.24	1.64	2.6896
064/65	0.44	-0.16	0.0256
065/66	0.16	-0.44	0.1936
066/67	-0.40	-1.00	1.000
Total	2.98		3.9124

$$\sigma^2 = \frac{\sum (R_j - \bar{R})^2}{n-1} = \frac{3.9124}{5-1} = 0.9781$$

$$\sigma = 0.99$$

$$CV = \frac{\sigma}{\text{EMBED Equation.3}} = \frac{0.99}{0.60} = 1.65$$

NIBL

Year	R_j	$R_j - \bar{R}$	$(R_j - \bar{R})^2$
062/63	1.37	0.97	0.9409
063/64	0.86	0.46	0.2116

064/65	0.69	0.29	0.0841
065/66	-0.43	-0.83	0.6889
066/67	-0.47	-0.87	0.7569
Total	2.02		2.6824

$$\sigma^2 = \frac{2.6824}{5-1} = 0.6706$$

$$\sigma = 0.82$$

$$CV = \frac{\sigma}{\text{EMBED Equation.3}} = \frac{0.82}{0.40} = 2.05$$

HBL

Year	R_j	$R_j - \bar{R}$	$(R_j - \bar{R})^2$
062/63	0.32	0.60	0.0036
063/64	1.05	0.79	0.6241
064/65	0.35	0.09	0.0081
065/66	0.03	-0.23	0.0529
066/67	-0.44	-0.70	0.4900
Total			1.1787

$$\sigma^2 = \frac{1.1787}{5-1} = 0.2947$$

$$\sigma = 0.54$$

$$CV = \frac{\sigma}{\text{EMBED Equation.3}} = \frac{0.54}{0.26} = 2.08$$

SCBL

Year	R_j	$R_j - \bar{R}$	$(R_j - \bar{R})^2$
062/63	0.92	0.36	0.1296
063/64	1.49	0.93	0.8649
064/65	0.68	0.12	0.0144
065/66	0.13	-0.43	0.1849
066/67	-0.40	-0.96	0.9216
Total			2.1154

$$\sigma^2 = \frac{2.1154}{5-1} = 0.53$$

$$\sigma = 0.73$$

$$CV = \frac{\sigma}{\text{EMBED Equation.3}} = \frac{0.73}{0.56} = 1.30$$

APPENDIX – 4

Covariance and Beta coefficient

Nabil

Fiscal Year	R_j	$(R_j - \overline{R_j})$	R_m	$(R_m - \overline{R_m})$	$(R_j - \overline{R_j}) * (R_m - \overline{R_m})$
062/63	0.54	-0.06	0.35	0.16	-0.0096
063/64	2.24	1.64	0.77	0.58	0.9512
064/65	0.44	-0.16	0.41	0.22	-0.0352
065/66	0.16	-0.44	-0.22	-0.41	0.1804
066/67	-0.40	-1.00	-0.35	-0.55	0.55
Total					1.6368

$$\text{Covariance } (R_j, R_m) = \frac{(R_j - \overline{R_j}) * (R_m - \overline{R_m})}{n - 1} = \frac{1.6368}{4} = 0.4092$$

$$\text{Beta } (\beta) = \frac{\text{Covariance } (R_j, R_M)}{\text{Var}R_m} = \frac{0.4092}{0.22} = 1.86$$

NIBL

Fiscal Year	R_j	$(R_j - \overline{R_j})$	R_m	$(R_m - \overline{R_m})$	$(R_j - \overline{R_j}) * (R_m - \overline{R_m})$
062/63	1.37	0.97	0.35	0.16	0.1552
063/64	0.86	0.46	0.77	0.58	0.2668
064/65	0.69	0.29	0.41	0.22	0.0638
065/66	-0.43	-0.83	-0.22	-0.41	0.3403

066/67	-0.47	-0.87	-0.36	-0.55	0.4785
Total					1.3046

$$\text{Covariance } (R_j, R_m) = \frac{1.3046}{4} = 0.32615$$

$$\text{Beta } (\beta) = \frac{0.32615}{0.22} = 1.48$$

HBL

Fiscal Year	R_j	$(R_j - \bar{R}_j)$	R_m	$(R_m - \bar{R}_m)$	$(R_j - \bar{R}_j) * (R_m - \bar{R}_m)$
062/63	0.32	0.060	0.35	0.16	0.0096
063/64	1.05	0.70	0.77	0.58	0.406
064/65	0.35	0.09	0.41	0.22	0.0198
065/66	0.03	-0.23	-0.22	-0.41	0.0943
066/67	-0.44	-0.70	-0.36	-0.55	0.385
Total					0.9147

$$\text{Covariance } (R_j, R_m) = \frac{0.9147}{4} = 0.2287$$

$$\text{Beta } (\beta) = \frac{0.2287}{0.22} = 1.04$$

SCBL

Fiscal Year	R_j	$(R_j - \overline{R_j})$	R_m	$(R_m - \overline{R_m})$	$(R_j - \overline{R_j}) * (R_m - \overline{R_m})$
062/63	0.92	0.36	0.35	0.16	0.0576
063/64	1.49	0.93	0.71	0.58	0.5394
064/65	0.68	0.12	0.41	0.22	0.0264
065/66	0.13	-0.43	-0.22	-0.41	0.1763
066/67	-0.40	-0.96	-0.36	-0.55	0.528
Total					1.3277

$$\text{Covariance } (R_j, R_m) = \frac{1.3277}{4} = 0.3320$$

$$\text{Beta } (\beta) = \frac{0.3320}{0.22} = 1.51$$

APPENDIX -5

Systematic Risk

Banks	β_j	β_j^2	σ_m^2	Systematic Risk
Nabil	1.86	3.4596	0.22	0.761
NIBL	1.48	2.1904	0.22	0.482
HBL	1.04	1.0816	0.22	0.238
SCBL	1.51	2.2801	0.22	0.502

$$\text{Systematic Risk} = \sigma_m^2 * \beta_j^2$$

Unsystematic Risk

Banks	Total Risk(σ_j^2)	Systematic Risk	Unsystematic Risk (Total risk- Systematic risk)
Nabil	0.9781	0.761	0.2171
NIBL	0.6706	0.482	0.1886
HBL	0.2947	0.238	0.0567
SCBL	0.53	0.502	0.028

APPENDIX -6

Calculation of Cut of Rate (C_j)

$$\text{Cut of Rate}(C_j) = \frac{\sigma_m^2 (R_j - R_f) \beta_j}{\sigma_{ei}^2} \div \left(1 + \sigma_m^2 \frac{\beta_j}{\sigma_{ei}^2} \right)$$

$$\text{Nabil} = \frac{0.19 \frac{(0.60 - 0.094) * 1.86}{21.71}}{1 + 0.19 \frac{1.86^2}{21.71}} = \frac{0.00824}{1.0303} = 0.008$$

$$\text{NIBL} = \frac{0.19 \frac{(0.40 - 0.094) * 1.48}{18.86}}{1 + 0.19 \frac{1.48^2}{18.86}} = \frac{0.0045624}{1.0221} = 0.0045$$

$$\text{HBL} = \frac{0.19 \frac{(0.26 - 0.094) * 1.04}{5.56}}{1 + 0.19 \frac{1.04^2}{5.56}} = \frac{0.005785}{1.0362} = 0.0056$$

$$SCBL = \frac{0.19 \frac{(0.56 - 0.094) * 1.51}{2.8}}{1 + 0.19 \frac{1.51^2}{2.8}} = \frac{0.04775}{1.15472} = 0.041$$

Calculation of Z value

$$Z_j = \frac{\beta_j}{\sigma_{ei}^2} \left(\frac{(R_j - R_f)}{\beta_j} - C^* \right)$$

$$Nabil = \frac{1.86}{0.2171} \left(\frac{0.60 - 0.094}{1.86} - 0.041 \right) = 2$$

$$NIBL = \frac{1.48}{0.1886} \left(\frac{0.40 - 0.094}{1.48} - 0.041 \right) = 1.30$$

$$EBL = \frac{1.04}{0.0567} \left(\frac{0.26 - 0.094}{1.04} - 0.041 \right) = 2.18$$

$$SCBL = \frac{1.51}{0.028} \left(\frac{0.56 - 0.094}{1.51} - 0.041 \right) = 14.43$$