A STUDY OF APPLICATION OF PORTFOLIO THEORY IN FINANCIAL INSTUTIONS OF NEPAL

A Thesis Submitted to
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DECLARATION

I here by declare the thesis entitled "A STUDY OF APPLICATION OF PORTFOLIO THEORY IN FINANCIAL INSTUTIONS OF NEPAL" submitted to the office of the Dean, Faculty of Management, Tribhuvan University is my original work, which is prepared as partial fulfillment of the requirement for Master's Degree of Business Studies (MBS) under the supervision of Mr. Rajendra Lamsal, Lecture of Lumbini Banijya Campus.

……..

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Recommendation

This is certify that the Thesis

Submitted by

Keshab Prasad Khanal

Entitled

"A STUDY OF APPLICATION OF PORTFOLIO THEORY IN FINANCIAL INSTUTIONS OF NEPAL"

Has been prepared as approved by this department in the prescribed format of Faculty of Management. This theis I forared for examination.

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Depart.	

Date:

Viva- Voce Sheet

We have conducted the viva voce examination of the thesis presented by

Keshab Prasad Khanal

Entitled

"A STUDY OF APPLICATION OF PORTFOLIO THEORY IN FINANCIAL INSTUTIONS OF NEPAL"

And found the thesis to be the original work of the student written according to the prescribed format. We recommended the thesis to be accepted as partial fulfillment of the requirement for the Master's Degree in Business Studies (MBS)

Viva – Voce Committee

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Date:

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATION

AFC	=	ANNAPURNA FINANCE COMPANY
EIC	=	EVEREST INSURANCE COMPANY
HB	=	HIMALAYAN BANK
KFL	=	KATHMANDU FINACE LIMITED
NFC	=	NATIONAL FINANCECOMPANY
NLGIC	=	NATIONAL LIFE AND GENERAL INSURANCE COMPANY
NAB	=	NABIL BANK
NFSC	=	NEPAL FINANCE AND SAVING COMPANY
NIC	=	NEPAL INSURANCE COMPANY
UIC	=	UNITED FINANCE COMPANY
SD	=	STANDARD DEVIATION
i. e.	=	THAT IS
VIZ.	=	VISUALLY
ROA	=	RETURN OF ASSETS
ROE	=	RETURN ON EQUITY
T.U	=	TRIBHUVAN UNIVERSITY
X	=	MEAN RETURN
C.V.	=	COEFFICIENT OF VARIATION
¢	=	STANDARD DEVIATION
¢*p*	=	PORTFOLIO STANDARD DEVIATION
WTO	=	WORLD TRADE ORGANIZATION
FY	=	FISCAL YEAR
HRD	=	HUMAN RESOURCE DEPARTMENT
TU	=	TRIBHUVAN UNIVERSITY

CHAPTER 1

INTRODUCTION

1.1Background of the Study

Due to the wave of industrial revolution many financial supporter like commercial banks, industrial development bank, investment bank, Finance Company and insurance company established to fulfill the capital requirement of the business organization and the root of financial market took its place.

Our country is divided into mountain, hills and terai regions geographically. Most people are farmers. There is very little properly cultivated land for agricultural activities. Economic status of the people is growing only at a pace. There are many more activities like developing roads, transport, electricity and tourism necessary to be developed to support the economics growth of our country in the world. For the growth and development of economy of a country, industrialization plays vital role. There are lots of examples regarding the rapid economic growth of countries because of industrialization. In the context Nepal, business and commercial sector is just Creeping now. The majority of the people are engaged in agriculture. Hence the business and commercial sector is backward so, far than other developed country. Of the restoration of the democracy, Private sectors are started playing crucial role for the economy development of the country. Many public Enterprises Converted into private company and the process of privatization is steel going on. Various Financial supporters like commercial banks, development banks and others financial institutions were established.

Financial management involves the solution of the three major decisions. i.e., investment decision, financing decision and dividend decision. (A.S. Dewing, 1993) A firm strives to solve jointly for an optimal combination of the three interrelated decisions to achieve the objectives of maximizing the value of the firm to its shareholders. The investment decision is the most important of the three decisions, when it comes to the creation of the value. It is mainly concerned with selecting new investment, managing current assets maintaining proper mix of liquidity, establishing credit policy and controlling the level of investors. Apart

from above investment decision is also important for mergers and acquisitions. Financing decision is concern determining the best capital structure to maximize market price per share, selection of financial instruments, re-arranging existing sources, reduction of financial risk through hedging and negotiating and developing relationship with capital suppliers and dividend decision concern with how the firm pays a return to all different types of investors for the use of their funds. it includes the percentage of earnings paid to stockholders in cash dividends, the stability of absolute dividends about a trend, stock dividends, splits and the repurchase of stock, all these analyzed in relation to the financing decision. Generally all decision makers are risk averse and prefer higher mean return and lower risk of return. Investors usually don't like to invest only single assets; rather they prefer to invest in portfolio of assets. Portfolio of assets usually offers the advantages of reducing risk through diversification. The total risk of investment may be reduced/ diversified by selecting a portfolio of securities. Portfolios theory deals with the selection of optimal portfolios, which provide the higher possible return for any specified degree of risk/ the lowest possible risk for any specified rate of return. (D.M Muir, 1980) A fundamental aspect of portfolio theory is the idea that the riskiness intrinsic in any single asset held in portfolio is different from the riskiness of that asset held in isolation. In general most of the investors are risk averters. They always expect higher return for taking more risk as risk premium. The primary problem in investment is to identify that security which is low risk and high return. Although, return cannot be increased substantially, risk can be reduced by diversification of funds in different stocks by making a portfolio which can eliminate the unsystematic risk that is not explained by general market movement. Systematic risk, which is associated with which in return on the market on the market as a whole, cannot be avoided by the diversification of investment in the different portfolio.

An empirical study made by Wagner and Lau (1971) can be taken as an example of diversification. They took a sample of 200 NYSPSE stock, divided the stocks in 6 sub-groups and constructed portfolio using 1 to 20 randomly selected securities applying equal weights to each security. They found that as the number

of securities in the portfolio increases the standard deviation (risk) of portfolio returns decreases.

Therefore, when a financial decision is being made the answer of the following questions must be sought after- what is the expected returns? What is the total risk of investment in single asset? What is the total risk of investment in portfolio of securities? How much risk can be diversified? This study is directed towards the above question i.e., the portfolio theory analysis of a number of Nepalese financial Institutions.

1.2 Focus of the Study

Every rational investor seeks to invest in such a way that risk is low and return is high. Different investors prefer different nature of return. Some prefer short term cash inflow and gives lesser value to more isolated returns and may buy the shares of those firms that would pay large cash dividend, other May concerns with growth. They invest in such projects that offer the long term returns which are higher than average growth of sales and earnings of the market. Others might seek firm to invest having high return on investment on return on equity. Thus, investors prefer high return that includes cash income plus accrued capital gain to invest

The focus of the study is the measurement of returns in terms of number of financial ratios and risk associated in single asset and portfolio of assets in terms of standard deviation, portfolio standard deviation and coefficient of variation of those ratios. This study seeks empirical evidence of portfolio theory that whether portfolio risk can be diversified by investing in different securities.

This study is also concerned with whether the highest possible return be achieved for any specified degree of risk and whether the possible risk can be reduced for any specified rate of return.

1.3 Statement of the Problem:-

Risk - return analysis is essential tool in the area of investment because by using risk and return analysis, investor can find the less risky and higher return investment alternatives from the different investment alternatives in the financial institutions. A portfolio is a combination of individual assets/ securities. Portfolio theory usually offers the advantage of reducing risk through diversification. The total risk of investment may be reduced / diversified by selecting a number of securities to make investment rather than investing entire wealth in a single assets/ security.

More apparently, the standard deviation of the return on the portfolio of assets may be less than the sum of standard deviation of the returns from the individual asset. A basic aspect of portfolio theory is that the riskiness inherent in any single asset held in a portfolio is less than that asset held in isolation. This shows that the total risk can be reduced by investing in different assets. However, there seems no sufficient empirical evidence available to support these theoretical propositions.

The main problem is lack of information to analyze the risk and return on securities. Alternatively some of the previous researchers in their studies and researched in the limited areas such as expected return. Standard deviation, coefficient of variation gives per unit risk of asset but ignores to give the decision what happens when the expected return is negative. In this study, following issues are to be dealed for the purpose of the study and these have identified as the problem area of the study.

I. What Nepalese investors should consider more risk/ return?

II. What is risk and return of financial institutions?

III. How risk and return are correlated?

IV. What is diversifiable and un -diversifiable - risk?

V. How to diversify the risk of assets?

VI. Which are higher risk/ return?

1.4 Objectives of the Study:-

The basic objectives of the study are to analyze and identify the risk inherent in any single asset held in portfolio and the risk of that held in isolation and whether the risk can be diversified, the objectives of this study are given as follows.

1. To examine whether the risk can be diversified by investing in portfolio of assets.
2. To examine the differentiation of riskiness inherent in any single asset held in portfolio from the riskiness of that asset held in isolation.
3. To examine whether highest possible return of portfolio can be achieved for any specified degree of risk.
4. To examine whether the possible risk be reduced for any specified rate of return.
5. To assess the relationship between risk and return.

1.5 Significance of the Study:-

This study has both theoretical as well as practical importance. This study and its findings will add to the literature of the portfolio theory in general and to the Nepalese literature of financial theory in particular.

This study will also have empirical evidence. The findings of the study will be important to the firms under study in making their financial decisions as all these decisions have risk reduction implications.

The study will also be significant for individual investors who are willing to invest in securities of the firms under study.

The findings and conclusion of the study will help to investors to select portfolio of securities possessing lowest risk and to help government in making policy regulating, controlling. Monitoring and supervising.

This study is also supposed to be significant for more researchers and the scholars who want to study the portfolio theory in the Nepalese context.

1.6 The Theoretical Framework

While selecting investment alternatives, the first task of investors is to identify the amount of the return and the risk associated with the investment.

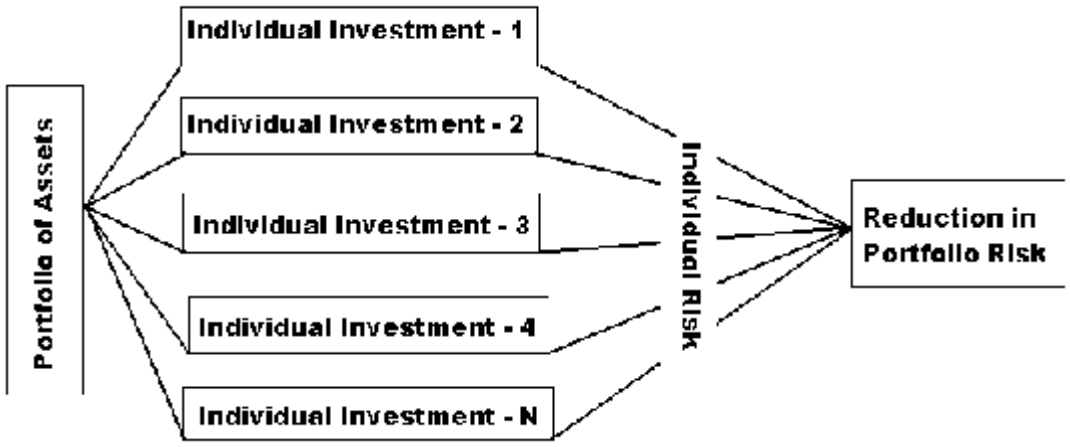
" The amount that invested money will earn is called in investment return" (Cheney and mosses, 1982:28)

And risk can be defined as a chance of loss.

" Risk can be financial loss or more formative the variability of returns associated with given assets" (Gitman 1988: 211)

The risk of portfolio isn't a simple average of the standard variation of the individual securities constitutions the portfolio but also on the relationship among securities.

The theoretical framework of reduction in portfolio risk can be presented as follows:



1.7. Hypothesis of the Study

Following at the Null hypothesis (H_0) and alternative hypothesis (H_1) formulated for the propose of the study.

1. Null hypothesis:

H_o: The risk can be diversified by investing indifferent assets of financial institution of Nepal.

Alternative hypothesis

H_1: The risk can not be diversified by investing indifferent assets of financial institution of Nepal.

2. Null hypothesis:

Ho: There is significant different between individual risk associated in portfolio of assets and in single assets of financial institution of Nepal.

Alternative hypothesis

H1: There is no significant different between individual risks associated in portfolio of assets and in single assets of financial institution of Nepal.

3. Null hypothesis:

H0: There is no significant relationship between the levels of return with specified level of risk.

Alternative hypothesis

H0: There is significant relationship between the levels of return with specified level of risk.

4. Null Hypothesis

H1: There is significant relationship between the levels of risk with specified level of return.

Alternative hypothesis

H1: There is no significant relationship between the levels of risk with specified level of return.

1. 8 Limitation of the Study:-

This study will be simply presented to fulfill a partial requirement of MBS program with in certain time period. Mainly this study has following limitations.

a. As the study is based on historical date, the expected return and risk associated with such returns could not be calculated. Only realized return and risk could be calculated.

b. The date used in the study is of secondary natures which are extracted from listed firms of Nepal Stock Exchange. The inherent limitations of the date used in the study associated in the preparation of the financial statements are also one of the limitations of the study
c. The sample for the study has been selected are small as the listed companies of Nepal Stock Exchange are small and only few number of company's security traded in the market.
d. Some of the data are taken on the verbal information of the management of the company. The validity and confidence of the data depends on their faithful and trust worthiness.

1.9 Organization of the Study:-

The entire thesis is divided in to five chapters. The first chapter presents the background of the topic of research study, focus of the study, statement of the problems, importance of the study, limitation of the study etc.

The second chapter is concerned with the conceptual framework and review of previous studies.

The third chapter presents the research methodology used in the study which includes research design, population and sample, nature and type of date, sources of data collection technique, data analysis tools, limitation of the methodology etc.

The fourth chapter presents data analysis and interpret them in appropriate manner using suitable techniques and point out the important findings of the study.

At last, the fifth chapter presents summary of the study and provides the conclusion of the study and recommendation of the study for the financial decisions.

CHAPTER 2

REVIEW OF LITERATURE

This part includes the definition of risk- return of individual and portfolio of assets, theoretical framework risk return theories and review of previous study.

2.1 Theoretical Review

Risk can be measured by the variance of return or by the square root of the variance; which is called the standard deviation, ¢ (R) and that return is measured by the expected return, E (R) (Thomas E. Cope land,1989)

The mean and variance of single asset.

The mean or average return is defined as the probability of observing each rate of return pi multiplied by the rate of return Ri and the summed across all possible return mathematically the mean return is defined as flows:

$$E(r) = \sum_{i=1}^{N} Pi \quad Ri$$

The Variance of return (given that we have subjective probity estimates and not sampling statistics) is defined as the average of the mean squared error terms. A mean squared error is simply the square of the difference between a given return, Ri and the average of all returns E(r).

Mean squared error = [Ri - E (r)] 2

The variance is the expectation (or average) or these terms in other words, each mean squared error is multiplied by the probability, Pi, that it will occur and then all terms are summed. The mathematical expression for the variance of return is.

$$Var(R) = E\{(Ri - E(r)^2\}$$

$$= \sum_{i=1}^{N} Pi\{Ri - E(R)\}^2$$

Usually, we express risk in terms of the standard deviation, rather than the variance of returns. The standard deviation just the square root of the variance.

$$¢(R) = \sqrt{VAR(R)}$$

The mean and Variance of portfolio of Assets Portfolio of assets usually offer the advantage of reducing risk through diversification. The standard deviation of the returns of the portfolio of Assets. May be less than the sum of the standard deviation of the returns from the individual assets.

The Expected Return on a portfolio of Assets A portfolio is defined as combination of assets. Portfolio theory deals with the selection of optimal portfolio that is portfolio that provides the highest possible returns for any specified degree of risk or the lowest possible risk for any specified rate of return.

The rate of return on portfolio is always s weighted average of the returns of the individual securities in the portfolio. So we can write the return on a portfolio of assets as:

$$Rp = WRs + (1 - w)Rc$$

Where,

W is the percentage invested in security S and (1-w) is the remaining portfolio. The expected rate of return on the portfolio is:

$$E(Rp) = wE(Rs) + (1 - w)E(Rc)$$

Here, E (Rp) is the expected return on the portfolio.

The Variance of the Portfolio.

A fundamental aspect of portfolio theory is that riskiness inherent in any single asset held in portfolio is different from the riskiness of that asset held in isolation. It is possible for given asset to be quite risk when held in isolation but Not very risky if held in a portfolio. Variance of the portfolio is given by

$$= \frac{N}{\sum_{i=1}} Pi\{Ri - E(R)\}^2$$

and the return and expected return on a two asset portfolio are defined as

$$Rp = wRs + (1-w)Rc$$

$$E(Rp) = wE(Rs) + (1-w)E(Rc)$$

By squaring the term in brackets and rearranging terms, we have.

$$VAR(Rp) = \sum_{i=1}^{N} PiW^2[Rs - E(Rs)]^2 + \sum_{i=1}^{N} 2PiW(1-W)[Rs - E(Rs)]$$

$$[Rc - E(Rc) + \sum_{i=1}^{N} Pi(1-w$$

The first of this assets is W-squared terms the variance of the first asset, S

$$W^2Var(Rs) = W^2 \sum_{i=1}^{N} Pi\,[\text{Rs-E (Rs)}]^2$$

This Third term is (1-W) Square the variance of the second assets, C

$$(1-W)^2VAR(Rc) = (1-W)^2 \sum_{i=1}^{N} Pi\,[\text{Rc-E (Rc)}]^2$$

The Middle term, the cross product term, id defined as the product of the portfolio weights, W (1-W), times twice the covariance between the returns on the two assets.

$$2W(1-W)\quad Cov(Rs,Rc) = 2W(1-W) \sum_{i=1}^{N} Pi\,[\text{Rs-E (Rs)}]\ \ [\text{Rc-E (Rc)}]$$

And the definition of covariance is simply.

$$Cov(Rs,Rc) = \sum_{i=1}^{N} Pi\,[\text{Rs-E (Rs)}]\ \ [\text{Rc-E (Rc)}]$$

Thus the variance of a portfolio of two risky assets not merely the sum of their separate variance. It also includes the covariance between them. Thus the expression for the variance of a portfolio of two risky assets is

$$VAR(Rp) = W^2VAR(Rs) + 2W(1-W)\quad Cov(Rs,Rc) + (1-W)^2 .....VAR(Rc)$$

Return, is the benefit associated with ownership include the cash dividends paid during the year together with an appreciation in market price, or Capital gain realized. More formally, the one period return is. (James C. Van Horne)

$$R = \frac{Dividends + (Ending \quad \Pr ice - Beginning \quad \Pr ice)}{Beginning \quad \Pr ice}$$

When, the term in parenthesis in the numerator is the capital gain or loss during the holding period.

Risk can be thought of as the possibility that actual return from holding a security will deviate from the expected return. The greater the magnitude of deviation and the greater the probability of its occurrence, the greater is said to be risk of the security. The provability distribution can be summarized in terms of two parameters. The expected return and the standard deviation. The expected return is.

$$\bar{R} = \sum_{i=1}^{N} Ri, Pi$$

Where Ri is the return for the its possibility, Pi is the probability of concurrence of that return, and n is the total number of possibilities. The Standard deviation is.

$$¢ = \sqrt{\sum_{1=1}^{N} (Ri - \bar{R})^2 \quad Pi}$$

Where $\sqrt{\ }$ represents the square root. It also can be expressed as []2

The square of Standard deviation $¢^2$ is known as the variance of the distribution.

Security portfolios

For a portfolio of two or more securities, the expected return, Rp is

$$rp = \sum_{J=1}^{m} Rj, \quad Aj$$

Where Rj is the expected return on security J, Aj is the proportion of total funds invested in security j, and m is the total number of securities in the portfolio,

the Greek sigma denotes the summation from security 1 through security n. The above equation merely says that the expected return for a portfolio is a weighted average of expected returns for securities making up that portfolio.

Portfolio Risk

The risk of portfolio is not a simple weighted average of the standard deviation of the individual securities. Portfolio risk depends not only on the riskiness of the securities constituting the portfolio but also on the relationship among those securities. By selecting securities that have little relationship with each other, an investor is able to reduce relative risk, diversification combining securities relative risk is reduced. (J.C. Francis, 2001)

The standard deviation of the portfolio is

$$¢p = \sqrt{\frac{N}{\sum_{1=1}} (Ri - \bar{R})^2 \quad Pi}$$

Where,

¢*p* = Portfolio standard deviation

Ri = Return for the it probability

R= expected return

Pi= Probability of concurrence of that return

n= the total number of possibilities,

The portfolio standard deviation is less than the weighted average of the individual standard deviation. One cannot n general calculate the standard deviation of a portfolio's returns simply by taking the weighted average of the standard deviation for the individual securities. The standard deviation of a probability distribution of possible portfolio of return is.

$$¢P = \sqrt{\frac{n}{\sum_{j=1}} \frac{n}{\sum_{k=1}} Aj \quad Ak \quad ¢ \quad jk}$$

Where,

N, is the total number of securities in the portfolio. Aj is the proportion of the total fund invested in security j, Ak is proportion invested in security k, and $¢jk$ is the covariance between possible returns for securities j and k. The two $\sum$ is the covariance for all possible pair wise combination of securities in the portfolio. The covariance of the possible returns of two securities is a measure of the extent to which they are expected to vary together rather than independently of each other. More formally, the covariance.

$$¢jk = rjk \quad ¢j \quad ¢k$$

Where rjk is the expected correlation between possible returns for securities j and k, $¢j$ is the standard deviation for security j and $¢k$ is the standard deviation for security k.

2.2 Reviews from Books

FINANCIAL MANAGEMENT

Risk and return are most important concept in finance and foundation of modern finance theory. **(**I.M. Pandey, 2003)

Risk and Return of Single Asset.

The rate of return of a share held for one year is as follows.

Return = Dividend yield + Capital gain

$$R = \frac{Div}{P_o} + \frac{Pi - P_o}{P_o}$$

Where, R= Rate of return

$\frac{Div}{P_o}$ = Dividend yield

$\frac{Pi - P_o}{P_o}$ = Percentage of capital gain

The average rate of return is the sum of the various the period rates of return divided by the number of periods, the formula for the average rate of return is as follows:

$$\bar{R} = \frac{1}{n}[R1 + R2 + ...Rn]$$
$$= \frac{1}{n}\sum_{t=1}^{n} Rt$$

Where, $\bar{R}$ is the average rate of return, R1, R2 …….Rt, the observed rates of return in periods 1, 2……t and n the total number of periods.

The variance can be calculated as.

$$Var = ¢^{2} = \frac{1}{n}\sum_{t=1}^{n}(Rt - \bar{R})^{2}$$

and standard deviation is the square root of the variance

Standard Deviation = $\sqrt{Var}$

$$¢ = \sqrt{\frac{1}{n}\sum_{t=1}^{n}(Rt - \bar{R})^{2}}$$

Instead of using historical dada for calculating return and risk, we may use forecasted data. The following equation can be used to calculate the expected rate of return.

$E(R) = Ri \times Pi + R_2 \times R_2 + \ldots\ldots\ldots R_n P_n$

$$E(R) = \sum_{t=1}^{n} Ri \quad Pi$$

Where E(R) is the expected rate of return, Ri the outcome i, Pi is the probability of the occurrence of I and n the number of outcomes.

The following formula can be used to calculate the variance of returns.

$$¢^{2} = [Ri - E(R)]^{2} \quad Pi + [R2 - E(R)]2 \quad P_2 + ...[Rn - E(R)]^{2} Pn$$

$$= \sum_{t=1}^{n}[Ri - E(R)^{2}]Pi$$

and the standard deviation is the $¢ = \sqrt{¢}^{2}$

Portfolio Theory and Risk Diversification.

The portfolio theory provides a normative approach to the investor's decision to investment in assets or securities under risk. It is based on the assumption that investors are risk averse. This implies that investor hold well diversified portfolios instead of investing their entire wealth in a single assets or security. A portfolio is a bundle or combination of individual assets or securities. of investor holds a well diversified portfolio, then his concern should be the expected return and risk of portfolio rather than individual assets. The second assumption of the portfolio theory is that returns of securities as normally distributed. This means that the mean (the expected value) and Variance (or standard deviation) analysis the foundation of the portfolio decisions. (J.C.Francis, 1995)

Portfolio Returns: Two-asset Case

A portfolio is a bundle on combination of individual assets or securities. The return of a portfolio is equal to the weighted average of the returns of individual assets in the portfolio with weights beings equal to the proportion of investment in each asset.

In the case of two-asset portfolio, the expected rate of return in given by the following equation.

$$E(Rp) = WE(Rx) + (1 - W) \quad E(Ry)$$

Where, E (Rp) is the expected portfolio return, E (Rx) is the expected return on x and E (Ry) is the expected return on Y, W is the proportion of investment in asset x and (1-W) the remaining investment in asset Y.

Measuring Portfolio Risk

Like in this case of individual assets or securities, the risk of a portfolio could be measured in terms of its variance or standard deviation, However, the variance C on standard deviation) of a portfolio is not simply the weighted average of variance (or standard deviation) of individual securities. The portfolio

variance is affected by the association of movement of returns of two securities. Covariance of two securities measures their co-movement. Three steps are involved in the calculation of covariance between two securities.

1. Determine the expected returns for securities.
2. Determine the deviation of possible returns from the expected return for each security.
3. Determine the sum of the product of each deviation of returns of two Securities and probability.

The covariance of returns of securities can be calculated as follows:

$$Covxy = \sum_{t=1}^{n} Pi\left[Rx - E(Rx)\right]\ \left[Ry - E(Ry)\right]$$

Where,

Cov xy B the covariance of returns of securities x and y, Rx and Ry returns of securities x and y respectively, E (Rx) and E (Ry) expected returned of x and y respectively and Pi probability of occurrence of the state of economy i.

The covariance is also a measure of both the standard deviations of the securities and their association. The covariance can also be calculated as follows:

$$Covxy = ¢x.¢y \quad Corxy$$

Where, $¢x$ and $¢y$ are standard deviations of returns for securities x and y and Cov xy is the correlation Co-efficient of securities x and y. Correlation ship measures the linear relationship between two variables (in the case of two securities, x and y) which can be calculated as follows:

$$Cov \quad xy = \frac{Covxy}{¢x.¢y}$$

The risk of portfolio of x and y has considerably reduce due to the negative correlation returns of securities X and Y. In practice, the correlation coefficient of returns of securities may vary between t1.0 and -1.0.

Perfectly positive correlation: when the returns of two securities as perfectly positively correlated, the portfolio variance is just equal to the variance of

individual securities. The combination of securities is as risky as the individual securities.

Perfectly negative correlation: if the returns of securities are perfectly negatively correlated, the portfolio variance is zero. The combination of securities completely reduces the risk.

Weak positive correlation: The portfolio variance under weakly positive correlation is less than the variance of individual securities.

Weak negative correlation: The portfolio variance under weakly negative correlated returns of two securities has reduced more than when the returns were weakly positively correlated.

A total reduction of risk is possible if the returns of two securities are perfectly negatively correlated. Such perfect negative correlation will not generally be found in practice. Securities do have a tendency of moving together to some extent, and therefore, risk may not be totally eliminated. Mark Ovitz summarizes the risk reduction through diversification in the following words:

If security returns are not correlated, diversification could eliminate risk. it would be like flipping a large number of coins, we cannot predict with confidence the out come of a single flip, but if a great many coins are flipped. We can be virtually sure that heads will appear approximately one half of them. Such cancel ling out of chances events provides stability to the disbursement of insurance companies. Correlation among security return however prevent a similar market. If correlation among security returns were perfect. If returns of all securities moved up and down together in perfect unison diversification could do nothing to eliminate risk. The fact that security returns are highly correlated implies that diversification can reduce risk but not eliminate it.

Principles of managerial Finance.

Each financial decision possesses retain risk and return characteristics, and all major financial decisions must be viewed in terms of expected risk, expected return and their combined impact on share price. (Lawrence J. Gitman, 1994)

Risk Defined

In the most basic sense, risk can be defined as the chance of loss Assets having greater chances of loss are viewed as more risk than those perfectly negatively correlated series, the perfectly positively correlated senses move exactly together, while the perfectly negatively correlated series move in exactly opposite direction.

Standard Deviation.

The most common statistical measure of an asset's risk is the standard deviation from the mean of expected value of return. The standard deviation of a distribution of asset returns represents the square root of the average squared deviations of the individual outcomes for the expected value. The first step in calculating the standard deviation of a distribution of returns is to find the expected value. (J.C. Francis, 1998)

$\overline{K}$ This is given by following equation:

$$\overline{K} = \sum_{i=1}^{n} Ki \times \Pr i$$

Where,

ki = The return for i th outcome

Pri = the probability of occurrence of i th return

n = the number of outcomes considered.

The expression for the standard deviation of the probability distribution of returns is given by following equation:

$$¢K = \sqrt{\sum_{i=1}^{n} (Ki - \overline{K})^2 \times Pi}$$

It can be seen from this above equation that the standard deviation represents the square root of the sum of the product of each deviation from the

expected value. K squared and the associated probability of occurrence. The formula commonly used to find the standard deviation of returns in a situation

Where, all the outcomes are known and their related probabilities are assumed equal is:

$$¢K \sqrt{\frac{\sum_{i=1}^{n} (Ki - \overline{K})^2}{n}}$$

Where n is the number of observations.

Coefficient of variation

In comparisons of assets with differing expected value the use of standard deviation can easily be improved upon by converting the standard deviation into a coefficient of variation. The Coefficient of variation, cv is calculated by dividing the standard deviation, $¢K$, for an asset by its expected value(E. F. Brigham,2001) $\overline{K}$ The following equation presents the equation for the coefficient of variation.

$$CV = \frac{¢K}{\overline{K}}$$

Correlation:

In order to diversify risk to create an efficient portfolio, which is one that allows its owner to achieve the maximum return for given level of risk/ to minimize risk for a given level of return, the investor must understand the concept of correlation? Correlation is a statistical measure of the relationship. If any between series of number representing anything from return to test data. If two series move together, they are possible direction, they are negatively correlated. The statistical measure of correlation, the correlation coefficient correlated. The statistical measure of correlations, the correlation coefficient has a range of + 1 for the perfectly positively correlated series and – 1 for the perfectly correlated series move exactly together while the perfectly negatively correlated series move in exactly opposite direction. (Rana Surya B, 2003)

Diversification:

In order to reduce overall risk, it is best to combine or add to the existing portfolio assets that have a negative (or law positive) correlation with existing assets. By combining negatively correlate4d assets, the overall variability of returns on risk, ok can be reduced. The creation of a portfolio by combining two assets having perfectly positively correlated returns can't reduce the portfolio's overall risk below the risk of the least risk asset, while the creation of a portfolio by combining two assets that are perfectly negatively correlated can reduce the portfolio's overall risk below the risk of the least risk asset, while the creation of a portfolio by combining two assets that are perfectly negatively correlated can reduce the portfolio's total risk to a level below that of either of the component assets, which in certain situations may be zero. Combining assets with correlations falling between perfect positive and perfect negative can therefore reduce the overall risk of portfolio. (E. F. Brigham, 2001)

Fundamentals of Financial Management.

Defining and measuring Risk.

Risk is defined in Webster's as "a hazard: a peril: exposure to loss or injury." Thus, risk refers to the chance that some unfavorable event will occur. Investment risk, then, is associated with the probability of losses. The greater the chance of loss, more risky the investment. The expected rate of return on stock (Eugene F. Brigham)

$\hat{K}s$ as the sum of the expected dividend yield plus the expected capital gain

$$\hat{K}s = D1/P0 + g$$

Expected rate of Return.

If we multiply each possible outcome by its probability of occurrence and then sum these products, we have a weighted average of out comes. The weights are the probabilities, and the weighed average is defined as the expected rate of

return. The expected rate of return calculation can also be expressed in equation format.

Expected rate of return = $\hat{K} = \sum_{i=1}^{n}$

Here,

Ki is the ith possible outcome, Pi is the probability of the i^{th} outcome, and n is the number of possible outcomes. Thus, K is a weighted average of the po0ssible outcomes (the Ki values) with each outcome's weight being equal to its probability of occurrence.

Measuring Risk: The Standard Deviation.

To be must useful, any measure of risk should have a definite value. We need a measure of the tightness of the probability distribution. One such measure is the standard deviation. The symbol for which is, pronounced "sigma". The smaller the standard deviation, the tighter the probability distribution and accordingly the lower the riskiness of the stock to calculate the standard deviation, we proceed as follows:

Calculate the expected rate of return:

Expected rate of return = $\hat{K} = \sum_{i=1}^{n} pi, ki$

Subtract the expected rate of return from each possible outcome to obtain a set of deviations about the expected rate of return:

Deviation **i** = $Ki - \hat{K}$

Square each deviation, multiply the squared deviation by the probability of occurrence for its related outcome, and sum these products to obtain the variance of the probability distribution:

Variance = ¢ = $\sum_{i=1}^{n} (Ki - \hat{K})^2 . Pi$

The standard deviation is found by obtaining the square root of the variance.

Standard Deviation: $= ¢ = \sqrt{\frac{n}{\sum_{i=1}} (Ki - \hat{K})^2 .Pi}$

Portfolio Risk

Most financial assets are not held in isolation: rather: they are held as parts of portfolios. Bank, pension fund, insurance companies, mutual fund, and other financial institutions are required by law to hold diversified portfolios. From an investor's stand point the fact that a particular stock goes up or down is not very important what is important is the value of the portfolio and the portfolio's return. (Weston J.F, 1994)

What Condition is necessary for diversification to cause the riskiness of a portfolio to be less than the riskiness of the individual assets contained in the portfolio? The only condition necessary it that the returns of the socks in the portfolio do not move exactly together. For diversification to be effective, returns must not be perfectly positively correlated. Since most stock is not perfectly correlated, diversification generally reduces, but does not eliminate some of the riskiness of a portfolio, but not all of it. Thus, risk consists of two parts.

1. Company specific, or diversifiable, risk, which can be eliminated by adding enough securities to the portfolio and
2. Market, non diversification, risk, which is related to broad swings in the stock market and which can not be eliminated by diversification.

Company risk is caused by such things as lawsuits, strikes, successful and unsuccessful marketing programs etc. Market risk, on the other hand, stems from such things as inflation recessions. And high interest rates, factors which affect all firms.

The minimum variance (Standard Deviation) Portfolio

It is always a difficult question what amount of fund (i.e. percentage of fund) to invest in particular asset to reduce ask. The concept of standard deviation

and their correlation between the returns of the given assets attempts to solve such a problem, in the case of two assets, i.e., X and Y, portfolio, the percentage of fund invested is obtained by:

$$Wx = \frac{¢y(¢y - Pxy\,¢x)}{¢x + ¢y - 2\,pxy\,¢x.¢y}$$

Where,

Wx = Weight or percentage of fund to be invested on the asset x to Minimize the risk.

$¢y$ = Standard Deviation of asset y

Pxy = Correlation coefficient between the returns of asset X & Y.

$¢x2$ = Variance of the returns of asset X

$¢y2$ = Variance of the returns of asset Y

Similarly, weight (Percentage) of asset Y can also be obtained by using

$$WY = \frac{¢x(¢x - pxy¢y)}{¢x2 + ¢y2 - 2\,px.x.¢y}$$

Or, Wy = i – Wx.

By using above formula, one can easily obtain the weight, (i.e. percentage) that are invested in the securities, x and y.

The Portfolio Risk and Return – N Asset Case.

An investor may make a number of possible portfolios out of the N risk assets. Selection of an ideal portfolio depend s on the mean rate of return and the standard deviation of the mean rate of return and the standard deviation of the returns in the portfolio concerned. Portfolio risk and return analysis of N asset case also involves the computation of means, variances and covariance between the returns which is quite difficult on the computation and may returns which is quite

difficult in the computation and may require a computer. Never the less, same of the meturtsane summary seed below.

Mean rate of return of a portfolio in case of N risky asset is the weighted average of the returns of the assets held in a portfolio. Symbolically,

$$E(RP) = \sum_{i=1}^{n} Wi \ .E \ .(Ri \ )$$

or E (RP) = W1E (R1) + W2 E(R2) + ... WN E (Rn).

Where,

E (RP) = Expected portfolio return

i = Number of assets held in portfolio.

W1 = Weights of i the assets in a portfolio.

E (Ri) = Expected returns of i the assets in a portfolio.

The variance (or standard deviation) involves a rather complex computational aspect, when the number of amounts increases in portfolio, the standard deviation can be expended by.

$$¢P = \sqrt{\sum_{i=1}^{n} Wi^{2}¢i^{2} \; 2\sum_{i=1}^{n-1} \cdot \sum^{n} WiWjPij \, ¢i¢j}$$

Here, Wi is the proportion of the investment allocated to asset i, Wj is the proportion allocated to asset j, Pij is the correlation coefficient between asset i and asset j, and N is the number of securities contained in the portfolio.

Since the formula has N assets, there are once N variance terms (that is, $Wi^{2}, ¢i^{2}$) and N^2 – N covariance term (That is Wi. Wj, Pij, ¢ i, ¢ i) since, the covariance terms in crèmes quadratic ally on the number of assets increases, the equation becomes quite complex if N is range.

Capital Asset Pricing Model (CAPM)

In addition to portfolios of risky securities along the efficient set, and investor can invest in risk free assets that yield a certain future return. This security or asset may be treasury security (i.e. govt. bands) that is held to maturity. Although expected return may be low, relative to other assets, the ij complete certainty of return. A risk averse investor may, hence, make a portfolio out of a risk free asset and other risk assets. In market equilibrium, risky assets will be expected to provide a return commensurate with its unavoidable risk. This is simply the risk that can not be avoided by diversifications which can be measured by beta ( ) the greater the unavoidable risk of an assets, the greater the return that investors will expect from the assets: The relationship between expected return and unavoidable risk, and the valuation of securities that follows is the essence of the capital assets pricing mode (CAPM)." (Van Horne, 1999:62. This model was developed by William F.Sharpe in 1964 and John Linter in 1965 and it has had important implications for every since. It represents the market equilibrium trade off between risk and return. It exists between of opportunities for investor to borrow and lend at the risk free rate Thus, in equilibrium, all risk averse investors will choose their optional portfolios from the combinations of the risk free assets and the risk portfolio that gives birth to the CAMP model.

The CAMP is developed in a hypothetical world where the following assumptions are made about investors and the opportunity set (Copeland, 1983:160):

1. Investors are risk averse individuals who maximize the expected utility of their end of period wealth.
2. Investors are price takers and have homogeneous expectations about asset return which have a joint normal distribution.
3. There exists a risk free asset such that investor may borrow or land unlimited amounts at the risk free rate.
4. The quantities of assets are fixed. Also, all assets are marketable and perfectly divisible.

5. Assets markets are frictionless and information is cost less and simultaneously available to all investors.
6. There are no market imperfections such as taxes, regulations, or restrictions on short-selling.

Although not all these assumption conform to reality, they are simplifications which permit the development of the CAMP, which is extremely useful for financial decision making because it quantifies and prices risk.

An investor can only have the expectation of the premium on unavoidable risk. Avoidable risk can be eliminated by well diversifying the wealth in the efficient portfolio. In other words, investors can diversify away all risk expect the risk to the economy as a whole, which is inescapable (undiversitable).

Consequently, the only risk which investor will pay premium to avoid is covariance risk. Therefore, the total risk of any individual assets can be partitioned into two parts, systematic risk which is a measure of how the assets co-variance with the economy, and unsystematic risk, which is independent of the economy. Mathematical precision (Van Horne, 1999:66)

Total Risk = Systematic Risk + Unsystematic Risk

(Non-diversifiable or Unavoidable Risk) + (Diversifiable or avoidable Risk)

A well diversified portfolio can eliminate the unsystematic risk which is unique to a particular company, being independent of economic, political and other factor that affect securities in a systematic manner. An investment will get the premium only on the systematic risk which is due to the changes in the whole economy. It is measured by beta coefficient.

Beta is indicator of the relationship between an individual investment's return and the general market return. The beta coefficient in linear regression can be defined in this manner (Copeland, 1983:164)

$$i = \frac{Cov(Ri, Pm)}{VAR(Rm)} = \frac{¢im}{¢^2 m}$$

Where,

i = Beta coefficient of security i.

Vov (Ri,Rm) = Covariance Between the market return and the Individual Security i.

VAR (Rm) = Variance of Market return.

The beta coefficient is measure of non diversifiable or systematic risk. An assets or portfolio with a beta greater than 1.0 is considered to be aggressive (More risky than the market), and an assets or portfolio with a beta less that 1.00 is considered to be defensive (less risky than the market). An investor can use the beta measure to asses the risk level of an asset or portfolio (Cheney and Moses, 1982:53)

One of the most important properties of CAPM in equilibrium, every assets must priced so that its risk adjusted required rate of return falls exactly on the security market line. Security market line and the capital market line are merely different pictures of the same market equilibrium. The CML may be used for determining the required rate of return only for those efficient portfolios that are perfectly correlated with the market portfolio because they fall on the CML, but the SML may be used to explain required rate of return on all securities whether or not they are efficient.

The SML may be used to explain required rate of return on all securities whether or not they are efficient. The SML provides a unique relationship between non-diversifiable risk (measure by) and expected return. Hence, if it is accurately measured the beta of a security, the equilibrium risk adjusted rate of return can easily be estimated by using the CAPM formula (Weston and Cope land, 9th Edition, 403).

$$E(Rj) = Rf + [E(Rm) - Rf] \quad i$$

Where,

E(Rj) = Expected return on an individual security J.

Rf = Risk-free return.

E (Rm) = Expected Market Return.

i = Beta Coefficient of Security J.

CAMP is derived from portfolio theory which involves the calculation of beta factor which enable a required rate to be calculated for each individual security investment. Although there are a number of problems inherent in the use of CAPM, it has undoubtedly contributed to an examination of the investment decision.

Interest Rate Risk:

This is one of the most common risks the bank face owing to the volatility of the interest in market. In Nepal, just a decade ago, the interest rate in saving and time deposits were at the height of around 8% and 12% respectively, but today they have pathetically gone down with an average of and percent and 6% respectively due to unexpected economic scenario. (Economic Report of Nepal Rasta Bank 2007/08)

Similarly volatility has also been observed in case of lending interest rate as well. The spread of interest between tending and deposits is what the bank earns but with above stated volatility there is great uncertainty.

Trading/Market Risk:

Excess liquidity (cash flows) is invested on various government and corporate securities, in foreign currencies and in other assets for instance swaps, option etc. owing to the market uncertainty the value of these asset may also decline. Hence managing such investments needs experts who can predict the future return of these assets and invest the excess return smartly. (Van Horne, 1999)

Credit Risk:

Credit risks are of two types. The first is the diversification risk of the firm specific risk which can be mitigated by maintaining an optimum and diversifiable risk and correlated across borrowers, countries. And industries such risk is not under the control of firm and bank. (Gitman, L.1988)

Off Balance Sheet Risks:

Banks often cerate contingent liabilities and they are not shown in the balance sheets. Some of the examples of such off-balance sheet items are as guarantor in case of default by the principal of borrower in loan commitments (issuance of guarantee) of risk of incurring loss in forward contract due to change in price of the purchasing/selling of assets, swaps, options, commitments made in letter of credit etc. such risks are managed by a prudent analysis of the bank officials materializing such contingent contracts. (Thapa, Kiran.2002)

Technology/Operational Risks:

Due to the modern technology and operational efficiency modern commercial banks are among the best in terms of services, profitability and image as well. This is very small example where the government owned banks has failed, as compared to the technological up gradation of other commercial banks. (Van Horne, 1994)

Liquidity Risks:

It is a matter of great concern for the banks to maintain sufficient liquidity in the form of hard cash of marketable securities which can be converted liquidity risk the central bank has initiated various regulatory frameworks to maintain reserve in their vault and certain specific percentage of the total deposit with central bank. (Nepal Rasta Bank, 2004/05)

Risk management of the banks is not only crucial for optimum trade off between risk and profitability but is also one of the deciding factors for the overall business investment leading growth of the economy. Managing such risks not only needs sheer professionalism at the organizational level but an appropriate environment also needs to be developed. Some of the major environmental problems of Nepalese banking sectors is unique government intervention (in the state owned banks), relatively weak regulatory framework, although significant improvement has been made in the last five years but still not competitive enough.

When we consider the international standard, meager corporate governance and the biggest of all is lack of professionalism (especially commitment). The only solution to mitigate the banking risk is to develop the badly needed commitment, eradication of disbursement of leading, and to formulate prudent and conducive regulatory frame-work.

2.3 Reviews from Journals

Narayan Prasad Acharya (2003) in his thesis paper an analysis of risk and return Associated with common stock investment of joint venture banks in Nepal concluded that generally average investors are risk averse. They prefer to invest on such investment, which provided higher return at the given level of risk. It is widely known that investment on portfolio generates higher and constants return as compared to single assets. It is obvious that investor can avoid risk by adopting portfolio but the situation in Nepal is different. The evidence shows that most of the investors prefer to invest on single security rather than portfolio. Concept of portfolio should be developed in their mind.

Poudel (2005) in his study 'investing in Share of Commercial Banks in Nepal: An assessment of Risk and Return Elements' has come up with the conclusion that the risk-return characteristics do not seem to be the same for all the shares review. He further added the shares with larger standard deviations seem too able to produce higher rates of return The portion of unsystematic risk is very high with the shares having negative beta coefficient of variation, is less than of the market as a whole for all the individual shares. Most of the shares fall under the category of defensive stocks.(Having beta coefficients less than 1)

Thapa (2007), at his article Managing Banking Risks identified various risk factors particularly in banking areas and various risk factors may equally be relevant for other sectors too. Bank's primary function is to trade risk. Risk cannot

be avoided by the banks but can only be managed. Now the question is what type of risk exist in banking system and how these are managed. Following are some of primary risks which the banking industry faces and must be point of interest not only to bankers and regulators but most importantly to the depositors as well so that they can map the capacity of their bank and safeguard their hard earner money.

2.4 Reviews from Thesis

Mishra (2004) in this thesis entitled “Risk and Return on common stock investment of commercial banks in Nepal” conclude that the risk of an assets can be measured quantitatively using statistics. The Standard Deviation and Coefficient of variation that can be used to measure the variability of assets return. The main objectives of the study are to analyze the risk and return of commercial banks in Nepal. The investor demanded compensation on their risk. For risk point of view, banking sector is the best for the investment in common stock.

Shrestha (2005) argued further to safeguard investor's interest: "The encouraging and growing confidence of shareholders over their investment seek an independent inquiry of disclosed contents of prospectus. This helps to satisfy minimum standard of faith on investment in shares through relying on pros and cons on prospectus. It is therefore, important to disclose everything in prospectus, which could reasonably influence the mind of the prudent investor. Various annual general meeting held by different public limited companies reveal a greater gap between disclosures made in prospectus and the actual result which were reported. In this context the expression of disclosure philosophy and investigation of frauds in prospectus need to be reconciles to check the growing problems in development of the capital market in Nepal."(Lebid)

Ojha (2007), in his research paper, "Financial performance and common stock pricing" states that investment in common stock is very sensitive on the ground of the risk. Dividend to common stock holders is paid only if The Company specific,

or diversifiable, risk, which can be eliminated by adding enough securities to the portfolio and Market, non diversification, risk, which is related to broad swings in the stock market and which can not be eliminated by diversification. Company risk is caused by such things as lawsuits, strikes, successful and unsuccessful marketing programs etc. Market risk, on the other hand, stems from such things as inflation recessions. And high interest rates, factors which affect all firms.

Sapkota (2008), in his thesis entitled "Risk and Return analyses in common stock investment". The main objectives of the study are to analyses the risk and return of common stock in Nepalese Stock The study is focused on the common stock of commercial banks. His thesis concludes that, banking industry is the biggest one in terms of market capitalization and turnover. He has performed an analysis of risk and return on common stock investment with special reference to banking sector. From his analysis, the portfolio approach of investment is better way to win stock market investment.

Timilsina (2009), in his thesis entitled "A study on risk and return Analysis of common stock" conclude that the ranking of selected companies on the based of coefficient lowest CV is bank sector and highest CV of others sectors. The min objectives of the study are to analyze risk and return of common stock and their portfolio. From this findings 15 companies the expected return of bank sector is highest and finance, insurance sector s lowest

2.5 Review of Other Studies

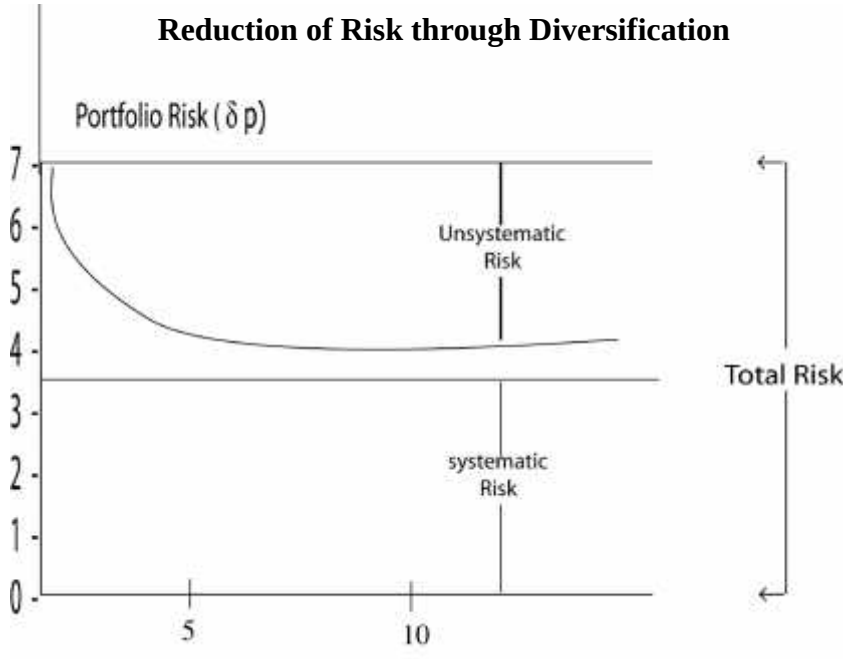
An empirical study bye Wagner and Lau [1981] can be used to demonstrate the effect of diversification. They divided a sample of 200 NYSE stocks into six sub groups based on the standard and Poor's quality ratings as of June 1960. Thus, they constructed portfolios from each of the sub groups, using 1 to 20 randomly selected securities and applying equal weights to each security.

The following table can be used to summarize some effects of diversification for the first subgroup (A + Quality Stock). As the number of securities in the portfolio increases, the standard deviation of portfolio returns decreases, but at a decreasing rate, with further reductions in risk being relatively small after about 10 securities are included in the portfolio. More will be said about the third column of the table, correlation with the market shortly.

Reduction of Risk through Diversification.

No. of Securities in Portfolio	Standard Deviation of Portfolio Returns (¢ p) (Percent per month)	Correlation with Return on Market Index
1	7%	0.54
2	5.0	6.63
3	4.8	0.75
4	4.6	0.77
5	4.6	0.79
10	4.2	0.85
15	4.0	0.88
20	3.9	0.89

Diagram – 2



Above data indicate that even well diversified portfolio posses some level of risk that can not be diversified away. The risk of the portfolio, ¢ p, has been divided into two parts. The part that can be reduced through diversification is defined as unsystematic risk, while the part that cannot be eliminated is defined as systematic or market related risk.

Malkiel (2001) study on "Shareholders Democracy and Annual Meeting Feedback" has critically analyzed the situation of common stock investors and the situation has not improved till now. "Though the size of the shareholders population in Nepal has been growing constantly the government seems to have not taken any initiative in formulating the separate act which protects the shareholders' right. Thus the need of separate act regarding the protection of shareholders right is questioned. Company and other acts relating to financial and industrial sector provisioned rights of the shareholders as:

Voting right	Participation in general meeting.
Right to getting information.	Electing as a board of director.
Participation in the Risk and Return of the company.	
Transferring shares.	Proxy representation.
The collective rights of the shareholders are:	
Amend the internal bylaws.	Authorize the sales of assets.
Enter into mergers.	Change amount of authorize capital

Some public limited companies have floated the shares to the general public without having shareholders representation in the board. There are many such companies, which conduct the annual general meetings just to fulfill their desire and do not consider the voice of the majority of the shareholders similarly management involvement and government intervention in the board election have brought a greater setback in the voting rights of the shareholders."

Research Gap:

Most of the investors are attracted to common stock investment due to higher return. When risk and return compared to different industries finance and insurance is best as per highest expected return with higher degree of risk where as trading industry has minimum risk & return. Publics are least understood about the stock market and have fake conceptual thoughts about its risk. Lack of education & adequate source of information are major constrains for development of stock market in Nepal. Investor on stock of Insurance Company thought the insurance companies are more eager to collect premium rather than settle down claims.

CHAPTER – 3
RESEARCH METHODOLOGY

3.1 Introduction

Research methodology refers to the various sequential steps (along with rationale, of each step) to be adopted by researcher in studying problem with certain object/objects in view (Kothari; 1983:19) Research methodology basically describes the methods, processes, tools and techniques used in the analysis of data, testing the hypothesis, arriving at generalization and preparation of the report.

To achieve the objectives of the study, the following methodology has been adopted which includes research design, population and sample, nature and type of data, sources of data, data collection technique, data processing procedure, techniques of analysis and so on. A Case of sample in Nepal" in 2004 the study was based on the data collected for Fifteen enterprises from 2004 through 2008.

3.2 Research Design

Research design refers to the entire process of planning and carrying out a research study. Since the study seeks to analyses the individual risk and return of number of Nepalese companies, diversification of risk by selecting portfolio of assets, the research design of the study is therefore, descriptive and fundamental type. The study analyses the pattern of their individual returns risk and diversification of risk by selecting a portfolio of assets which are weakly or negatively correlated.

3.3 Population

Since the study is concerned with the risk, return and diversification of risk of return of number of companies enlisted on the Nepal Stock Exchange But Many more financial and non financial company established, at present Nepal Rasta Bank licensed by 26 commercial banks, 78 finance Company and Nepal insurance Commission licensed by 18 insurance Company. So the population for the study

Has, been all the companies enlisted their in. The census of the population is neither feasible nor desirable for the study of this nature, a sample from the population has therefore, been selected for the purpose of the study.

3.4 Sample

For the selection of the sample from the population, stratified random sampling procedures has been followed. In doing so, all the companies enlisted on the Nepal Stock Exchange were classified into three industries, viz., banking finance and insurance companies. The following companies have been taken for 5 samples from each of the industries under study. One the major objectives related to the study was "to assess the risk can diversified by investing in portfolio of assets."

1. Banking Industry.
    i. Nabil Bank Limited (NABIL)
    ii. Nepal Bangladesh Bank Limited (NBB)
    iii. Himalayan Bank Limited. (HBL)
    iv. Nepal SBI Bank Limited (SBI)
    v. Standard Chartered Bank Limited (SCB)
2. Finance Company
    i. Nepal Finance and Saving Company Limited (NFSC)
    ii. National Finance and Company Limited (NFC)
    iii. Universal Finance and Capital Market Limited (UFCM)
    iv. Annapurna Finance Company Limited. (AFC)
    v. Katmandu Finance Limited (KFL)
3. Insurance Company
    i. Nepal Insurance Company Limited (NIC)
    ii. United Insurance Company Limited (UIC)
    iii. National Life and General Insurance (NLGI)
    iv. Premier Insurance Company Limited (PIC)
    v. Everest Insurance Company Limited. (EIC)

3.5 Nature and Type of Data.

The data used for the study is secondary in nature, for the study undertaken, second hand published data of the respective companies are considered. Such data have been taken from the financial statements of the concerned companies enlisted in Nepal Stock Exchange.

3.6 Sources of Data

The main source of data used in the study has been Nepal Stock Exchange Limited. All the financial Statements of the companies understudy are obtained there from. However, such statements are copied from the website of the Nepal Stock Exchange through the internet. The website of Nepal Stock Exchange Limited. [www.Nepalstock.com.

3.7 Data Collection Technique

After the identification of sources of data, the required data for the study have been gathered through the following procedures: First the financial statements of all the required enlisted companies to Nepal Stock Exchange are down loaded to computer disk, Secondly, all the down loaded financial statements were transcribed into computer print-out.

3.8 Data Processing Procedure

First of all, the financial statements of sample companies are taken into account. And then, the required data are extracted from the financial statements i.e., income statements and balance sheet as per the need of calculating accounting ratios. After this, applying the formula of computing two profitability ratios, viz, return on equity and return on assets were computed over the period of five years (i.e. during 2004 to 2008) for the computational purpose of mean return, risk (standard deviation) of return, their coefficient of variation, which is further used for the diversification of risk. Different statistical method has been applied to compute the coefficient of correlation, variance ratio test and t-value.

3.9 Techniques of Analysis

This study has used both descriptive as well as inferential technique of analysis. For the purpose of descriptive analysis, two profitability ratios such as

return on asset (ROA) and return on equity (ROE) where calculated and arranged in the tabular form. The standard deviation and coefficient of variation have also been computed to observe the variability of these ratios over the periods of the study. And finally the portfolio return is calculated to check whether the risk can be diversified.

3.10 Data Analysis Tools

For the purpose of analysis following accounting and statistical tools were used:

3.10.1 Accounting Tools

A number of profitability ratios have been used to measure the returns of the sampled companies in the following ways:

a) Return on Assets (ROA)

This ratio is useful in measuring the profitability of all financial resources invested in the firms' assets. The return on asset ratio is calculated by dividing the amount of net profit after tax by the amount of total assets employed multiplied by 100.

Mathematically,

$$\text{Return on Assets} = \frac{Net\,Profit\,After\,Tax}{Total\,Assets} \times 100$$

b) Return on Equity (ROE)

This ratio measures a relationship between net profit after tax and shareholders fund (Net worth). It shows the efficiency of employing fund supplied by shareholders. It can be measured by dividing the net profit after tax by net worth multiplied by 100.

$$\text{Return on Equity} = \frac{Net\,Profit\,After\,Tax}{Total\,Assets} \times 100$$

3.10.2 Statistical Tools

The statistical tools used in this study are arithmetic mean, standard deviation, coefficient of variation, Karl-Pearson's coefficient of correlation,

student's t-test of the coefficient of correlation and variance ratio test explained as below.

a) Arithmetic Mean (X).

Arithmetic mean is the most popular and widely used measure of representing the entire data by one value called average. Arithmetic mean has been used to compute the company wise average rate of return in terms of return on assets and return on equity. Its value can be obtained by adding together all the items and by dividing this total by the number of items symbolically.

$$\text{Arithmetic Mean } (\overline{X}) = \frac{X1 + X2 + X3 + ...Xn}{N}$$

$$\text{Or } (\overline{X}) = \frac{\sum X}{N}$$

Where,

X	=	Arithmetic Mean
X_1, X2, X3	=	Values of Variables
$\sum$ X	=	Sum of the Values of Variables.
N	=	Total number of observations.

b) Standard Deviation:

The standard deviation measures the absolute value of risk, that is, variability of the returns form the mean returns. It is also known as root mean square deviation for the reason that it is the square root of the mean of the squared deviations form the arithmetic mean symbolically:

$$\text{Standard Deviation } (¢) = \sqrt{\frac{\sum^{x}}{N - 1}}$$

Where,

¢ = The standard deviation

$\sum X^2$ = Sum of the mean deviation squared.

N = Total Number of Observations.

c) Coefficient of Variation

As noted above the standard deviation is the absolute measure of risk in the case of the companies having different mean returns, it misleads to the decision. Hence, to overcome on such a problem, standard per unit of risk can be used to measure the risk which is called coefficient of variation. It indicates risk per unit of average return.

Variability of returns (i.e. the risk) has, therefore, been measured by making use of coefficient of variation. Like the average return, coefficient of variation has been computed to show the company wise variability or return (risk) in respect of ROA and ROE ratio. It can be computed by dividing the standard deviation by average rate of return. Symbolically;

$$\text{Coefficient of Variation (CD)} = \frac{¢}{\overline{X}}$$

¢ = Standard deviation of the rate of return

$\overline{X}$ = Mean rate of return.

d) Karl Pearson's Correlation Coefficient.

When the relationship is at a quantitative nature, the appropriate statistical tool for discovering and measuring the relationship and expressing it in brief formula is known as correlation.

Thus, correlation is a statistical device which, help to analyze the co-variation of two or more variables. There are several methods of calculating correlation between two variables such as scatter diagram, graphic method, Karl Pearson's coefficient method and so on. Among them, Karl Pearson's correlation coefficient is most widely used in practice. There are few notable merits of Pearson's correlation coefficient which made the method most popular.

i) This method of calculating correlation coefficient is base on the all observations.

ii) The correlation coefficient summarizes in one figure not only the degree of correlation but also the direction, i.e., whether the correlation is positive or

negative.

Therefore, in order to establish the nature of relationship between risk and return, the study maker use of Karl Pearson's coefficient of correlation between company wise average rate of return and their coefficient of variation for the two accounting ratios for the industries under study. The Pearson's Coefficient of correlation is denoted by the symbol r which is mathematically defined as:

$$r = \frac{N\sum XY - \left(\sum X\right)\left(\sum Y\right)}{\sqrt{N\sum X^2 - \left(\sum x\right)^2}\ \sqrt{N\sum Y^2 - \left(\sum Y\right)2}}$$

Where,

r = Karl Pearson's correlation coefficient.

N = Total number of observations.

$\sum xy$ = Sum of the values of two variables multiplied

$\sum x$ = Sum of the values of two variables X

$\sum y$ = Sum of the values of two variables Y

$\sum x^2$ = Sum of the squared values of variables X

$\sum y^2$ = Sum of the squared values of variables Y

$\left(\sum x\right)^2$ = Squared the sum of the values of variables X

$\left(\sum y\right)^2$ = Squared the sum of the values of variables Y

The value of the coefficient of correlation as obtained by the above formula shall always lie between ± 1. When r = ± 1, it means there is perfect positive correlation between the variables (i.e. returns of company). When r = -1, it means there is perfect negative correlation between the variables. When r = 0, it means there is no relationship between the variables. However in practice, such values of r as +1, -1 and o are rare. They normally (i.e. between the two extreme points ± 1 the relationship the return of concerned companies have therefore, been analyzed by making use the above proposition.

After the identification of individual return, risk correlation between the assets of sampled companies, we further calculate the portfolio return and portfolio risk and the inferential analysis is attempted to clarify whether the risk can be diversified (reduced) by investing in portfolio of assets or not. For this purpose, the

study has made the use of student's t-test of coefficient of correlation for the two accounting rations.

e) Student's t-test

If it is to test the hypothesis that the correlation coefficient of the population in zero i.e., the variables in the population are uncorrelated, the formula is applied.

$$t = \frac{r}{\sqrt{I - r^2}} x\sqrt{n-2}$$

Where,

t = Student's Values (i.e. Test statistics)

r = Coefficient of correlation.

N = Number of observations.

Here,

t is based on (n-2) degree of freedom, and the test is based on 5% level of significance.

If the calculated value of t exceeds the tabulated value of to 0.5 for (n-2) degree of freedom, the null hypothesis with be rejected. (or alternative hypothesis is accepted) which will imply that the value of r is significant i.e., the risk can be diversified by investing in different assets at 5% level of significance. If T< to. 05 the data are consistent with the hypothesis of an uncorrelated population.

f) Variance Ratio Test:

Variance is an important statistical measure frequently used measure of variation. Professor R.A. Fisher was the first man to use the tem variance who developed the theory properly.

F coefficient or the variance ratio is the ratio, which the greater variance bears to the smaller variance. In other words, this ratio is worked out as under.

$$F = \frac{GreaterVar\ iance}{SmallerVar\ iance}$$

As such the value of F will always be greater than unity. This F coefficient is used to judge whether the difference between the two variance (i.e. between and within sample) is significant or just due to fluctuations of sampling. For this purpose we proceed on the Null hypothesis presuming the difference between the

two variance insignificant. We then calculate F as stated above. We also look into the table value of F for the given degree of freedom at certain level of significant. If the calculated value of F is either equal to or less than the table value of F, the difference is taken as insignificant i.e. due to chance and the null hypothesis stands. But if the calculated value of F happens to be more than its table value, the difference is taken as significant and according to the decision is taken.

3.10.3 Limitations of the Methodology.

The methodology used in this study has the following limitations:

1. The sample used in this methodology has been selected are small as the listed companies of Nepal Stock Exchange are small and only few numbers of company's securities traded in the market.
2. The date used in the methodology are secondary in nature. The inherent limitations of the data used in the study associated in the preparation of the financial statements are also one of the limitations of the methodology.
3. The result obtained by one of the limitations of the methodology states that is some two asset case the portfolio risk were not diversified, but it does not specify, why not.
4. This methodology is carried on historical data, so the expected return of expected risk were not taken into account.

CHAPTER – 4
DATA PRESENTATION AND ANALYSIS

4.1 Introduction

This chapter is concerned with presentation, analysis and interpretation of collected. For these purpose, two types of analysis have been carried out

descriptive and inferential analysis. Therefore, this chapter has been divided into two sections descriptive and inferential sections of analysis.

First section is concerned inter firm analysis of risk and return and diversification of risk of various two combined firms under study and the second section is the inferential analysis, inter industry and combined industry's return and diversification of portfolio risk under study.

4.2 Descriptive Analysis

Descriptive Analysis does not mean generalization and estimating of all the population parameters. Rather, such an analysis simply attempts to rank the firms under study in terms of their risk and returns and diversification of risk. For this purpose, first of all, inter-firm comparison of risk and return has been done on the basis of return on assets and return on equity. Secondly, diversification of risk by investing in different two assets in done.

The following tables 1-12 have shown the inter-firm analysis of risk and return and diversification of portfolio risk in two asset case. This table presents the figures relating to the coefficient of variation and the mean rate of return and correlation, average standard deviation and portfolio standard deviation of various two combined firms under study.

4.2.1 Risk and Return with respect to return on Asset (ROA).

This part of descriptive analysis presents risk and return analysis of the sample firms under different industries chosen for the study with respect to their return on Assets.

Table No 4. 1

Inter-firm comparison of Risk and Return on the Basis of Return on Assets (%) of the firms under Insurance Company.

Year	EIC	PIC	UIC	NLGIC	NIC
2004	0.6984	5.1661	3.2369	5.4159	15.2567
2005	2.1646	05823	6.7938	4.4756	15.5847
2006	6.32.26	4.3059	9.1084	4.0229	13.2303
2007	8.6655	10.2149	11.5035	3.0838	11.9434
2008	10.0085	8.8127	9.1070	2.0378	103640
$\overline{X}$	5.5719	5.8164	7.9499	3.8132	13.2758
¢	4.0367	3.8214	3.1168	1.2874	2.2086
C.V	0.7245	0.6571	0.3921	0.3376	0.1664

Source: Nepal Stock Exchange Available at www.Nepalstock.com.

The above table No. 4.1 shows that all the firms under insurance company have shown inverse relationship between their mean return and coefficient of variation. Among the firms, NIC has shown extreme inverse relationship between mean return and coefficient of variation. The mean return of NIC is 13.28% which is the highest return than all firms while the coefficient of variation is 0.1664, which is the lowest. In the case of other firms, PIC has 5.82% mean return which is more than EIC and coefficient of variation is 0.6571 which is less than coefficient of variation of EIC i.e., 0.7245. The mean return NLGIC, UIC is 3.81% and 7.7 95%. While coefficient of variation are 0.3376 and 0.3921 respectively. Comparing NLGIC with EIC, the preposition of lower the return lower the risk, higher the return higher the risk is justified.

Table No 4.2

Inter-firm comparison of Risk and Return on the basis of return on asset of the firms under Finance Company.

Year	NFC	KFL	AFC	UFCM	NFSC
2004	0.02443	0.0249	0.0192	-0.0269	0.0627

2005	0.0228	0.0389	0.0241	0.0216	0.0311
2006	0.0261	0.0368	0.0233	0.0349	0.0221
2007	0.0226	0.0314	0.0247	0.0076	0.130
2008	0.0255	0.0324	0.0283	0.0108	0.0295
$\overline{X}$	0.0243	0.029	0.0239	0.0096	0.0317
¢	0.0016	0.0054	0.0033	0.0230	0.0188
C.V	0.0658	0.1641	0.1381	2.3958	0.5931

Source: Nepal Stock Exchange Available at www.Nepalstock.com

The above table No. 4.2 show that all the firms under finance company have shown inverse relationship between their mean return and coefficient of variation. Among the five companies, KFL and UFCM have shown extreme inverse relationship between their mean return and coefficient of variation. The mean return of KFL is 3.29% which is the highest but the coefficient of variation is 0.1641. Again, the coefficient of variation of UFCM is 2.3958, which is the highest but mean return is 0.0096.

In case of other firms, the mean return and coefficient of variation of NFSC, NFC and AFC 3.17%, 2.43%, and 2.39% and 0.5931, 0.0658 and 0.1381 respectively.

Table No 4.3

Inter-firm comparison of Risk and Return on the basis of Return on Asset of the firms under banking industry.

Year	NABIL	NBB	HB	SBI	SCB
2004	0.0259	-0.0071	0.0198	0.0083	0.0232

2005	0.0207	0.0064	0.0248	0.0204	0.0300
2006	0.0185	0.0139	0.0203	0.0170	0.0250
2007	0.0159	0.0220	0.0156	0.0143	0.0285
2008	0.219	0.0172	0.0148	0.0035	0.0276
$\overline{X}$	0.0206	0.0105	0.0491	0.0127	0.0269
¢	0.0038	0.0113	0.0040	0.0068	0.0027
C.V	0.1845	1.0762	0.2094	0.5354	0.1004

Source: Nepal Stock Exchange Available at www.Nepalstock.com

In the above table No. 4.3 shows NBB have shown extreme inverse relationship between the mean return and coefficient of variation. NBB has the highest coefficient of variation i.e. 1.0762 but the mean return is 1.05%, the lowest. On the other hand, SCB has highest mean return 2.69% but it has the lowest coefficient of variation, 0.1004. In case of other banks, the mean return and coefficient of variation of NABIL, HB and SBI are 2.06%, 1.91% and 1.27% and 0.1845, 0.2094 and 0.5354 respectively. The above table shown that Risk and Return are Inversely Related.

4.2.2 Risk and Return Analysis with respect to return on Equity (ROE)

Table No 4.4

Inter-firm comparison of Risk and Return on the basis of return on Equity of the firms under Insurance Company.

Year	EIC	PIC	UIC	NLGIC	NIC

2004	0.089	0.061.	0.0494	0.2204	0.2469
2005	0.0332	0.0078	0.0962	0.2013	0.2029
2006	0.0504	0.0640	0.1302	0.1827	0.2587
2007	0.1944	0.1538	0.1622	0.1751	0.2353
2008	0.2114	0.1517	0.1394	0.1444	0.1710
$\overline{X}$	0.1197	0.0877	0.1155	0.1848	0.2230
¢	0.0931	0.0635	0.039	0.0286	0.357
C.V	0.7778	0.7241	0.3801	0.1548	0.1601

Source: Nepal Stock Exchange Available at www.Nepalstock.com

The above table No 4.4 shown that the highest return is of NIC i.e. 22.3% and the lowest coefficient of variation is of NLGIC i.e., 0.1548 On the other hand, investment is found more risky in EIC i.e. 0.7778 and PIC has the lowest mean return 8.77%. The mean return of NLGIC, EIC, and UIC are 18.48%, 11.97% and 11.55% and the coefficient of variation of PIC, UIC and NIC are 0.7241, 0.3801 and 0.1601.

Table No 4.5

Inter-firm comparison of Risk and Return on the basis of return on Equity of the firms under Finance Company.

Year	NFC	KFL	AFC	UFCM	NFSE
2004	0.2522	0.0654	0.1437	-0.1707	0.3626
2005	0.1935	0.1171	0.2428	0.1179	0.2856
2006	0.2892	0.1537	0.2636	0.2504	0.2180
2007	0.2488	0.1828	0.2826	0.0937	0.1318
2008	0.2624	0.2440	0.2916	0.1272	0.2969
$\overline{X}$	0.2491	0.1526	0.2449	0.0837	02590
¢	0.0350	0.0673	0.0596	0.1547	0.0877
C.V	0.1405	0.4410	0.2434	1.8483	0.3386

Source: Nepal Stock Exchange Available at www.Nepalstock.com

The above table No. 4.5 depicts that the UFCM has shown extreme inverse relationship between its mean return and coefficient of variation. Its mean return is 8.37%. The lowest and the coefficient of variation is 1.8483 the highest. In case of other firms, the mean return and coefficient of variation of NFSC, NFC and KFL

are 2.9.9%. 24.91, 24.49% and 15.26% and 0.3386, 0.1405, 0.2434 and 0.4410 respectively.

Table No. 4.6

Inter- firm comparison of Risk and Return on the basis of return on Equity of the firms under Banking Industry.

Year	NABIL	NBB	HB	SBI	SCB
2004	0.3764	-0.0898	0.4513	0.0528	0.2781
2005	0.2872	0.1016	0.5286	0.2411	0.3671
2006	0.2297	0.2799	0.4193	0.2286	0.3070
2007	0.2110	0.3339	03541	0.2249	0.2912
2008	0.3036	0.3335	0.3663	0.0522	0.3327
$\overline{X}$	0.2816	0.1918	0.4239	0.1599	0.3127
¢	0.0655	0.1840	0.0706	0.0982	0.0354
C.V	0.2326	0.9593	0.1665	0.61.41	

Source: Nepal Stock Exchange Available at www.Nepalstock.com

In the above table HB has 42.39% the highest mean return on equity and the coefficient of variation is 0.1665 which is just highest than the coefficient of variation of SCB (0.1123). NBB has highest coefficient of variation (0.9593) but the mean return is 19.18% which is higher than the mean return of SBI (15.99%). The mean return of NABIL, SCB is 0.6141 and 0.2326 respectively. The above analysis shows the inconsistent relationship between their mean return on equity and coefficient of variation.

4.2.3 Correlation, Weight average and Portfolio Standard Deviation Analysis with Respect to Return on Asset.

Table No 4.7

Inter-form analysis of correlation, weighted and portfolio standard deviation on the basis of return on asset of the firms under Insurance Company.

Combination of Firms	Correlation	Respective Weight	Weighted Average Risk	Portfolio Risk
EIC and PIC	0.76	38.67%, 61.33%	3.9%	3.67%
UIC and NLGIC	-0.79	27.26%, 72.74%	1.79%	0.58%
PIC and UIC	0.56	27.72%,72.28%	3.31%	2.98%
NLGIC and NIC	0.95	192.14%,-92.14%	0.44%	0.83%
EIC and NIC	-0.97	35.16%,64.84%	2.85%	0.35%
EIC and UIC	0.87	-29.91%, 129.91%	2.84%	3.06%
EIC and NLGIC	-0.96	23.8%,76.2%	2.006%	0.28%
PIC and NLGIC	-0.67	21.67%,78.33%	1.84%	0.76%
PIC and NIC	-0.83	35.48%, 64.52%	2.78%	0.81%
UIC and NIC	-0.73	40.18%, 59.82%	2.57%	0.95%

The above table No. 4.7, the combination of firms such as UIC and NLGIC, EIC and EIC and NIC, EIC and NLGIC, PIC and NLGIC, PIC and NIC and UIC and NIC show strong negative correlation where as other combination of firms. EIC and PIC, PIC and UIC, NLGIC and NIC and EIC and UIC show positive correlation in terms of their mean return on assets.

The portfolio of risk is diversified in all cases of combined firms except the combination of NLGIC and NIC and EIC and UIC as they are strongly positively correlated in terms of their mean return on assets. In case of portfolio risk diversification, portfolio risk is significantly diversified in the combined firms of EIC and NIC and EIC and NLGIC since they are strongly negatively correlated. Thus, portfolio risk can be diversified by investing in those assets which are strongly negatively correlated.

Table No 4.8

Inter-firm analysis of correlation, weight and portfolio standard deviation on the basis of return on Asset of the firms under Finance Industry.

Combination of Firms	Correlation	Respective Weight	Weighted Average Risk	Portfolio Risk
NFC and KFL	-0.001	91.91%,8.09%	0.19%	0.15%
KFL and AFC	0.47	10.79%, 89.21%	0.35%	0.33%
AFC and UFCM	-0.04	97.45%, 2.55%	0.38%	0.32%
UFCM and NFSC	-0.57	43.62%, 56.38%	2.06%	0.96%
NFC and AFC	0.13	84.48%, 15.52%	0.19%	0.15%
NFC and UFCM	0.4	102.42%, -2.42%	0.11%	0.16%
NFC and NFSC	0.11	100.21%, -0.21%	0.16%	0.16%
KFL and UFCM	0.38	104%, -4%	0.47%	0.53%
KFL and NFSC	-0.64	81.63%, 18.37%	0.79%	0.34%
NDC and NFSC	-0.67	88.28%, 11.72%	0.51%	0.22%

In the above table No. 4.8, NFC and KFL and AFC and UFCM are weakly negatively correlated and KFL and NFSC and AFC and CFSC are strongly negatively correlated. Other combination of firms such as KFL and AFC, NFC and AFC, NFC and UFCM, NFC and NFSC and KFL and UFCM are weakly positively correlated.

The portfolio of risk is diversified in all cases of combined firms except the combination of NFC and UFCM, and KFL and UFCM. The portfolio risk is significantly diversified in the combination of UFCM and NFSC, KFL and NFSC and AFC and NFSC as they are negatively correlated in terms of their mean return on assets.

Table No 4.9

Inter-firm analysis of correlation, weight average risk and portfolio risk in the basis of return on Asset of the firms under Banking Industry.

Combination of Firms	Correlation	Respective Weight	Weighted Average Risk	Portfolio Risk
NABIL and NBB	-0.96	72.21%,24.79%	0.57	0.08
NBB and HB	-0.61	21.91%,78.09%	0.56	0.25
HB and SBL	0.73	117.12%,-17.12%	0.35	0.39
SBI and SCB	0.38	0.79%,99.21%	0.27	0.27
NAB and HB	0.21	53.24%,46.76%	0.39	0.30
NAB and SBI	-0.50	68.38%,31.62%	0.47	0.24
NABIL and SCB	-0.53	39.04%,60.96%	0.31	0.15
NBB and SBI	0.06	25.27%,74.73%	0.79	0.60
NBB and SBI	0.62	-11.97%,111.97%	0.17	0.24
HB and SCB	0.09	29.6%,70.4%	0.31	0.23

In the above table No. 4.9, the combination of firms such as NABIL and NBB, and NBB and NB show strongly negative correlation an NAB, SBI and NAB, SCB show moderately negative correlation. In case of other combination except above show positive correlation.

The Portfolio of risk is diversified in all case of combined firms except the combination of HB and SBI and NBB and SCB as they are strongly positively correlated. On the other hand, the portfolio risk is significantly diversified in the combination of NAB and NBB since they are strongly negatively correlated in terms of their return on asset.

4.2.4 Correlation, Weight Average Risk and Portfolio Risk with Respect to Return on Equity.

Table No 4.10

Inter-firm analysis of correlation, weighted average risk and portfolio risk on the basis of return on equity of the firms under Insurance Company.

Combination of Firms	Correlation	Respective Weight	Weighted Average Risk	Portfolio Risk
EIC and PIC	0.84	-33.73%,133.73%	0.57%	0.08%
PIC and UIC	0.68	1.46%,98.54%	0.56%	0.25%
UIC and NLGIC	-0.82	38.46%,61.54%	0.35%	0.39%
EIC and NIC	0.59	75.72%,24.28%	0.27%	0.27%
EIC and UIC	0.92	-59.62%,159.62%	0.39%	0.30%
EIC and NLGIC	-0.93	22.82%,77.18%	0.47%	0.24%
EIC and NIC	-0.28	18.68%,81.32%	0.31%	0.15%
PIC and NLGIC	0.75	-25.59%,125.59%	0.79%	0.60%
ULC and NIC	-0.26	41.87%,58.13%	0.17%	0.24%
PIC and NIC	-0.26	28.74%,71.26%	0.31%	0.23%

The above table No. 4.10 depicts that EIC and NLGIC and UIC and NLGIC are strongly negatively correlated correlated and ELC and NIC, UIC and NIC, and PIC and NIC, are weakly negatively correlated where as other combination of firms – EIC and UIC, EIC and PIC, PIC and NLGIC, PIC and UIC and NLGIC and NIC, show strong and moderately positively correlated.

The portfolio of risk diversified in all cases of combined firms except the combination of EIC and UIC and PIC and NLGIC. Since they are strongly positively correlated. In case of portfolio risk diversification, portfolio risk is significantly diversified of portfolio risk is not equally application in two assets case.

Table No 4.11

Inter-firm analysis of correlation, weighted average risk and portfolio risk on the basis of Return on Equity if the firms under Finance Company.

Combination of	Correlation	Respective Weight	Weighted	Portfolio

Firms			Average Risk	Risk
EIC and PIC	0.31	88.48%, 11.52%	3.87%	3.42%
PIC and UIC	0.89	-1.88%, 101.88%	5.95%	5.95%
UIC and NLGIC	0.79	128.89%, -28.89%	3.21%	4.97%
EIC and NIC	0.94	-82.75%, 182.75%	3.23%	5.92%
EIC and UIC	0.14	77.75%, 22.25%	4.05%	3.19%
EIC and NLGIC	0.34	102.87%, -2.87%	3.16%	3.63%
EIC and NIC	-0.49	77.117%, 22.89%	4.71%	2.45%
PIC and NLGIC	0.98	170.44%, -70.44%	0.57%	2.31%
ULC and NIC	-0.44	58.61%, 41.39%	7.05%	4.02%
PIC and NIC	-0.69	61.21%, 38.79%	7.05%	2.78%

Above table no 4.11 shown that there is negative correlation between NFC and NFC and NFSC, KFL and NFSC, and AFC and NFSC in terms of their mean return on equity. The combination of NFC and KFL, NFC and AFC and NFC and UFCM show weak positive correlation and DFL and UFCM, UFCM and NFSC, KFL and AFC and AFC, UFCM show strong Positive correlation.

The diversification of portfolio risk is found in all combined firms except KFL and UFCM, UFCM and NFSC, AFC and UFCM as they are positively correlated in terms of their mean return on equity. In case of portfolio risk diversification, the portfolio risk of AFC and NFSC has significantly diversified along with the NFC and NFSC, and KFL and NFSCS portfolio risk.

Table No 4.12

Inter-firm analysis of correlation, weighted average risk and portfolio risk on the basis of Return on Equity of the firms under Banking Industry.

Combination of Firms	Correlation	Respective Weight	Weighted Average Risk	Portfolio Risk
NABIL and NBB	-0.85	75.21%, 24.79%	9.49%	2.62%
NBB and HB	-0.73	25.03%, 74.97%	9.9%	3.69%
HB and NSBI	0.25	70.87%, 29.13%	7.86%	6.35%
SBI and SCB	0.30	2.39%, 61.97%	3.69%	3.53%
NABIL and HB	0.38	56.03%, 43.97%	6.77%	5.64%
NAB and SBI	-0.79	61.11%, 89.89%	7.82%	2.54%
NAB and SCB	-0.08	24.32%, 75.68%	4.27%	3.01%
NBB and SBI	0.34	11.21%, 88.79%	10.78%	9.62%
NBB and SCB	0.17	0.44%, 99.56%	3.61%	3.54%
HB and SCB	0.51	-0.58%, 100.58%	3.52%	3.54%

Above table no: 4.12 shows that NABIL and NBB, NAB and SBI, NBB and SBI have strong negative correlation that why their portfolio risk has also significantly diversified. NAB and SCB also have weak negative correlation of firms NABIL and HB, NBB and SBI, SCB and SBI, HB and SBI and NBB and SCB show weak positive correlation in terms of their mean return on equity. The correlation between HB and SCB in terms of their mean return on equity how moderate positive correlation and its portfolio risk is not diversified.

Table No 4.13

Industry wise analysis of Average Standard Deviation and Portfolio Standard Deviation (Taking 5 Firms from each Industry)

Industry	Average Standard Deviation	Portfolio Standard Deviation
Insurance	5.3%	3.52%
Finance	8.09%	6.29%
Banking	0.57%	0.24%

In the above table, we find that the risk is diversified more in the banking industry. Similarly the portfolio risk is reduced in insurance Industry and finance Industry to O with compared to its average standard deviation.

Table No 4.14

Analysis of Average Standard deviation and Portfolio Standard deviation of combined industries under study (Taking 5 terms from each Industry).

Industry	Average Standard Deviation	Portfolio Standard Deviation
Insurance + Finance	1.97%	0.7%
Insurance + Finance + Banking (=15)	0.015%	0.005%

The above table shows that the portfolio standard deviation decreases as the number of securities in the portfolio increases. The portfolio standard deviation of 5 firms under, Insurance, Finance and Banking industry is 0.005 less then the portfolio standard deviation of 10 firms under Insurance and finance company 0.7%.

4.3 Inferential Analysis

Inferential analysis is based on the sampling and statistics. It helps to estimate a good estimator of population parameters. Attempts are, therefore, made to estimate the population parameters to predict the future outcomes, i.e., whether the risk can be diversified by investing in portfolio of assets. For this, average standard deviation and portfolio of standard deviation were calculated based on mean profitability ratios.

The following table 15 showed the industry wise analysis of average standard deviation and portfolio standard deviation. This presents the figure relating to standard deviation, computed value and tabulated value of variance ratio (T-test), pertaining to the industries under study.

4.3.1 Variance Ratio Test

Table No 4.15

Industry wise analysis of variance Ratio-test of Insurance Company Finance Company and Banking Industry. (5 Firms from each Industry)

Industry	Average SD	Portfolio SD	Computed f-test Value	Tabulated f-test Value
Insurance	5.3%	3.52%	1.51	6.39
Finance	8.09%	6.29%	1.30	6.39
Banking	0.57%	0.24%	2.38	6.39

At 5% level of significance.

The computed value of f-test ratio of insurance company is 1.5 and tabulated value is 6.39. Computed value of f-test ratio of Finance Company is 1.30 while tabulated value is 6.39 and the computed value of f-test ratio of banking industry is 2.38 while the tabulated value is 6.39.

Testing of Hypothesis:

Null Hypothesis

Ho: The risk can be diversified by investing in different assets of financial institution of Nepal.

Alternative Hypothesis

Ha: The risk can't be diversified by investing in different assets of financial institutions of Nepal.

The computed f-test value of insurance company is 1.51 while the tabulated value of f-test ratio is 6.39 at 5% level of significance for 4,4 degree of freedom. Since the calculated value of f-test ratio of insurance company is less than the tabulated value of f-test ratio, the null hypothesis is accepted. It means the risk can be diversified by investing in different (5 Firms) assets of Financial Instating of Nepal.

Table No 4.16

Analysis of Variance Ratio-test of 10 combined firms under Insurance Company and finance company.

Industry	Average SD	Portfolio	Computed F-test Value	Tabulated f-test Value
Insurance Finance	1.97%	0.7%	2.81	3.18

The computed value of f-test ratio is 2.18 while the tabulated value of f-test ratio at 5% level of significance for 9,9 degree of freedom is 3.18.

Testing of Hypothesis:

Null Hypothesis

Ho: The risk and be diversified by investing in different assets of financial institution of Nepal.

Alternative Hypothesis

H1: The risk can't be diversified by diversified by investing in different assets of financial institutions of Nepal.

The computed value of f-test ratio of 10 combined firms under insurance and finance company is 2.81 while the tabulated value of f-test ratio at 5% level of significance for 9,9 degree of freedom is 3.18. Since the calculated value is less

than tabulated value, the null hypothesis is accepted. It means the risk can be diversified by investing in different (10 firms) assets of financial institutions of Nepal.

Table No 4.17

Analysis of Variance Ratio-test of 15 combined firms under Insurance Company and finance company and Banking Industry.

Industry	Average SD	Portfolio SD	Computed f-test Value	Tabulated f-test Value
Insurance Plus (+) Finance Plus (+) Banking	0.0015	0.005	3	3.52

The computed value of f-test ratio is 3 while the tabulated value of f-test ratio at 5% level of significance is 3.52

Testing of Hypothesis:

Null Hypothesis

Ho: The risk can be diversified by investing in different assets of financial institution of Nepal.

Alternative Hypothesis

H1: The risk can't be diversified by investing in different assets of financial institution of Nepal.

Since the calculated value of f-test ratio is less than the tabulated value, the null hypothesis is accepted. If means the risk can be diversified by investing in different (15 firms) assets of financial institutions of Nepal.

4.3.2 Student's T-test

Table No 4.18

Student's T-test with respect to Risk and Return Analysis of the Firms under Insurance, company, finance company and Banking Industry.

Industry	Portfolio Return	Portfolio Risk	Computed T-Value	Tabulated T-Value
Insurance	7.29%	3.52%	0.1741	2.776
Finance	2.45%	6.29%	0.85	2.776
Banking	1.80%	0.24%	2.39	2.776

In above table, the portfolio return o Insurance Company is 7.29. While the portfolio risk is 3.52%. For finance company the portfolio return is 2.45%. While the portfolio risk is 6.29%. Again, the portfolio return of banking industry is 1.80% wile the portfolio risk is 0.24%. Here, for insurance and finance company, the relationship between risk and return is inverse i.e., higher the risk lowers the return. But in case of Banking industry, the relationship between risk and return is positive. It means lower the return. In above three industry the computed value of 't' at 5% level of significance for 4 degree of freedom is lower than the tabulated value.

Testing of Hypothesis:

Null Hypothesis

Ho: There is no significant relationship between the level of return (or risk) with specified level of risk (or return)

Alternative Hypothesis

H1: There is significant relationship between the level of return (or risk) with specified level of risk (or return)

Since the computed value of t of Insurance Company Finance Company and Banking Industry are (0.1741, 0.85 and 2.39) less than the tabulated value i.e., 2.776, at 5% level of significance for 4 degree of freedom, the null hypothesis is accepted. It means there is no significant relationship between the level of return (or risks) with specified level risk (or return)

4.3.3 Diversification of Risk

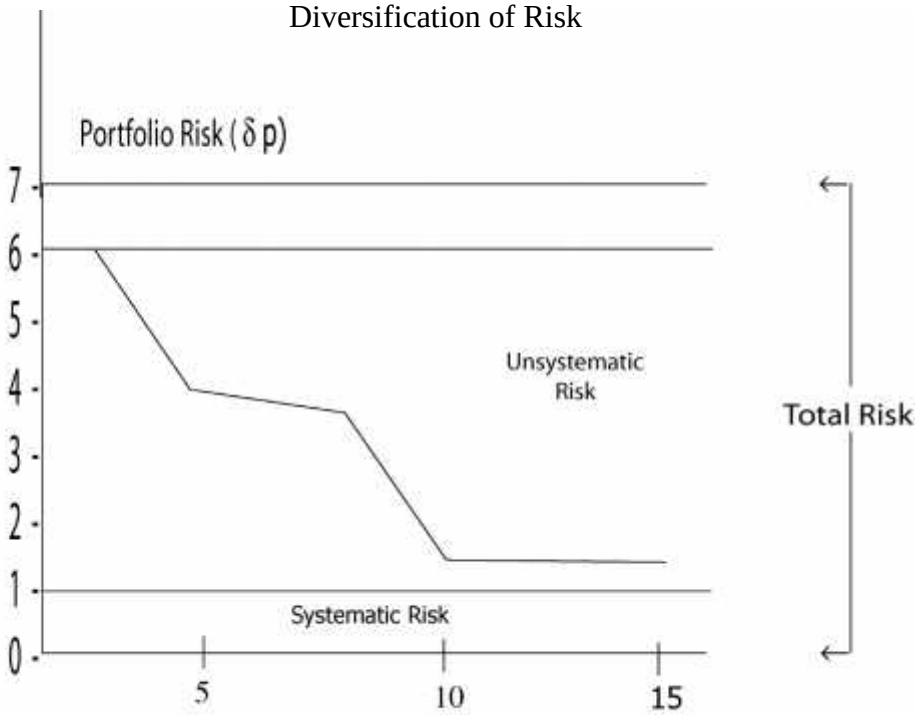
The following table depicts that the risk can be diversified by investing in portfolio of assets. As the number of securities in the portfolio increases, the standard deviation of the portfolio return decreases.

Table -19

Reduction in Portfolio Risk through Diversification

Firms Under Industry	Number of Securities In Portfolio	Standard Deviation In Portfolio (¢p)
Insurance	1	5.82%
Insurance	2	3.67%
Insurance	5	3.52%
Insurance +Finance	10	0.7%
Insurance + Finance + Banking	15	0.005%

Diversification of Risk



Number of Securities in the Portfolio

Fig: 4.1

The above table shows that portfolio risk has been divided into two parts. The parts that can be reduced through diversification are defined as unsystematic risk. It is between 5.82% risk to 0.005% risk. While the part that can not be eliminated is defined as systematic on market related risk i.e.) to 0.005% risk.

Table No 4.20

Portfolio Risk Diversification Ranking of Insurance Company based on ROA.

Combination of Firms	Weighted Average Risk	Portfolio Risk	Percentage Reduction in Portfolio Risk
EIC and NIC	2.85%	0.35%	87.72%
EIC and NLGIC	2.06%	0.28%	86.04%
PIC and NIC	2.78%	0.81%	70.86%
UIC and NLGIC	1.79%	0.58%	67.6%
UIC and NIC	2.57%	0.95%	63.04%
PIC and NGLIC	1.84%	0.76%	58.7%
PIC and LIC	3.31%	2.98%	9.97%
ELC and PIC	3.9%	3.67%	5.9%

- In terms of return on asset of the firms under finance company, the firms AFC And NFSC, KFC and NFSC, UFCM and NFSC were moderately negatively Correlated and the firms KFL and AFC, NFC and UFCM, KFC and UFCM were moderately positively correlated.
- In terms of return on assets of the firms under finance Industry the portfolio risk were diversified in all the combined firms except the combination of the firms KFL and UFCm, NFC and UFCM and UFCM and NFC and UFCM.
- In terms of return on assets of the firms under finance company the portfolio risk diversification found to be ranked as follow:

Table No 4.21

Portfolio Risk Diversification Ranking of Finance Company based on ROA.

Combination of Firms	Weighted Average Risk	Portfolio Risk	Percentage Reduction in Portfolio Risk
UFCM and NFSC	2.06%	0.96%	59.4%
KFL and NFSC	0.79%	0.34%	56.97%
AFC and NFSC	0.51%	0.22%	56.86%
NFC and AFC	0.19%	0.15%	21.05%
NFC and KFL	0.19%	0.15%	21.02%
AFC and UFCM	0.38%	0.32%	15.79%
KFC and AFC	0.35%	0.35%	5.71%

- In terms of return on assets of the firms under Banking Industry, the firms NAB and NBB war of firms under banking industry, the portfolio risk diversification found to be ranked as follow:

- In terms of return on assets of firms under banking industry, the portfolio risk diversification found to be ranked as follows:

Table No 4.22

Portfolio Risk Diversification Ranking of Banking Industry based on ROA.

Combination of Firms	Weighted Average Risk	Portfolio Risk	Percentage Reduction in Portfolio Risk
UFCM and NFSC	0.57%	0.8%	85.96%
KFL and NFSC	0.56%	0.25%	55.36%
AFC and NFSC	0.31%	0.15%	51.61%
NFC and AFC	0.47%	0.24%	48.94%
NFC and KFL	0.31%	0.23%	25.81%
AFC and UFCM	0.79%	0.60%	24.05%
KFC and AFC	0.39%	0.30%	23.08%

- In terms of return on equity of the firms under Insurance Company the firms UIC and NLGIC and EIC and NLGIC were extremely negatively correlated where as the firms EIC and UIC, EIC and PIC, PIC and NLGIC, were strongly positively correlated.
- In terms of terms on equity of the firms under insurance company the portfolio risk diversification found to be ranked as follow:

Table No 4.23

Portfolio Risk Diversification Ranking of Insurance Company based on ROA.

Combination of	Weighted	Portfolio	Percentage Reduction in

Firms	Average Risk	Risk	Portfolio Risk
EIC and PIC	0.57%	0.8%	85.96%
PIC and UIC	0.56%	0.25%	55.36%
EIC and NIC	0.31%	0.15%	51.61%
EIC and NLGIC	0.47%	0.24%	48.94%
PIC and NIC	0.31%	0.23%	25.81%
PIC and NLGIC	0.79%	0.60%	24.05%
EICC and UIC	0.39%	0.30%	23.08%

- In terms of terms on equity of the firms under Finance company, the firms AFC and NFSC, NIC and NFC, and KFL and NFSC were negatively correlated while the firms KFL and UFCM, UFCM and NFSC, KFL and AFC and UFCM were strongly positively correlated.
- In terms return on equity of the firms under finance company the portfolio risk of the combined firms were diversified except the combination of the firms AFC and UFCM were strongly positively correlated.
- In terms return on equity of the firms under finance company, the portfolio risk diversification found to be ranked as follows:

Table No 4.24

Portfolio Risk Diversification Ranking of Finance Company based on ROA.

Combination of Firms	Weighted Average Risk	Portfolio Risk	Percentage Reduction in Portfolio Risk
AFC and NFSC	7.05%	2.78%	60.57%
NFC and NFSC	4.71%	2.45%	47.98%
KFL and NFSC	7.57%	4.02%	46.9%
NFC and AFC	4.05%	3.19%	21.23%
NFC and KFC	3.87%	3.42%	11.63%

- In terms of return on equity of the firms under Banking Industry, the firms NAB and NBB, NAB and SBI and NBB and HB were negatively correlated

where as HB and SCB, NAB and HB, NBB and SBI were positively correlated.

- In terms of return on equity of the firms under Banking Industry the portfolio risk diversification found to be ranked as follows:
- In terms of return Equity of the firms under Banking industry, the portfolio risk diversification found to be ranked as follows:

Table No 4.25

Portfolio Risk Diversification of Banking Industry.

Combination of Firms	Weighted Average Risk	Portfolio Risk	Percentage Reduction in Portfolio Risk
NABIL and NBB	9.49%	2.62%	72.39%
NAB and SBI	7.82%	2.54%	67.52%
NBB and HB	9.9%	3.69%	62.73%
NABIL and SCB	4.27%	3.01%	29.51%
HB and SBI	7.86%	6.35%	19.21%
NABIL and HB	6.77%	5.64%	18.69%
NBB and SBI	10.78%	9.62%	10.76%
SBI and SCB	3.69%	3.53%	4.34%
NBB and SCB	3.61%	3.54%	1.94%

- In terms of return on Asset of the industry under insurance Company, Finance Company and Banking Industry, the portfolio risk diversification found to be ranked s:

Table No 4.26

Portfolio Risk Diversification of Banking Industry based on ROE

Industry	Average SD	Portfolio SD	
Banking	0.57%	0.24%	57.89%
Insurance	5.3%	3.52%	33.58%
Finance	8.09%	6.29%	22.25%

4.4 Major Findings of the Study.

The major findings of the study can mentioned as follow:

- In terms of returns on assets of the firms under Insurance company. NIC has the highest mean return and NLGIC has the lowest mean return.
- In terms of return on assets of the firms under insurance company. The firms can be arranged form the highest mean return to the lowest mean return as? NIC (13.28%), UIC (7.95%), EIC (5.57%) and NLGIC (3.81%).
- In terms of return on assets of the firms under insurance company, the firms can be arranged from the lowest co-efficient of variation to the highest Coefficient of variation as: NIC (0.1664), NLGIC (0.3376), UIC (0.3921), PIC (0.6571) and EIC (0.7245).
- In terms of return on assets of the firms under insurance company, NIC has the highest mean return (13.28%) and the lowest coefficient of variation (0.1664).
- In terms of the return on assets of the firms under finance company, KFL has the highest mean return 2.39% and UFCM has the lowest return 0.9.
- In terms of return on assets of the firms under Finance Company, NFC has the lowest coefficient of variation 0.0658 and UFCM has the highest mean return. 2.30%
- In terms of return on assets of the firms under insurance company, UFCM has the lowest mean return 0.0096% and the highest coefficient of variation.2.395.
- In terms of return on assets of the firms under Banking Industry, SCB has the Highest mean return 0.0269% and the lowest coefficient of variation 0.1004

- In terms of return on assets of the firms under banking industry, NBB has the lowest mean return 0.0105% and the highest coefficient of variation1.0762
- In terms of return on equity of the firms under Insurance Company, NIC has the highest mean return 0.2233% and PIC has the lowest mean return0.0877%
- In terms of return on equity of the firms under Insurance Company, NLGIC has the lowest coefficient of variation0.1548 EIC has the highest coefficient of variation 0.7788
- In terms of return on equity of the firms under finance company, NFSC has the highest mean return0.0317% and UFCM has the lowest mean return 0.0096%
- In term of return on equity of the firms under finance company, UFCM has the highest coefficient of variation 2.39 and the lowest mean return0.0096%
- In term of return on equity of the firms under banking industry, HB has the highest mean return 0.0491% and SBI has the lowest mean return 0.0127%
- In terms of return on equity of the firms under banking industry. SCB has the lowest coefficient of variation 0.1004 and NBB has the highest coefficient of Variation 1.0762
- In terms of return on assets of the firms under insurance company. The firms EIC and NIC, EIC and NLGIC, PIC and NIC, UIC and NLGIC, UIC and NIC Were strongly negatively correlated and PIC and NLGIC were moderately negatively correlated.
- In terms of return on assets of the firms under Insurance Company the firm NLGIC and NIC, EIC and UIC, EIC and PIC were extremely positively correlated and PIC and LIC were moderately positively correlated.
- In terms of return on assets of the firms under insurance company. The Portfolio risk were diversified in all two combined firms except the Combination of the firms NLGIC and NIC and EIC, UIC.

CHAPTER – 5

SUMMARY CONCLUSIONS AND RECOMMENDATION

5.1 Summary

Investment decision is one of the important parts of financial management. It concerns with the determination of optimal investment project to maximize shareholders wealth. Determination of optional portfolio of assets concerns with rational evaluation of each alternatives as they involve risk and return.

Investors always want to secure a higher return from their holding taking a minimum level of risk. Theoretically, as portfolio theory states that risk can be diversified by investing in different assets. The risk derives from the total investment by investing in portfolio of assets is less than the risk derives from the total investment by investing in single asset. Again theoretically, if investors want to secure a higher return should also assume a higher risk and assuming a lower risk they should remain satisfied with lower returns as there is positive relation between risk and return.

On the basis of these assumptions, that is, the risk can be diversified by investing in portfolio of assets and there is positive relationship between risk and return, some theories such as portfolio theory, capital asset pricing model have emerged. But still there is a lack of knowledge about the diversification of portfolio risk and the relationship between risk and return but due to insufficient empirical evidence. Therefore, this present study has focused on the analysis of diversification of portfolio risk and the relationship between risk and return with reference to 15 Nepalese companies randomly. Selected from three industrial group i.e., insurance company, finance company and banking industry.

This study has used both accounting tools and statistical tools. In accounting tools return on assets (ROA) and return on equity (ROE) where computed to present profitability ratios.

In statistical tools arithmetic mean, standard deviation, coefficient of variation, coefficient of correlation, variance ratio test and student's t-values were computed. To calculate the profitability ratios and other measures, published financial statements (secondary data) of the sampled companies were obtained from Nepal Stock Exchange through internet Web Site – www. Nepalstock.com. the financial statements of the year 2004 to 2008were used in the present study.

Since the study is descriptive and inferential, descriptive analysis involved the inter firm analysis of diversification of portfolio risk and the analysis of risk and return on the basis of mean profitability ratios and their coefficient of variations and inferential analysis involved the inter industry analysis of diversification of portfolio of risk and return by testing the null hypothesis (i.e. the risk cannot be diversified, and there is no significant relationship between the level of return with specified level of risk) with the help of variance ratio test and student's t-test.

In this study its is found that, risk can be diversified by investing in portfolio of assets in the case of insurance, finance and Banking industry or combination there of while the relationship between risk and return is positive as well as negative. The relationship between risk and returns is negative for insurance and finance company where as Banking industry shows positive relationship between its risk and return.

5.2 Conclusion of the Study

Since the study has been divided into descriptive and inferential analysis, the conclusions of the study are also divided into two parts. The major conclusions derived from descriptive analysis are:

- In terms of return on asset of the firms under insurance companies, NIC is the best because it has the highest mean return13.57% and the lowest coefficient of variation and EIC is the most risk among others.
- In terms of return of assets of the firms under finance company KFL has the highest return0.029% but risky while UFCM is the worst because its mean return is the least and coefficient of variation the highest.
- In terms of return on assets of the firm under banking industry, SCB is the best since its mean return is highest 0.0269% and coefficient of variation is the lowest 0.1004 while NBB is the worst because its mean return is the lowest0.0105% and coefficient of variation is the highest1.0762
- In terms of return on equity of the firms under insurance company, NIC is the best because its mean return is the highest 0.2230% and the co-efficient

of variation is the second lowest while EIC is the most risky company among them.

- In terms of return on equity of the firms under finance company, NFSC is the best in terms of highest mean return 0.0317% and moderate risk while UFCM is the worst because its mean return is the lowest and coefficient of variation it the highest2.3958
- In terms of return on equity of the firms under banking industry, HB is the best as its mean return is the highest and the co-efficient of variation is the second lowest while the NBB is the worst as its coefficient of variation is the highest and mean return is the second lowest.
- In terms of diversification of portfolio of risk of two asset case based on return on asset of the firms under insurance company the portfolio risk of EIC and PIC, ULC and NLGIC, PIC and UIC, ELC and NIC, ELC and NLGIC, PIC and NLGIC, PIC and NLGIC, PIC and NIC, and UIC and NLC where diversified where as the portfolio of risk of NLGIC and NIC, ELC and UIC, ELC and NLGIC were not diversified.
- In terms of diversification of portfolio of risk of two asset case based on return on assets of the firms under finance company, the portfolio risk of all combination of the firms are diversified other than the NFC and UFCM and KFL and UFCM.
- In terms of diversification of portfolio of risk of two asset case based on return on asset of the firms under banking industry, the portfolio risk of all combination of the firms are diversified except the combination of HB and SBI and NBB and SCB.
- In terms of diversification of portfolio of risk of two asset case based on return on equity of the firms under insurance company, the portfolio risk of all the firms are diversified other than the combination of the firms of ELC and ULC and PIC and NLGIC.
- In terms of diversification of portfolio of risk of two asset case based on return on equity of the firms under finance company, the portfolio risk of AFC and UFCM, UFCM and NFSC, NFC and UFCM, and KF and UFM

were not diversified rather increased while other remaining combined firms were diversified.

- In terms of the diversification of portfolio of risk of two asset case based on return on equity of the firms under Banking Industry, the portfolio of risk of the combination of the firms were diversified other than the combination of the firms NABIL and SCB, and HB and SCB.
- In terms on asset of the firms under Insurance Company, the portfolio risk was diversified.
- In terms of diversification of portfolio of risk of five asset case based on return on asset of the firms under finance company, the portfolio risk were diversified.
- In terms of diversification of portfolio of risk five asset case based on return on asset of the firms under Banking Industry, the portfolio risk were diversified.
- In terms of diversification of portfolio if five asset cases based on return on equity of the firms under insurance company, the portfolio risk were diversified.
- In terms of diversification of portfolio of risk of the five asset case based on return on equity of the firms under finance company, the portfolio risk was diversified.
- The portfolio risk of five firms under Banking Industry is diversified.
- The diversification of portfolio risk of 10 asset case based on return on asset of the firms under combined insurance company and finance company, the portfolio of risk were diversified.
- The diversification of portfolio of risk was also found when 15 firms under insurance company, finance company and Banking Industry were combined.
- In case of Insurance companies, the portfolio theory is applicable. Here, The portfolio of risk is diversified. In other words, the portfolio risk less Than the average risk of the five firms computed under return on asset and Return on equity.

- In case of Finance company too, the portfolio Theory applicable. Here, the portfolio of the risk of combined five firms are less than the average risk derived from return on assets and return on equity. In other words, for finance company also the portfolio risk can be diversified.
- The portfolios of risk of five banks are also found to be diversified. The portfolio risk is less than the average risk of the five banks based on return on assets and return on equity
- The correlation coefficient of risk and return of the firms under Insurance Company is weakly negatively correlated each in two profitability ratio. Return on assets and return on equity.
- Similarly, the risk and return of the firms under finance company is also negatively correlate based on return on assets and return on equity.
- But in case of Banking industry, the risk return is positively correlated.

  From the above result of inferential analysis, it can be observed that the implication of portfolio theory in case of randomly selected firms under insurance company, finance company and banking industry is positive. In other words. In case of Nepalese company too. The portfolio risk can be diversified. It is the one of the positive factor in case of Nepal's capital market. Though the capital market of Nepal is not so developed and imperfect the portfolio risk is diversified.

5.3 Recommendations

- Under the company wise analysis of the insurance company, NLGIC shows the least return of assets, in order to improve its return on assets it should to increase its net profit by reducing both operating and non operating expenses.
- Similarly, UFCM NFC, AFC, under finance company shows the least return on asset. To increase the return, the UFCM should manage its assets and

equities in at the same time net profit should be increased by reducing operating and non-operating expense.

- Similarly, the firms NAB, NBB, HB, NSBI, show less return on asset to increase its return on assets, the asset management, market expansion and cost management should be primarily improved.
- The finding of the descriptive analysis of the study my be useful to the rational investors who want to maximize their returns while keeping risk within a controllable level. The knowledge of risk and return of individual firm also help to format optimum portfolio of investment.
- The finding of the study is also important to mutual funds companies which seek to each sufficient return and create reserves for mutual funds. These mutual funs companies can conduct regular and detailed analysis of the behavior of risk and returns for companies falling under different industries. This would help them in identifying the best possible portfolio for investing the funds raised for the general public.
- This analysis is important to capital market which can provide information of optimum portfolio of investment to its market participants.

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Appendix 1

Arithmetic Mean ($\overline{X}$) = $\frac{X1+X2+X3+.....Xn}{N}$

Expected rate of return $\hat{K} = \frac{n}{\sum_{i=1}}$

Expected Return on Portfolio $E(Rp) = wE(Rs) + (1-w)E(Rc)$

Standard Deviation $(¢) = \sqrt{\frac{\sum^{x}}{N-1}}$

Portfolio Standard Deviation ($¢p = \sqrt{\frac{N}{\sum_{1=1}}(Ri-\bar{R})^2 \quad Pi}$

Coefficient of Variation (CD) = $\frac{¢}{X}$

Student's t-test t = $\frac{r}{\sqrt{I-r^2}} x\sqrt{n-2}$

Coefficient of Variation (CV) = $CV = \frac{¢K}{\overline{K}}$

Beta coefficient $i = \frac{Cov(Ri,Pm)}{VAR(Rm)} = \frac{¢im}{¢^2 m}$

Appendix 2

Return of equity (ROA) of Insurance Company

Year	EIC	PIC	UIC	NLGIC	NIC
2004	0.6984	5.1661	3.2369	5.4159	15.2567
2005	2.1646	05823	6.7938	4.4756	15.5847
2006	6.32.26	4.3059	9.1084	4.0229	13.2303
2007	8.6655	10.2149	11.5035	3.0838	11.9434
2008	10.0085	8.8127	9.1070	2.0378	103640
$\overline{X}$	5.5719	5.8164	7.9499	3.8132	13.2758
¢	4.0367	3.8214	3.1168	1.2874	2.2086
C.V	0.7245	0.6571	0.3921	0.3376	0.1664

Return of equity (ROA) of Finance Company

Year	NFC	KFL	AFC	UFCM	NFSC
2004	0.02443	0.0249	0.0192	-0.0269	0.0627
2005	0.0228	0.0389	0.0241	0.0216	0.0311
2006	0.0261	0.0368	0.0233	0.0349	0.0221
2007	0.0226	0.0314	0.0247	0.0076	0.130
2008	0.0255	0.0324	0.0283	0.0108	0.0295
$\overline{X}$	0.0243	0.029	0.0239	0.0096	0.0317
¢	0.0016	0.0054	0.0033	0.0230	0.0188
C.V	0.0658	0.1641	0.1381	2.3958	0.5931

Return of equity (ROA) of Banking Industries

Year	NABIL	NBB	HB	SBI	SCB
2004	0.0259	-0.0071	0.0198	0.0083	0.0232
2005	0.0207	0.0064	0.0248	0.0204	0.0300
2006	0.0185	0.0139	0.0203	0.0170	0.0250
2007	0.0159	0.0220	0.0156	0.0143	0.0285
2008	0.219	0.0172	0.0148	0.0035	0.0276
$\overline{X}$	0.0206	0.0105	0.0491	0.0127	0.0269
¢	0.0038	0.0113	0.0040	0.0068	0.0027
C.V	0.1845	1.0762	0.2094	0.5354	0.1004

Appendix 3

Return of equity (ROE) of Insurance Company

Year	EIC	PIC	UIC	NLGIC	NIC
2004	0.089	0.061.	0.0494	0.2204	0.2469
2005	0.0332	0.0078	0.0962	0.2013	0.2029
2006	0.0504	0.0640	0.1302	0.1827	0.2587
2007	0.1944	0.1538	0.1622	0.1751	0.2353
2008	0.2114	0.1517	0.1394	0.1444	0.1710
$\overline{X}$	0.1197	0.0877	0.1155	0.1848	0.2230
¢	0.0931	0.0635	0.039	0.0286	0.357
C.V	0.7778	0.7241	0.3801	0.1548	0.1601

Return of equity (ROE) of Finance Company

Year	NFC	KFL	AFC	UFCM	NFSE
2004	0.2522	0.0654	0.1437	-0.1707	0.3626
2005	0.1935	0.1171	0.2428	0.1179	0.2856
2006	0.2892	0.1537	0.2636	0.2504	0.2180
2007	0.2488	0.1828	0.2826	0.0937	0.1318
2008	0.2624	0.2440	0.2916	0.1272	0.2969
$\overline{X}$	0.2491	0.1526	0.2449	0.0837	02590
¢	0.0350	0.0673	0.0596	0.1547	0.0877
C.V	0.1405	0.4410	0.2434	1.8483	0.3386

Return of equity (ROA) of Banking Industry

Year	NABIL	NBB	HB	SBI	SCB
2004	0.3764	-0.0898	0.4513	0.0528	0.2781
2005	0.2872	0.1016	0.5286	0.2411	0.3671
2006	0.2297	0.2799	0.4193	0.2286	0.3070
2007	0.2110	0.3339	03541	0.2249	0.2912
2008	0.3036	0.3335	0.3663	0.0522	0.3327
$\overline{X}$	0.2816	0.1918	0.4239	0.1599	0.3127
¢	0.0655	0.1840	0.0706	0.0982	0.0354
C.V	0.2326	0.9593	0.1665	0.61.41	