CHAPTER I

INTRODUCTION

1.1 BACKGROUND OF THE STUDY

Nepal is a developing country struggling with current state of Nepalese economy. The economy is characterized by unutilized natural resource, mass poverty, illiteracy, miserable agriculture, deficit trade, and so on. Although agriculture is the main livelihood, scientific method of agriculture has not yet been implemented. Although it is one of the richest countries in the world in terms of natural resources, it could not utilize effectively. Its economy is unbecoming not because of lack of resources but inefficient utilization of resources. Therefore, the proper plan and strategy should be developed for the efficient utilization of resources to enhance the growth of economy. The natural resources available here have remained unutilized due to various reasons. The living standard of people is very low poverty; misery and conflict are existed all around. While the country has been moving towards a market oriented economy since early 1990's, frequent changes in government have hampered the realization of policy reform and delayed the implementation of development projects. It not only depends on availability of fund to fulfill the need of government and businesses but also of individuals. The private domestic investment is very essential for the economic growth as well as for employment generation for the developing country. The healthy economy can be made only through resource mobilization which is possible by the efficient collection of the scattered capital of the people and transfer of these capitals to the firms and individual who are in need to make investment on productive sector. Resource mobilization won't be fruitful only by collecting the scattered resources and making investment. For this, proper investment should be made for its productivity. Here investment management plays significant role.

In today's market consumers are treated as king, and consumers are now quality oriented and they prefer qualities goods. Technological changes has made easier to give many new and surprising materials to the market. Organizations that do not have new technology cannot compete in the market. But technologies are very costly, so an organization should raise enough

money to get the new technologies. Business institution if it is sole generally does not dare to get the funds financed because it is very risky for a single person to bear unlimited liability; single person rarely has enough money to invest also. So business organizations are generally limited companies with many shareholders or sometime partnership firm. Partnership firms also many times can't manage funds so in modern business, public limited companies are one and only one the alternate for investing huge amounts, advent of security market has successfully served the pubic limited companies to raise funds and then invest on the business. Every shareholder has limited liability up to his ownership amount only or the amount of shares he holds. Rest of the financing may be from financial institutions like Banks, Finance Companies etc.

1.1.1 INVESTMENT

An investment is a commitment of funds made in the expectation of some positive rate of return. If the investment is properly undertaken, the return will be commensurate with the risk the investor assumes.

Investments generally involve real assets or financial assets. Real assets are tangible, material things such as buildings, automobiles, and textbooks. Financial assets are pieces of paper representing an indirect claim to real assets held by someone else. These pieces of paper represent debt or equity commitments in the form of stock certificates.

Among the many properties that distinguish real from financial assets, one of special interest to investors is liquidity. Liquidity refers to ease of converting an asset into money quickly, conveniently, and at little exchange cost. Real assets are more heterogeneous, often peculiarly adapted to a specific use, and yield benefits only in cooperation with other productive factors. In addition, returns on real assets are frequently more difficult to measure accurately, owing to the absence of board, ready, and active markets.

An investment involves the sacrifice of current rupees for future rupees. The sacrifice takes place in the present and certain but the reward comes later

and is generally uncertain. Return, risk and time are generally involved in the investment.

Investors may buy and sell financial assets in order to earn return on them. The return better known as reward form investments includes both current income and capital gains or losses that arise by increase or decrease of the security price. Return is the income received in investment. People invest their wealth with an expectation of getting some reward for leaving its liquidity; they only invest in those opportunities where they can get higher return. Hence, investor wants favorable return to be yield by its stock, and go for those, which yield more.

Risk is inseparable from return. Risk in fact is an indication of chance of losing investment values. Different people interpret risks in different ways. To some, it is simply a lack of definite outcome, which can be any unknown event, which may be unfavorable. It is a chance of happening some unfavorable event or danger of losing some material value. Risk in holding securities is generally associated with the possibility that realized returns will be less than the returns that were expected. The source of such disappoint is failure of dividends (interest) and/or the security's priced to materialize as expected. The investment process must be considered in terms of both aspects risk and return.

Another important factor in investment is the time, which offers several different courses of action. Time period depends on the attitude of the investor who follows a "buy and hold" policy. As time moves on, analysts believe that conditions changes and investors reevaluate expected return and risk for each investment.

The investment process describes how an investor should go about making decisions with regard to what marketable securities to invest in, how extensive the investment should be, and when the investment should be made. A five step procedure for making decisions forms the basis of investment process Set investment policy.

a. Set investment policy

The first step of investment process is to set the investment policy which involves determining the investor's objectives and the amount of investable wealth. Investor objective should be stated in terms of both risk and return. This step involves the identification of the potential categories of financial assets for consideration in the ultimate portfolio. This identification is based on the investment objectives, amount of investable wealth, and tax status of investor.

b. Security Analysis

The second step in the investment process is to perform security analysis, involves examining a number of individual securities (or group of securities) within the board categories of financial assets. The purpose of conducting such examination is to identify those securities that currently appear to be mispriced. There are two main approaches to security analysis. They are (1) Technical Analysis (2) Fundamental Analysis.

Technical analysis involves the study of stock market price in an attempt to predict future price movements for the common stock of a particular firm. First, past prices are examined in order to identify recurring trends or patterns in price movements. Then more recent stock prices are analyzed in order to identify emerging trends or patterns that are similar to past ones.

Fundamental analysis begins with intrinsic value of any financial asset equals to present value of all cash flows that the owner of the asset expects to receive. Once the intrinsic value of the common stock of a particular firm has been determined, it is compared with the security's current market price of the common stock. If the current market price of the common stock is below the intrinsic value, a purchase is recommended. Conversely, if the current market price is above this intrinsic value, a sale is recommended.

c. Portfolio Construction

The third step of the investment process is construction of portfolio. Construction of portfolio involves identification of specific securities in which to

invest, along with the proportion of investable wealth to be put into each security. Here, selectivity, timing and diversification need to be addressed by the investors.

d. Portfolio Revision

The four step of investment process portfolio revision which involves both realizing that the currently held portfolio is not optimal and specifying another portfolio to hold with superior risk-return characteristics. The investor must balance the costs of moving to the new portfolio against the benefits of revision.

e. Portfolio Performance Evaluation

The fifth step in the investment process, portfolio performance evaluation, involves determining periodically how the portfolio performed in terms of risk and return, and compares the performance with that of an appropriate "benchmark" portfolio.

1.1.2 PORTFOLIO

A portfolio is a combination of investment assets. The portfolio is the holding of securities and investment in financial assets i.e. bond, stock. Individual securities have risk-return characteristics of their own. Portfolios may or may not take on the aggregate characteristics of their individual part. Portfolio analysis thus takes the ingredients of effects of combining securities and considers the blending or interactive effects of combining securities.

The portfolio management is characterized by Tradition Approach and Modern Approach.

In traditional approach, portfolio planning called for the selection of those securities that best fit the personal needs and desires for the investors. For example, a young, aggressive, single adult would be advised to buy stocks in newer, dynamic, rapidly growing firms. A retired widow would be advised to purchase stocks and bonds in old-line, established, stable companies, such as utilities.

Modern Approach suggests that the traditional approach to portfolio analysis, selection, and management may well yield less than optimum results that a more scientific approach is needed, based on estimates of risk and return of the portfolio and the attitudes of the investor toward a risk-return in trade-off streaming from the analysis of the individual securities.

The return of the portfolio is nothing more than the weighted average of the returns of the individual stocks. The weights are based on the percentage composition of the portfolio. The total risk of the portfolio is more complex. Here we need only point out that securities when combined may have a greater or lesser risk than the sum of their component risks. This fact arises from the degree to which the returns of individual securities move together or interact.

1.1.3 INSURANCE COMPANIES IN NEPAL

Insurance is a contract whereby one person (the insurer) undertakes to compensate another person (the assured) by paying him a sum of money on the happening of a specified event. The consideration for the insurer's promise is the payment by the assured of a sum known as the "premium". Insurance is therefore merely another form of contract for which a special type of rules was evolved over the years.

Main purpose of contract of insurance is to protect the insured from of risk. So the insurer promises to pay on the happening of a specified event. The insurance contract is a device whereby the risk of financial loss accruing from death or disability, or damage to the property is passed on to another. The insurer usually collects an agreed rate of contribution from a large number of people and relieves the insured by paying the insurance money. It does not to attempt to prevent the happening of the event insured, but it merely compensates the insured when the event insured against occurs.

The history of insurance business in Nepal is not as long as in other countries. As the economic was confined completely before 2007, the scope of insurance was also narrow to a large extent. Generally, the insurance activity

in Nepal was executed by the Indian insurance companies prior to 2007. However, the history shows the introduction of insurance company named "Mal Chalani and Beema Co." in 2004. It was later converted into Nepal Insurance and Transport Company Pvt. Ltd. in 2016 which was again renamed as Nepal Insurance Company Ltd in 2048.

Main purpose of insurance is to protect the insured from of risk. So the insurer promises to pay on the happening of a specified event. The insurance contract is a device whereby the risk of financial loss accruing from death or disability, or damage to the property is passed on to another.

The functions and importance of insurance companies can be pointed out as:

- To safeguard losses
- To extend protection
- Underwriting
- To facilitate funds
- To assist in economic development
- Managing claims and losses
- Assists to reduce inflation
- Motivates saving and means of investment

1.2 STATEMENT OF THE PROBLEM

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

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

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

Theory depicts that the stock price in market is guided by intrinsic value, which is calculated by and of company's required rate of return and growth. In an efficient market condition, stock price is equal to the intrinsic value since the buyer and the seller are fully aware of the facts and figures of the company. Therefore, one can say that market price and financial performance are positively correlated but conditions here are totally different from that. Whatever the theory depicted is not applicable in our context, where most of the investors do not know to interpret the information and so they can make an irrational decision, regarding transaction of the stock. Therefore stock price in Nepal is determined more by other factors that the financial performance of the concerned people feels more risk in stock investment than real risk. Investors will be helped to build their confidence, to create optimal portfolio, to find easy tools and techniques to analyze risk and return of individual stock and portfolio, to increase stock investment and stock market efficiency.

The basic research problems are identified as:-

a. Does the risk and return of common stock investment of insurance companies vary significantly?

b. To what extent there is systematic risk in relation to total risk?

c. Which of the portfolio construction within the insurance companies is profitable?

d. How can investors diversify the risk within insurance companies?

1.3 OBJECTIVE OF THE STUDY

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

a. To evaluate common stock of insurance companies in terms of risk and return.

b. To estimate an optimal portfolio among Common Stock investment of insurance companies.

c. To determine whether the shares of insurance companies in Nepal are overpriced or underpriced by analyzing the risk and return characteristics of the individual shares.

d. To evaluate the systematic and unsystematic risk associated with security under study.

1.4 SIGNIFICANCE OF THE STUDY

Traditional investment analysis emphasizes the projection of prices and dividends. That is, the potential price of a firm's common stock and the future dividend stream are forecast, then discounted back to the present. This intrinsic value is then compared with the security's current market price. If the current market price is above below the intrinsic value, a purchase is recommended. Conversely, if the current market price is above this intrinsic value, a sale is recommended.

Although the modern security analysis emphasizes the risk and return estimates rather than mere price and dividend estimates. The risk and return estimates, of course, are dependent on the share price and the accompanying dividend stream.

Investors are investing in shares following trial and error approach. Therefore, it is necessary to establish clear picture about the return from investing in securities. Not only risk and return but the variability in return is to be addressed. These factors i.e. risk and return are the most important factors influencing investment decisions and process.

Existing and potential public investors are not well known about the real financial strengths and weaknesses of the public companies in which they are investing or going to invest their funds.

This study is focused on the risk and returns analysis of individual insurance companies and estimates an optimal portfolio among common stock investment of insurance companies.

This study is conducted to provide basic and necessary information about investment and investment process. This current study will help to take an appropriate decision about how to set investment policies and how to analyze and evaluate the investment worthwhile over the different time period.

The focus of the study is on the analysis of risk, return and portfolio, which will enable investors to guide the investment activities.

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

This research work will be the valuable assets for the further research work.

1.5. LIMITATION OF THE STUDY

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

a. The overall study is based on the secondary data. So the incorrectness of the key source might affect the accuracy of the outcome of the study.

b. Data of FY 2007/08 to 2011/12 are used for the study.

c. Mainly the study is concentrated on risk, return and portfolio estimation of insurance companies.

d. Among the different financial assets, only common stock is taken for the purpose of the study.

e. There is time constraint as it is only a study to fulfill partial requirement of confining MBS Degree.

1.6 ORGANIZATION OF THE STUDY

The entire study has been designed into five main chapters, each devotes to some aspect of study on Risk and Return on Common Stock Investment. The first chapter is introduction. It includes statement of the problem, objective of the study, significance of the study, limitations of the study and organization of the study. The second chapter is review of literature. It is done to know what research had been done in the related topic in previous days and what is to be done at present or in future. This chapter has been divided into three main aspects: conceptual framework, portfolio analysis among multiple assets and Review of previous studies. The third chapter is research methodology. It includes research design, population and sampling, techniques of data collection and tools used for analysis. The fourth chapter is presentation,

analysis and interpretation of data. This chapter is the major part of the study. The data collected from various sources have been tabulated in their sequential order and data have been described and analyzed with the findings. The fifth chapter is summary, conclusion and recommendations. It includes summary, conclusion and recommendations of the study, which are important to solve the problems associated to the present analysis and offers recommendations for the improvement in future. Finally bibliography and appendices have been presented at the end of the study.

CHAPTER II

REVIEW OF LITERATURE

2.1 INTRODUCTION

This chapter provides some review on the literature that is available in the topic risk, return and portfolio analysis. This section covers those studies that are conducted by academicians and scholars. In this part books, research works, journals and articles are reviewed.

2.2 CONCEPTUAL FRAMEWORK

Before getting into the core subject matter, it is necessary to have general knowledge of risk, return and portfolio. Major focus is on analysis of risk, return, and portfolio within the common stock of selected insurance companies.

2.2.1 COMMON STOCK

Common equity in a corporation or partnership or proprietorship interests in a unincorporated firm constitute the first source of funds to a new business and the base of support for borrowing by existing firms. There are different instruments that include a capital structure such as common stock, preference stock, debt and so on. The most important one is common share or equity share or ordinary share. Common stock represents the ownership position in a corporation. Common stock is the first security of a corporation to be issued and in case of bankruptcy, the last to retired. They have the lowest-priority claim on earning and assets of all securities issue. Common stockholders have the power to elect the board of directors. Common stocks are generally fully pain and non-assessable i.e. the common stockholders may lose their initial investment, not more which means stockholders have limited liability to the share that they hold.

In case of liquidity or bankruptcy, common stockholders are in the principal entitled only to assets remaining after all prior claimants have been satisfied. As expressed above, common stock is the most risky security, so, must be in its expected return as well. When investors buy common stock, they receive certificate of ownership as a part of there being part owners of the company. The certificate states the number of shares purchased and their par value."

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

"Of all the other forms of securities, common stock appears to be the most romantic, while fixed income investment avenue may be more important to most of the investors, equity shares seems to capture their interest the most. The potential reward and penalties associated with the equity make them an interesting even exciting proportion, no wonder, equity investment is a favorite topic for conservation in parties and get together."

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

2.2.2 SECURITY MARKET

A security market can be defined as a mechanism for bringing together buyers and sellers of financial assets in order to facilitate trading. Security market exists in order to bring together buyers and sellers of securities. It means the market where the securities are treated. One of the main functions is “price discovery” i.e. to cause prices to reflect currently available information.

Security market can be distinguished into

- Primary and Secondary Market
- Money and Capital Market

Primary Market

Securities offered for the first time to the general public through the primary securities markets. The issuer may be a brand new company or one that has been in business for many years. It is also known as New Issue Market (NIM)

Secondary Market

The Secondary Market is not keeping pace with the growth of the primary market. This is mainly due to lack of the needed efforts on the concerned authority to devise suitable package of measure to encourage the growth of broker networks in the country’s growing stock exchange.

Money Market

Money Market is also called short term financial market which is the set of supplying short term debt or working capital needed for industries, business or incorporated etc. The instruments of money market are government securities, inter-bank deposits, banker’s acceptance, certificate of deposit and commercial papers issued by non-financial institutions.

Capital Market

Capital Market is the market where the transaction of long-term finance is made. The funds collected in this market are raised and traded by long-term financial instruments such as equities and bonds. From the capital market,

the maturity preference of lender and borrower is adjusted. The lender can immediately get cash in case of need and borrower also receives long-term credit.

2.2.3 MARKET PRICE OF THE SHARE

Market price of Shares as the output of the demand and supply interaction is the most influencing factor in determining the price of the stock. In relation to the interacting forces of demand and supply i.e. Market Price is determined at given time and the prices and volumes of its past transaction are meaningful indication of probable relationship of future supply and demand pressure. And such relationship is the most important element in determining the probable direction of the price movements. If the demand exceeds the supply, the price will rise and if the supply exceeds the demand the price will fall.

2.2.4 PROFIT MAXIMIZATION OR WEALTH MAXIMIZATION

In the past, profit maximization was regarded as the only objective of business firms but in modern time, a firm has multiple objectives though some objectives may receive priority over other objectives. It is a rational behavior of the firm to maximize the profit. The financial manager should select the alternative having maximum monetary return. Profit maximization objective is short run objective where as wealth maximization objective is long run objective of the firm. When the time period is short and uncertainty is not much, profit maximization and wealth maximization are almost same. The wealth of the shareholders is measured by the share price of the stock. The share price depends on the timing of returns, cash flow and risk. Generally the value or wealth can be expressed more explicitly in following ways.

$$W\ X \frac{A_1}{(1\Gamma K)} \Gamma \frac{A_2}{(1\Gamma K)^2} \Gamma \frac{A_3}{(1\Gamma K)^3} \Gamma ..... \Gamma \frac{A_n}{(1\Gamma K)^n} ZC$$

$$X \sum_{t X 1}^{n} \frac{A_t}{(1\Gamma K)^n} ZC$$

where,

A_1, A_2, A_3,...,A_n= stream of benefit expected to occur a course of action is adopted.

C = cash out lay or cost of action

K = Discount rate.

W = Value or worth

But the value of the company does not increase itself; there are a number of factors that may contribute to increase the value. The value is represented by the market price of the company's common stock, which in turn reflects the firm's investment strategy, and dividend decisions. So, to maximize of the stock, the financial manager should consider following factors.

- ❖ Project earning per share
- ❖ Timing of the earning stream.
- ❖ Use of debt
- ❖ Dividend policy

Hence, the wealth maximization principal implies that the fundamental objective of a firm should be to maximize the market value of its shares.

2.2.5 STOCK VALUATION

Financial managers use different analytical techniques for valuing common stock. The stockholder expects regular earnings in the form of dividends and capital gain by upward movement of the stock price. To maximize the stock price stock valuation model can be used as important tools. Mainly three basic models are used to value stock.

Table 2.1 Stock Valuation Model

S. No	Model	Valuation Model
1	NAVM	NW=TA-(CL+LTD)
2	DVM	$P_o = \sum_{t\,X1}^{n} \frac{D_1}{(1\ \Gamma\ K_e)}$
3	EVM	P_o = P/E ratio x EPS

Source: *Richard Pike and Neale (1996). "Corporate Finance and Investment decision and Strategies" India: Prentice Hall.pp.76.*

Where,

NVAM = Net Asset Value Model	P_o = Value of the stock today
DVM = Dividend Value Model	D_1 = Dividend Expected in year 1.
EVM = Earning Valuation Model	K_e = Cost of Equity Capital
NW = Net Worth	t = 1,2,3, ...,n yr.
TA = Total Asset	P/E = Price earning Ratio
CL = Current Liabilities	EPS = Earning per share.
LTD = Long Term Debt	

2.2.6 THE EXPECTED RATE OF RETURN ON COMMON STOCK

The expected rate of return is the increase in the expected after tax value of the initial investment over the holding period. The cash payoff to owners of common stock is of two kinds:-

- Cash dividend [Dividend component]
- Capital gain (loss) [capital appreciation]

Capital appreciation is the difference between ending value and beginning value of an investment. Returns are defined as the dividend yield plus capital gain/loss. Thus return comes from two sources, income and price appreciation.

Return is the main attraction for invests to invest in a risky security as stock (equity share) accepting a varying degree of risk tolerance. "The return from holding an investment over some period, say a year is simply any cash payment received due to ownership plus the change in market price, derived by the beginning price. From common stock we can define single period return as:

$$\text{Single Period Return (R)} = \frac{\text{Ending Price } (P_t) - \text{Begining Price } (P_{t-1}) + \text{Dividends } (D_t)}{\text{Begining Price } (P_{t-1})}$$

This formula can be used to determine both actual one period return (when based on historical figure), as well as expected one period return (when

based on expected dividend and prices). Also note that the term in parenthesis in the number of above equation represents the capital gain or loss during the year."

Annualized rate of return over several periods can be calculated in two ways. The first one is simply to take the arithmetic average of the annual Holding Period Return (HPR) over a period and the second one, which also takes in to account the compounding effects of cash receipts over different time intervals, is the geometric mean rate of return.

Simple Arithmetic Mean $HPR = \sum_{t=1}^{n} HPR_t / n$

The geometric mean $HPR_g = \prod_{t=1}^{n} (1 + HPR)^{1/n} - 1$

Where, HPR=Holding Period Return, n = No. Of periods, HPR_g=Geometric mean holding Period return."

2.2.7 RISK ON COMMON STOCK

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

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

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

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

- Interest rate risk

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

- Purchasing power risk

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

- Bull-Bear market risk

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

- Management risk

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

- Default risk

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

- Liquidity risk

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

- Callability risk

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

- Convertibility risk

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

- Political risk

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

- Industry risk

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

2.2.7.1 THE RANGE

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

- Range=Best possible rate of return-Worst possible rate of return

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

2.2.7.2 STANDARD DEVIATION

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

$$\exists = \sqrt{\sum_{t=1}^{n} (R_i - \bar{R})^2 (P_i)}$$ where R_i = Expected rate of return

$P(_i)$ = Probability

∃ = Standard Deviation

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

2.2.7.3 SYSTEMATIC RISK AND UNSYSTEMATIC RISK

Systematic risk is the portion of the total risk of an individual security caused by market factors that simultaneously affect the prices of all securities. It cannot be diversified. It is also called market risk or unavoidable risk or non-diversifiable risk or beta risk. It stems from factors, which systematically affect

all firms, such as war, inflation, recession, high interest rate, depressions, and long term changes in consumption in the economy.

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

Systematic risk has its source factors that affect all marketable assets and thus cannot be diversified away. The sources of systematic risk are market-pervasive. The measure of systematic risk permits an investor to evaluate an asset's required rate of return relative to the systematic risk of the stock. Unsystematic (company specific/unique) risk can be reduced through diversification. The relationship among total risk, systematic risk and unsystematic risk are shown below:-

Total risk = Systematic Risk + Unsystematic Risk

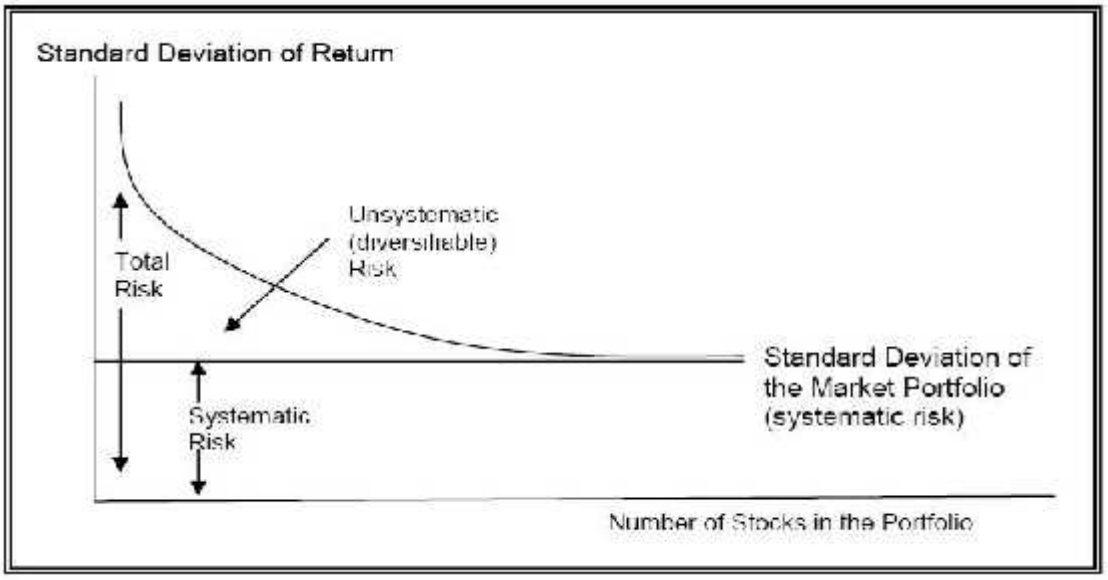
or, $\exists_j=(\exists_j) \times (\partial_{jm}) + (\exists_j)(1-\partial_{jm})$

or, $\exists_j= \wp^2 \times \text{Var}(r_m) + \text{Var}(e)$

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

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

Figure 2.1 Relation between S.D. of portfolio and Number of securities in portfolio.



Systematic risk refers to that portion of total variability in return caused by factors affecting the prices of all securities. Economic, political, and sociological changes are sources of systematic risk. Their effect is to cause prices of nearly all individual common stocks and/or all individual bonds to move together in the same manner.

Systematic risk includes Market risk, Interest rate risk and purchasing power risk. "Market risk and interest rate risk can be defined in terms of uncertainties as to the amount of current dollars to be received by an investor's purchasing power risk is the uncertainty of the purchasing power of the amounts to be received. In more, every day terms, purchasing power risk refers to the impact of inflation or deflation on an investment."

Unsystematic risk is that portion of total risk that is unique to a firm or industry. Factors such as management capability, consumer preferences, and labor strikes can cause systematic variability of returns for in a firm. Unsystematic factors are largely independent of factors affecting securities markets in general. Because these factors affect one firm, they must be examined separately for each company.

The uncertainty surrounding the ability of the issuer to make payments on securities seems from two sources: (1) The operating environment of the business, and (2) the financing of the firm. These risks are referred to as business risk and financial risk, respectively. They are strictly a function of the operating conditions of the firm and the way in which it chooses to finance its operations. Our intention here will be directed to the broad aspects and implications of business and financial risk."

2.2.7.4 PORTFOLIO

Conceptually portfolio is a collection of securities that have been gathered to achieve certain investment goals. Investors usually diversify their portfolio in order to minimize their risk given the rate of return. To minimize the risk of portfolio an individual invest in securities with different risk and return characteristics. This procedure is called diversification. The degree of diversification varies depending on how risk avert the investor, is. This determines the level of risk and return of the portfolio. “An efficient portfolio is that portfolio which maximizes return for a given risk or minimizes, risk for a given return. The efficient frontier may be defined as the collection of all possible portfolios that are not dominated or that have the maximum possible expected return, given a level of risk or standard deviation”.

Portfolio can be classified into

a. Growth oriented portfolio and
b. Income oriented portfolio.

Growth oriented portfolio is a part portfolio whose primary objective is long-term price appreciation. Income oriented portfolio is a portfolio that stresses current dividends and interest return.

There are two types of objectives of portfolio:

Primary Objectives	Secondary Objectives
o Maximization of Profit o Minimization of risk.	o Regular return o Stable income. o Appreciation of Capital. o Ever liquidity. o Easy marketability. o Safety of investment. o Tax Benefits.

2.2.8 CAPITAL ASSETS PRICING MODEL (CAPM)

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

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

1. Investors evaluate portfolios by looking at the expected returns and standard deviations of the portfolio over a one-period horizon.
2. Investors are risk averse, so when given a choice between two otherwise identical portfolios, they will choose the one with the higher expected return.
3. Investors are never satisfied, so when given a choice between two otherwise identical portfolios, they will choose the one with lower standard deviation.
4. Individual assets are infinitely divisible meaning that an investor can buy a fraction of a share if he or she so desires.

5. There is a risk–free rate, at which an investor may either lend (that is invest) money or borrow money.
6. Taxes & transactions costs are irrelevant.
7. All investors have the same for one period horizon.
8. The risk–free rate is the same one period horizon.
9. Information is freely and instantly available to all investors.
10. Investors have ‘homogeneous expectation’ meaning they have the same perception in regard to the expected returns, standard deviations, and covariance of Securities.

The equation for CAPM is

$$E(r_i)= R + [E(r_m) – R]\, b_i$$

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

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

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

b_i is the systematic or market related risk.

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

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

"Remember the relevant risk associated with an individual stock is based on its systematic risk, which depends on how sensitive the firm’s operations are to economic events such as interest rate changes and inflationary pressures. Because the general movements in the financial market reflect movement in the economy, the market risk of the stock can be measured by observing its tendency to move with the market, or with an average stock that has the same

characteristics as the market. The measure of the stock's sensitivity to market fluctuations is called its beta coefficient. Beta is a key element of the CAPM."

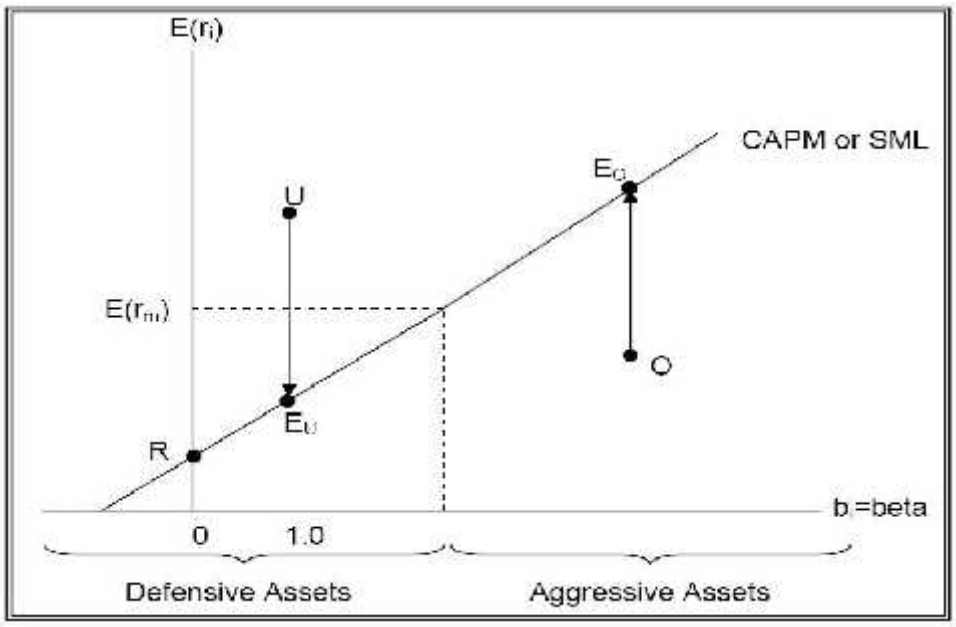
"Based on the behavior of the risk averse investor, there is implied an equilibrium relationship between risk and expected return for each security. In market equilibrium, a security will be expected to provide a return commensurate with its unavoidable risk. This is simply the risk that cannot be avoided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

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

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

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

Figure 2.2 The Capital Assets Pricing Model



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

A vertical line in the Figure 2.2 shows a risk class for systematic risk. The CAPM relates an expected return to each of the systematic risk. These expected returns can be interpreted as the appropriate discount rates, as the cost of capital, or as equilibrium rate of return that investors expect for that amount of systematic risk. In the figure, U and O are not in equilibrium on the CAPM. Asset U is undervalued and therefore desirable to own the asset. The price of U will rise in the market as more investors purchase it. When price goes up of asset U, its return falls. When U's return falls to the return consistent with its beta on the SML, equilibrium is attained. The asset O is overvalued. Investors will attempt to sell O, and therefore puts the downward pressure on O's price. When the return on asset O increases to the rate that is consistent with the beta risk level given by the SML, equilibrium will be achieved and downward price pressure will cease.

Hence, the CAPM or SML is relationship in which the expected rate of return of the individual asset is a linear function of that asset's systematic risk as represented by beta (β), symbolically. According to Sharpe & Litner (CAPM) study: the greater the beta of a security, the greater the risk and the greater the expected return required. The lower the beta, the lower will be the risk.

2.2.9 CAPITAL MARKET LINE (CML)

If borrowing and lending opportunities are included in the chart analysis, a linear set of investment opportunities is appeared called capital market line (CML) emerges. It is the locus of the portfolios that wealth seeking risk-averse investors will find more desirable than any other portfolios. CML illustrates the positive relationship between risk and average return. So, it is always be positive sloped because investors are risk averse i.e. sleepless.

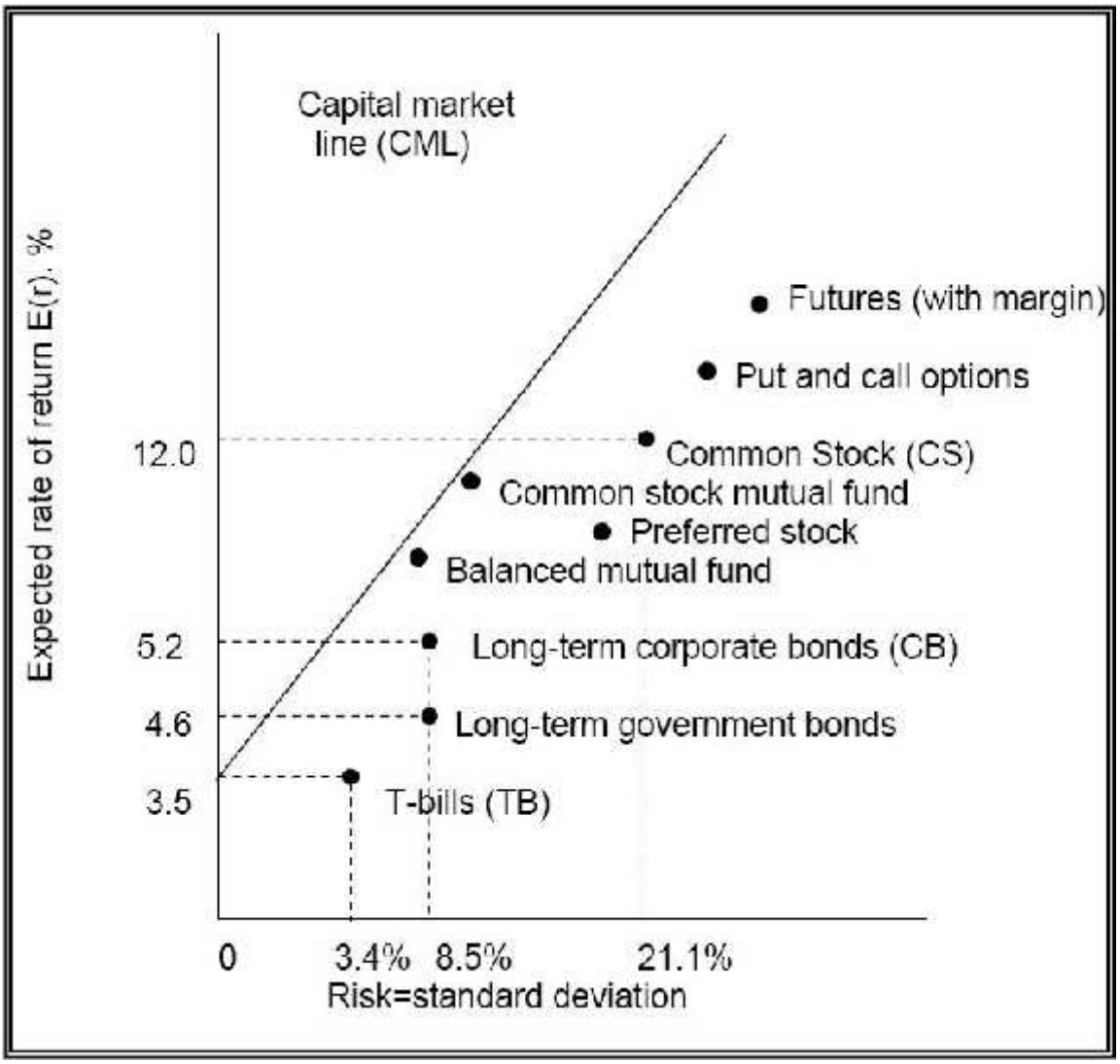
The assumptions underlying capital market theory are as follows:

1. Money can be borrowed and lent at the risk-free rate.
2. All investors have homogenous expectations concerning expected returns and risks on securities.
3. Investments are infinitely divisible.
4. No taxes or transaction costs exist.
5. No inflation exists.
6. Capital markets are in equilibrium.

The main focus of investment graphed in risk-return space which has (1) the maximum expected rate of return in their risk class or (2) the maximum risk at whatever rate of return is selected. The efficient investments are called efficient portfolios because individual assets are dominated and will not be able to attain the efficient frontier. So, if it is constructed, it will be found convex towards expected rate of return axis in risk rate space.

The portfolio having risk reducing power of diversification is needed to reach a positive in risk-return space that is on or near the CML. Only diversified portfolio can attain the CML. The CML is assumed to be the market equilibrium situation and is the locus of the most desirable, or most dominant, investment portfolios. CML concentrates how to form a portfolio that is efficient enough to lay on the CML.

Figure 2.3 The capital Market Line (CML) and other investment opportunities



Source: *Jack Clark Francis, Investment: Analysis and Management: Seventh Edition McGraw-Hill, Inc, New York, P-19.*

The dots that lie below the CML represent individual stocks, bonds, commodity futures, puts, calls, and other investments. The dots labeled CS, CB, and TB represents the average common stock (CS), corporate bond (CB), and Treasury bill (TB) investments that were shown in the Figure 2.3.

2.3 PORTFOLIO ANALYSIS AMONG MULTIPLE ASSETS

The capital-asset pricing model (CAPM) discovered by Sharpe (1964), Litner (1965) and Mossin (1966) is a general equilibrium model. It not only allows improved understanding of market behavior, but also provides practical benefits. At the same time, it also provides a practical mechanism for evaluating performance in a risk-adjusted mode. This model thus provides the initial basis for the practical implementation of the many aspects of portfolio analysis. However, Richard Roll (1977) has directed some biting criticism at the tests in affirming the CAPM. This criticism is aimed at one of the critical notions "the identifying of the efficient market portfolio". This paper solves the highly difficult problem by a geometrical way. It first denotes the efficient frontier of Markowitz model with the weights vector of portfolio. Then, it denotes the capital market line (CML) with the weights vector too. By the definition of the CML, the efficient market portfolio thus can be identified.

In the path-breaking work on Portfolio Selection, Markowitz (1952) developed the concept of an efficient portfolio in terms of the expected return and standard deviation of return. It analyses the ingenerate relation between the return and risk for portfolio quantification. The Markowitz model is the foundation for portfolio. It make people be able to describe and solve the optimization question of a portfolio by the numbers. The Markowitz model is normative it shows how investors ought to behave. Given that investors behave in the fashion suggested by Markowitz, there are implications for

- The behavior of security prices,
- The sort of risk-return relationship that one would expect, and
- The appropriate measure of risk for securities.

The capital-asset pricing model (CAPM) discovered by Sharp (1964), Litner (1965) and Mossin (1966) is a general equilibrium model that attempts to provide more explicit answers for those implications.

The CAPM not only allows improved understanding of market behavior, but also provides practical benefits. At the same time, it also provides a practical mechanism for evaluating performance in a risk-adjusted mode. This model

thus provides the initial basis for the practical implementation of the many aspects of portfolio analysis. However, Richard Roll (1977) has directed some biting criticism at the tests in affirming the CAPM. This criticism is aimed at one of the critical notions "the concept of a market portfolio".

2.3.1 EFFICIENT FRONTIER OF MARKOWITZ MODEL

Portfolio construction can be viewed as a matter of selecting securities to include in a portfolio and then determining the appropriate weighting: proportional representation of the securities in the portfolio. The Markowitz model indicates that the proper goal of portfolio construction should be to generate a portfolio that provides the highest return at a given level of risk or the minimum risk at a given level of return. A portfolio having this characteristic is known as an efficient portfolio and lie in the solution set of the below model.

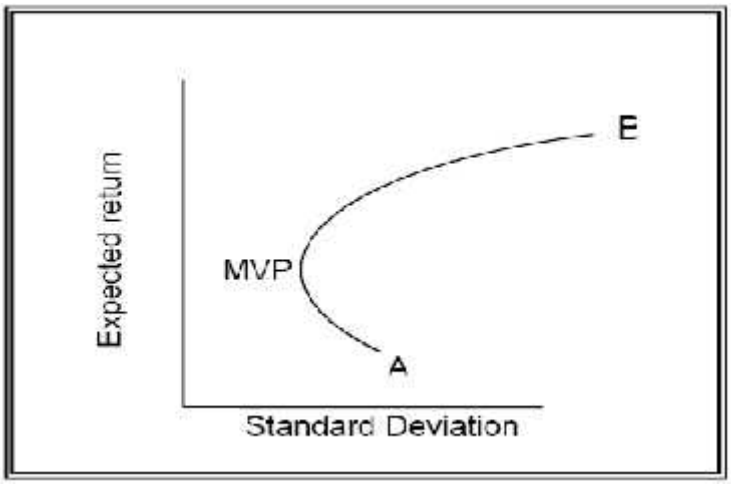
$$
\text{(I)}\quad
\begin{cases}
\min \exists_p^{\,2} = X X^T \phi X \\
\max E(r_p) = X X^T R \\
\text{s.t.} \sum_{i=1}^{n} x_i = 1
\end{cases}
$$

$R = [R_1, R_2, \ldots, R_n]^T, R_i = E(r_i)$ is the expected return rate of the i^{th} asset.

$X = [X_1, X_2, \ldots, X_n]^T$ is the weight vector of the portfolio. $\phi = [\exists_{ij}]_{n|n}$ is the covariance matrix of n assets. $R_p = E(r_p)$ and $\exists_p^{\,2}$ are the expected return rate and its variance of portfolio. The $\exists_p$, which is used to measure the risk of portfolio by Markowitz and called the standard deviation of the return rate, express the scope between the return rate of portfolio r_p and $E(r_p)$.

It is common knowledge that the solution of the model (I) is the curve $\overline{AB}$ in $\exists_p = R_p$ space (figure 2.4) and is called the *efficient frontier* of portfolio.

Figure 2.4 Standard Deviation



Because $x_1 \Gamma x_2 \Gamma o \Gamma x_n \; X1, x_n \; X1 Z x_1 \; Z x_2 \; Z o \; Z x_{nZ1}$. The expected return $R_p \; XE(r_p)$ and its variance $\exists_p^{\,2}$ of portfolio can be represented:

$$R_p \; X x_1 R_1 \Gamma x_2 R_2 \Gamma o \Gamma x_{nZ1} R_{nZ1} \Gamma (1 Z x_1 \; Z o \; Z x_{nZ1}) R_n \qquad (2.1)$$

$$\exists_p^{\,2} \; X x_1^{\,2} \exists_{11} \Gamma x_2^{\,2} \exists_{22} \Gamma o \Gamma x_{nZ1}^{\,2} \exists_{nZ1nZ1} \Gamma (1 Z x_1 \; Z o \; Z x_{nZ1})^2 \exists_{nn}$$
$$\Gamma 2 x_1 x_2 \exists_{12} \Gamma o \, 2 x_1 x_{nZ1} \exists_{1nZ1} \Gamma 2 x_1 (1 Z x_1 \; Z o \; Z x_{nZ1}) \exists_{1n}$$
$$\Gamma o \; \Gamma 2_{nZ1} (1 Z x_1 \; Z o \; Z x_{nZ1}) \exists_{nZ1n} \qquad (2.2)$$

The covariance matrix ϕ is a definite matrix. So the formula (2.2) stands for an equal variance ellipsoid in the weights-space(x_1, $x_2, o \; x_{n-1}$). With regard to different $\exists_p^{\,2}$, we can get a family of equal-variance ellipsoids that have a concentric MVP. The center MVP expresses the portfolio that has the least risk in the set of feasible portfolios. In the weights-space (x_1, $x_2, o \; x_{n-1}$), the formula (2.1) stands for an equal-expected-return super-plane. With regard to different R_p, we can obtain a family of parallel super-plane. So the optimal weights of the portfolio that includes n assets should be the tangential point between the equal -expected-return super-plane (2.1) and the equal-variance ellipsoid (2.2). Joining these tangential points, we can obtain straight line that is called the critical-line of the portfolio of n assets. In fact, the critical-line is the manifestation of the efficient frontier in weights-space.

Knowing from differential geometry, the normal vector of the formula (2.1) at point (x_1, x_2, o x_{n-1}) is:

$$(R_1 \, Z R_n, R_2 \, Z R_n, o, R_{n Z1} \, Z R_n)$$

The normal vector of the formula (2.1) at point (x_1, x_2, o x_{n-1}), is

$$(\exists_{11} \, \Gamma \exists_{nn} \, Z 2 \exists_{1n}) x_1 \, \Gamma o \, \Gamma (\exists_{1k} \, \Gamma \exists_{nn} \, Z \exists_{1n} \, Z \exists_{kn}) x_k \, \Gamma o$$
$$\Gamma (\exists_{1nZ1} \, \Gamma \exists_{nn} \, Z \exists_{1n} \, Z \exists_{nZ1n}) x_{nZ1} \, \Gamma \exists_{1n} \, Z \exists_{nn}$$

$$o o o o o o o o o,$$

$$(\exists_{1nZ1} \, \Gamma \exists_{nn} \, Z \exists_{1n} \, Z \exists_{nZ1n}) x_1 \, \Gamma o \, \Gamma (\exists_{knZ1} \, \Gamma \exists_{nn} \, Z \exists_{kn} \, Z \exists_{nZ1n}) x_k \, \Gamma o$$
$$\Gamma (\exists_{nZ1nZ1} \, \Gamma \exists_{nn} \, Z 2 \exists_{nZ1n}) x_{nZ1} \, \Gamma \exists_{nZ1n} \, Z \exists_{nn}$$

Let

$P_1 = [1,0,0, o, 0,0,-1]$

$P_2 = [0,1,0, o, 0,0,-1]$

$o \; o \; o \; o \; o$

$P_{n-1} = [0,0,0, o, 0,1,-1]$

$$Q \begin{matrix} 1 & 0 & o & 0 & 0 \\ 0 & 1 & o & 0 & 0 \\ M & M & o & M & M \\ 0 & 0 & o & 1 & 0 \\ Z1 & Z1 & o & Z1 & 1 \end{matrix} W \begin{matrix} x_1 \\ x_2 \\ M \\ x_{nZ1} \\ 1 \end{matrix}$$

Then the normal vector of the formula (2.1) at point (x_1, x_2, o x_{n-1}) can be simplified to $(P_1 \phi QW, P_2 \phi QW, o, P_k \phi QW, o, P_{nZ1} \phi QW)$ According to the definition of the critical-line, we can obtain the equation of the critical-line (i.e. the efficient frontier of Markowitz Model) that is

$$\frac{P_1 \phi QW}{R_1 \, Z R_n} X \frac{P_2 \phi QW}{R_2 \, Z R_n} X o \; X \frac{P_k \phi QW}{R_k \, Z R_n} X o \; X \frac{P_{nZ1} \phi QW}{R_{nZ1} \, Z R_n} \text{.....(2.3)}$$

By the formula (2.3), we can obtain a linear equations group that is composed of n-1 linear equations.

$$a_{11} x_1 \, \Gamma a_{12} x_2 \, \Gamma o \, \Gamma a_{1nZ1} x_{nZ1} \, X b_1$$
$$a_{21} x_1 \, \Gamma a_{22} x_2 \, \Gamma o \, \Gamma a_{2nZ1} x_{nZ1} \, X b_1$$
$$o o o o o$$
$$a_{nZ2,1} x_1 \, \Gamma a_{nZ2} x_2 \, \Gamma o \, \Gamma a_{nZ2nZ1} x_{nZ1} \, X b_{nZ2} \text{.....(2.4)}$$

Here,

$$a_{ij} \, X \frac{\exists_{ij} \, \Gamma \exists_{nn} \, Z \exists_{in} \, Z \exists_{jn}}{R_i \, Z R_n} Z \frac{\exists_{i,nZ1} \, \Gamma \exists_{nn} \, Z \exists_{jn} \, Z \exists_{nZ1,n}}{R_{nZ1} \, Z R_n}$$

$$b_i = \frac{\sigma_{in} - \sigma_{nn}}{R_i - R_n} - \frac{\sigma_{n-1,n} - \sigma_{nn}}{R_{n-1} - R_n} \quad (i=1, 2, \ldots n-2, j=1, 2, \ldots, n-1)$$

2.3.2 CAPITAL MARKET LINE (CML) AND THE MARKET PORTFOLIO

The CAPM is usually derived on the assumption that there exists a risk less asset available for investment. It is further assumed that investor can borrow or lend as much as desired at risk-free rate. Given this opportunity, investors can then mix risk-free assets with a portfolio of risky assets M to obtain the desired risk-return combination. Let W represents the proportion invested in risk-free assets and 1-W the proportion invested in the risk assets, we can use a formula to calculate the expected return on the combination of portfolio R_p:

$$R_p = E(r_p) = Wr_f + (1-W)E(r_M) = Wr_f + (1-W)R_M \quad \ldots\ldots\ldots\ldots (3.1)$$

The variance of the portfolio is:

$$\sigma_p^2 = W^2\sigma_p^2 + (1-W)^2\sigma_M^2 + 2W(1-W)\rho\sigma_f\sigma_M = (1-W)^2\sigma_M^2 \quad \ldots\ldots (3.2)$$

So,

$$\sigma_p = (1-W)\sigma_M \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (3.3)$$

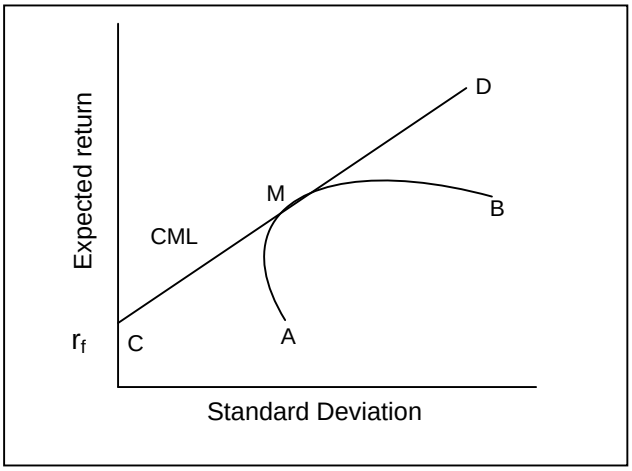
Taking the formula (3.3) into formula (3.1), we get:

$$R_p = r_f + \frac{R_M - r_f}{\sigma_M}\sigma_p \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (3.4)$$

This is the capital market line (CML).

The possibility of lending and borrowing changes the original efficient frontier AMB to the straight line CMD, as shown in Figure 2.5. This line, rising from the interest rate point C on the vertical axis and tangential to the curve at point M, sets out all the alternative combinations of the risky portfolio M with risk-free borrowing and lending. The portfolio M is called the efficient portfolio, it is an efficient portfolio.

Figure 2.5 Efficient Portfolio



Changing the formula (3.4) into:

$$R_p = r_f + k\sigma_p \quad \text{.....(3.5)}$$

We can then obtain

$$\sigma_p^2 = \frac{1}{k^2}(R_p^2 - 2R_p r_f + r_f^2) \quad \text{..... ....(3.6)}$$

Taking $R_p = X^T R$ and $\sigma_p^2 = X^T \phi X$ into the formula (3.6), we can get:

$$X^T \phi X = \frac{1}{k^2}(X^T R - r_f)^2 \quad \text{..... ...(3.7)}$$

The rank of the linear equations group (2.4) is n-2, so the number of its basic set of solutions is 1. That is saying that $x_2, x_3, \ldots, x_{n-1}$ can all be expressed by x_1. Knowing from the formula (2.5), therefore, x_n can be expressed by x_1 too. Taking $x_2, x_3, \ldots x_n$ into the formula (3.6), we get a quadratic equation with one unknown concerning x_1. The point M is a tangential point, so x_1 has only one root. According to the extract roots formula, we can find the values of x_1 and k. Then we can get naturally the value of $x_2, x_3, \ldots x_n$. By the value of k, we can also get the equation of the capital market line (CML). According to the following formulas:

$$R_p = X^T R \quad \text{.....(3.7)}$$

$$\sigma_p^2 = X^T \phi X \quad \text{.....(3.8)}$$

We can obtain the expected return R_M and the variance σ_M^2 of the efficient market portfolio respectively.

2.4 REVIEW OF PREVIOUS STUDIES

2.4.1 FOREIGN CONTEXT

In the year 2004, Elyas Elyasiani has used the Multivariate Generalized Autoregressive Conditionally Heteroskedastic (GARCH) method by taking daily data from January 4, 1988 to December 29, 2000 and data are sorted into three portfolios – the Money Centre Bank, the Large Bank and the Small Bank portfolios and drawn the conclusion as "The study examines the effect of interest rate volatility on bank stock returns and risk. Volatility in financial markets is generally overlooked in bank asset pricing models as a factor influencing bank stock returns and/or stock volatility. However, according to the results reached volatilities, as measured by volatilities of the short-term and long-term interest rates, do play a considerable role in determining the distribution of the bank stock returns, with the direction of the effect being model dependent. Specifically, fluctuations in the long-term interest rate volatility are found to increase bank stock return volatility. Hence, the use of a misspecified model may subject the direction and the magnitude of the interest rate effect to error and may misguide investors in bank stocks, as well as bank managers and policy makers. The overall results seem to be more plausible in the second model which uses the long-term interest rate level as an argument in the mean return equation. Determination of the appropriate interest rate in the bank asset pricing model through a formal model selection procedure is a logical next step in addressing the issues of concern".

In year 2004 Peter Byrne and Stephen Lee had different tools and techniques such as mean-variance model, mean absolute deviation approach, lower partial movement and minimax model in their research and concluded that "Traditionally, the measure of risk used in portfolio optimization models is the variance. However, alternative measures of risk have many theoretical and practical advantages and it is peculiar therefore that they are not used more frequently. This may be because of the difficulty in deciding which measure of risk is best and any attempt to compare different risk measures may be a futile exercise until a common risk measure can be identified. To overcome this, another approach is considered, comparing the portfolio holdings

produced by different risk measures, rather than the risk return trade-off. In this way we can see whether the risk measures used produce asset allocations that are essentially the same or very different. The results indicate that the portfolio compositions produced by different risk measures vary quite markedly from measure to measure. These findings have a practical consequence for the investor or fund manager because they suggest that the choice of model depends very much on the individual's attitude to risk rather than any theoretical and/or practical advantages of one model over another."

2.4.2 NEPALESE CONTEXT

Paudel, has carried out study about "Investing in shares of commercial Banks in Nepal: An assessment of return and risk elements."

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

His findings are summarized as below:

Bank	Price	K_{avg}	K
Nepal Arab Bank Ltd.	Over-priced	5.90	6.18
Nepal Indosuez Bank Ltd.	Over-priced	5.79	5.90
Standard Chartered Bank Ltd.	Under-priced	7.06	5.72
Himalayan Bank Ltd.	Over-priced	5.52	6.00
Nepal SBI Bank Ltd.	Under-priced	8.56	5.82
Nepal Bangladesh Bank Ltd.	Under-priced	14.24	5.81
Everest Bank Ltd.	Under-priced	13.09	5.75
Bank of Kathmandu Ltd.	Under-priced	15.57	5

Where,

K_{avg}= Average mean return

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

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

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

2.4.3 REVIEW OF MASTER'S THESES

Bhandari (2003), conducted the study on "*Risk Return analysis in common stock Investment of listed companies in Nepal."* out of the objective, "risk return of common stock and their portfolio in a simple way and to study volatility" is related with this study.

His finding was that expected return on the common stock of Nepal Finance and Saving Co. Ltd. is highest (i.e. 91.56%). His study was related with various types of organizations but results derived some relevant organizations are as below:

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

Adhikari (2002), conducted the study on common stock investment by using nine years data year from 1992/1993 to 2000/2001. There were various objectives of the study; among them one "to evaluate common stock of listed commercial banks in terms of risk and return and to perform sector wise comparison on the basis of market capitalization" is related to this study. Expected return of HBL is minimum (i.e. 13.3%) only HBL's expected rate of return is lower than market return (i.e. 13.3 %< 23.85%). The risks C.V of SCBNL has 0.9689 risks per 1% return but HBL has highest risk 1% of return (i.e. 2.9261). Market beta of Bank of Kathmandu ltd. is most volatile (i.e. β=1.9656) and SCBNL's common stock is least volatile (i.e. β=0.2218). All banks common stocks are under-priced.

Sitaula (2003), "Risk and Return Analysis of Joint Venture Banks of Nepal", he conducted his study between NABIL, HBL and SBI, he create the portfolio of two asses case. His findings are summarized as below:

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

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

Pokhrel (2004), conducted the study on Portfolio analysis on common stock of Joint venture Banks in Nepal, by using nine years data year from 1993/94 to 2002/2003. He has conducted the study of all the Joint Venture banks that are NABIL, SCBNL, HBL, SBI, NBBL, and EBL. There were various objectives of the study; among them one "to estimate the optimal portfolio among common stock investment of JVBs" is related to this study. In his study all the common stock of JVBs are underpriced. Correlation between HBL and EBL was found tos have 1, there is no chance to minimize risk by

creating portfolio of HBL and EBL so excluding the EBL, he has estimated the optimal portfolio among the remaining five JBVs whose return was 88.2% and the risk underlying on it was 102.3% with the investing weight as:

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

Thapa (2009) conducted the research study "*Risk and return analysis of common stock*" with special reference to insurance company. The major objectives of the study were as follows:

- To analyze the risk and return of common stock,
- To focus on the common stock of listed insurance companies, and
- The five listed insurance companies are taken into consideration.

With the aim of providing help to the study, sound methodology has been used for the analysis of the collected information. Both financial and statistical tools have been used for the analysis. Tables, graphs and diagrams are used to make the finding simple and easy to understand. This study primarily depends on secondary data collected from Nepal Stock Exchange, Nepal Rastra Bank and the financial records of the studied companies.

The research findings of the study were as follows:

- Major conclusions derived from her study are stock have greater risk than other form of securities hence investors must be prepared to face the up and down of the stock market.
- One the basis of industry wise comparison HGIC has greatest market share of 48.7% where as PIC has the lowest market share of 1.2%, which means that HGIC has the biggest market followed by EIC, NIC, UIC and PIC.

- On the basis of sector wise comparison the banking sector has highest market share of 67.4%, where as trading sector has the market share of 1.3%. The size of the different sector in the market is in the increasing trend.
- In case of return, she had concluded that return is the changes in the initial value plus cash distribution in addition to the initial value. Expected return of common stock of EIC is the highest at 41.2% where as the NIC has least return at 17.7%.
- On the basis of sector wise comparison banking has maximum expected return where as hotel and trading sector has negative return. From the investment point of view, EIC is the best as it has high return and moderate risk due to moderate C.V. Since the beta of all studied companies is greater than one, it indicates that the share is more risky of volatile than the market.
- The beta co-efficient of the various companies PIC, HGIC, EIC, UIC and NIC are 1.24, 2.06, 2.0, 1.3 and 2.86 respectively.
- The P/E ratio of the sampled insurance companies range from 0.3 to 20.76; generally P/E ratio indicates investor's expectations about the company performance. HGIC has the highest P/E ratio where as NIC has the lowest.
- Among the selected companies, the stock prices are under priced. Stock of PIC, HGIC, EIC and UIC are underpriced where as stock price of NIC is overpriced.

Pradhan (2010) had conducted the research on "*Risk, Return and Portfolio Analysis of Common Stock of Insurance Companies*". The major objectives of the study were as follows:

- To focus on analysis of price movement of individual insurance companies.
- To analyze and evaluate the insurance companies in terms of their risk and return.
- It will also focus on the analysis of portfolio that can be constructed by bringing together the risk and return of all insurance companies included in the study.

Nepalese investors are facing various aforementioned problems in setting their investment policies, evaluating financial assets, constructing portfolio and revising and analyzing their portfolio performance. The key objectives of the study revolve around the subject of finding out risk minimizing tools and techniques in relation to certain financial as well as other constraints.

The research findings of the study were as follows:

- Stock market being one of the prominent sources of economic development, ultimately, its potential investors are biggest assets. The target of this study is to explore and increase stock investment. Modern security analysis emphasizes the risk, return analysis rather than price and dividend estimates.
- The risk and return estimate is dependent upon the share price and the dividend stream. The investors are investing in shares by trial and error approach.

Bhattarai (2011) had conducted the research study title "*Risk and return on Common Stock Investment in commercial banks*." The study has undertaken to focus on the risk and return on financial assets like common stock of two Neplese Commercial Bank, Nepal Credit & Commerce Bank and Kumari Bank. The objectives of the study were as follows:

- To study and analyze the risk and return of a common stock investment.
- To find overpriced, underpriced and equilibrium priced common stock of commercial banks.
- To analyze the risk and return relationship of individual stock with that of market.
- To identify the covariance and correlation between the return of common stock of commercial banks.
- To calculate and analyze the risk and return of different portfolio.
- To study and analyze the Beta-coefficient.

The research findings of the study were as follows:

- The expected return that on the common stock of KBL is the maximum i.e. 76.76% due to effect of increase in price of share in the secondary market and it is also affected be the issue of bonus share.
- The expected return of NCCB has found minimum to compare with KBL i.e. 50.49% due to price of share in the secondary market and there is no distribution of dividend. The price evaluation of stock of commercial banks of Nepal Credit and Commerce Bank is underpriced and Kumari Bank is overpriced.
- There is no stock in equilibrium (i.e. the stock market is not in equilibrium and the stock in the market are striving towards equilibrium) and correct priced (i.e. expected rate or return equal to required rate of return). There is negative required rate of return of the stock of KBL due to negative Beta coefficient of stock. In the analysis of correlation of stocks there is no perfect positive and perfect negative correlation coefficient between the stock of two banks which is determined with the help of co-variance from calculation we found stock of banks have negative correlation coefficient it seems better because negatively correlated stock can reduce total risk considerably.
- The analysis of market sensitivity of common stock of commercial banks shows common stock of NCCB is more volatile because it has highest Beta coefficient i.e. 3.8256 which shows the change in market return by 1% bring the change in the return on common stock of NCCB by 3.8256%. The Beta coefficient of KBL have negative Beta coefficient which shows even the market is prosperous the stock of KBL connot significantly perform or vice versa.
- At last the calculation of risk and return of portfolio between the stocks KBL and NCCB has found that the return is average return i.e. 77.33% between the banks KBL (76.76%) and NCCB (50.48%).
- Similarly, the portfolio risk has also reduced to 85.48% while the risk of NCCB 110.79 and KBL 116.14%. Risk can be reduced by investing in portfolio rather than investing in the individual stock. From the analysis

of optimum portfolio or minimum risk portfolio the weight allocation are 75.93% and 24.07% between NCCB and KBL respectively.

2.5 Concluding Remarks

There are very few research work conducted on this same case study with special reference on Insurance Companies though there are many research done on Banking and Finance Companies. Hence the primary aim of this research work is to present the risk and return on common stock of Insurance Companies.

CHAPTER III

RESEARCH METHODOLOGY

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

3.1 RESEARCH DESIGN

The research is based on recent historical data that are collected from secondary sources. It covers ten years period from F/Y 2007/08 to F/Y 2011/12

A.D. It deals with the study of risk, return and portfolio analysis of insurance companies on the basis of available information. As the title of the research suggests, it is more analytical, empirical and less descriptive. This study has followed descriptive cum analytical research design.

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

3.2 POPULATION AND SAMPLE

As on Mid July 2012, there are 21 Insurance Companies that are listed in NEPSE and out of them there are 3 insurance companies are taken as sample which is 14.29% of population.

3.3 DATA COLLECTION TECHNIQUES

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

3.4 DATA ANALYSIS TOOLS

Market price of stock (P):

Among the various major data of the study, market price of stock is the most important. There are three-price records available, namely high price, low price and closing price of each year. Therefore two approaches either average price (i.e. average of high and low price) or closing price can be used.

By using average price, result may be very close to reality as it represents the price of whole year, but it is very difficult to obtain the real average. To get the real average, volume and price of each transaction in the stock and duration of time of each transaction in the whole year are essential. So, it is, of course, very hard and difficult together and includes all these information and average of high and low price cannot be used for this study. Due to such difficulties, it is very difficult to use average price as market price of stock, which has a specific time span of one year and the study has focused in annual basis.

Dividend (D):

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

In this study, models have been developed considering practical and theoretical aspect as well.

In case of stock dividend;

Total dividend amount = Cash Dividend + Stock Dividend % x Next years MPS

where, MPS = Market Price Per share

Return on common stock investment (R):

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

Symbolically

$$R \; X \frac{D_t \; \Gamma (P_t \; Z P_{t \; z1})}{P_{t \; z1}}$$

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

D_t= Cash Dividend received at time t.

P_t= Price of stock at time t.

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

Expected Return of common stock $E(R_j)$:-

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

Symbolically,

$$E(R_j) X\overline{R_j} X\frac{R_j}{n}$$

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

N= Number of years that the return is taken.

ϕ= Sign of summation.

Standard Deviation ($\pm$)

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

Symbolically

$$\exists_j X\sqrt{\frac{\phi(R_j Z\overline{R_j})^2}{n Z1}}$$

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

Co-efficient of variation (C.V.)

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

Symbolically

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

Beta ( ):

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

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

Where β_j = Beta co-efficient of stock J.

$$Cov(R_j, R_m) = \frac{(R_j - \bar{R}_j)(R_m - \bar{R}_M)}{n - 1}$$

σ_m^2 = Variance of market return.

Correlation Co-efficient (ρ_{ij}):-

The correlation is also a measure of the relationship between two assets. The correlation co-efficient can taken on a value ranging from -1 to +1. Correlation and covariance are related by the following equation.

$$Cov_{ij} = \sigma_i \sigma_j \rho_{ij}$$

$$\ldots \rho_{ij} = \frac{Cov_{ij}}{\sigma_i \sigma_j}$$

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

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

Perfect positive correlation (ρ_{ij} =+1)

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

Perfect Negative Correlation (∂_{ij}=-1)

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

No relationship between returns (∂_{ij}=0)

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

Intermediate risk (∂_{ij}=+0.5)

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

Portfolio return (R_p)

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

In case of two assets case:

$$\overline{R_p} = W_A \overline{R_A} + W_B \overline{R_B}$$

In case of three assets case:

$$\overline{R_p} = W_A \overline{R_A} + W_B \overline{R_B} + W_C \overline{R_C}$$

Where: $\overline{R_p}$ = Expected return on portfolio of stocks

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

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

Portfolio Risk ($\exists_p$):

It is measured by the combined standard deviation of the standard deviations of individual stock returns.

In case of two assets case:

$$\exists_p \text{ X} \sqrt{W_A{}^2 \exists_A{}^2 \Gamma W_B{}^2 \exists_B{}^2 \Gamma 2 W_A W_B \text{Cov}(R_A, R_B)}$$

In case of three assets case:

$$\exists_p \text{ X} \sqrt{\begin{array}{l} W_A{}^2 \exists_A{}^2 \Gamma W_B{}^2 \exists_B{}^2 \Gamma W_C{}^2 \exists_C{}^2 \Gamma 2 W_A W_B \text{Cov}\ (R_A, R_B) \Gamma \\ 2 W_B W_C \text{Cov}\ (R_B, R_C) \Gamma 2 W_C W_A \text{Cov}\ (R_C, R_A) \end{array}}$$

Where $\exists_p$ = Standard deviation of portfolio return of stock A, B and C

$\text{Cov}(R_A,R_B)$= Equivalent representation for covariance of returns between assets A & B

$\text{Cov}(R_B,R_C)$=Equivalent representation for covariance of returns between assets B & C

$\text{Cov}(R_C,R_A)$=Equivalent representation for covariance of returns between assets C & A

Risk minimizing Portfolio:

It is the ratio of two assets, which minimize the risk ($\exists_p$).

Symbolically,

$$W_A \text{ X} \frac{\exists_B{}^2 \text{ Z} \text{Cov}(R_A, R_B)}{\exists_A{}^2 \Gamma \exists_B{}^2 \text{ Z} 2\text{Cov}(R_A, R_B)}$$

where,

W_A= Weight of Stock A that minimize the portfolio risk of stock A & B.

$\exists_A$ = Standard Deviation of stock A

$\exists_B$ = Standard Deviation of stock B.

Systematic Risk

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

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

Total risk X Systematic risk Γ Unsystematic risk
$\exists_j^2$ X $\wp_j^2 \exists_m^2$ Γ $\exists_e^2$

Portion of systematic risk = $\frac{\text{Systematic Risk}}{\text{Total Risk}} = \frac{\wp_j^2 \exists_m^2}{\exists_j^2}$

Where $\exists_j^2$ = Variance of stock J.

$\wp_j^2$ = Square of beta to of stock j.

$\exists_m^2$ = Variance of Market.

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

Or $1 - \frac{\wp_j^2 \exists_m^2}{\exists_j^2}$

In case of multi Assets

Portfolio return (R_P)= r_f Γ k$\exists_P$

Portfolio risk ($\exists_P^2$) X $\frac{1}{k}$ ∫ R_P^2 Z 2$R_P r_f$ Γ r_f^2 Λ k should be calculated solving equations.

CHAPTER IV

DATA PRESENTATION, ANALYSIS AND INTERPRETATION

This chapter is the major part of the study and holds the main important place in the entire research. This chapter deals with analysis of data collected and their presentation with interpretation using different tools and techniques of analysis. In this chapter effort has been made to analyze risk return and portfolio behavior of Insurance companies of Nepal. The analysis of data consists of organizing, tabulating and assessing financial and statistical result. Tables and diagrams are listed to make the result more simple and understandable with reference to the various readings and review of literature.

4.1 DATA ANALYSIS OF INDIVIDUAL COMPANIES

As per Annual Report 2011/2012 of Securities Board, Nepal there are altogether 21 insurance companies that are listed in NEPSE. Since the study is concentrated on the common stock of the Insurance companies, analyses are done separately.

4.1.1 NEPAL INSURANCE COMPANY LIMITED

4.1.1.1 INTRODUCTION

Nepal Insurance Company Limited was incorporated in the year 1947 A.D. in the name of Mal Chalani and Beema Co. Later in the year 1991 A.D. name of company was changed to Nepal Insurance Company Limited. This company was listed on 1984 A.D in NEPSE. Authorized capital, paid-up capital, issued capital, par value of shares and number of shareholders are as below:

Authorized Capital	:	Rs. 500000000.00
Paid-up Capital	:	Rs. 109822600.00
Issued Capital	:	Rs. 300000000.00
Par value of shares	:	Rs. 100

4.1.1.2 High MPS, Low MPS, Closing MPS, DPS and Stock Dividend of Nepal Insurance Company.

Market price and dividend records of common stock of Nepal Insurance Company Limited are shown in Table 4.1. Closing MPS of Nepal Insurance Company Limited is found to be high in the year 2008/09. Year-end price movement and annual dividends paid to shareholders of Nepal Insurance Company Limited are also shown in the same Table 4.1.

Table 4.1 MPS and Dividend of Nepal Insurance Company Limited

F/Y	High MPS	Low MPS	Closing MPS	DPS	Stock Dividend	Total Dividend
06/07	400	357	357	10	0	10.00
07/08	357	345	350	0	3:1	0.00
08/09	367	357	367	0	0	0.00
09/10	395	360	360	0	0	0.00
10/11	360	346	346	0	14:1	14.57
11/12	340	190	204	0	5:1	40.80

Source: *NEPSE, website <http:\\www.nepalstock.com> (data are as on mid July of each year)*

Note: *Model for total dividend calculation is mentioned in Research Methodology section.*

Figure 4.1 Year-end Price Movement of common stock of Nepal Insurance Company Limited

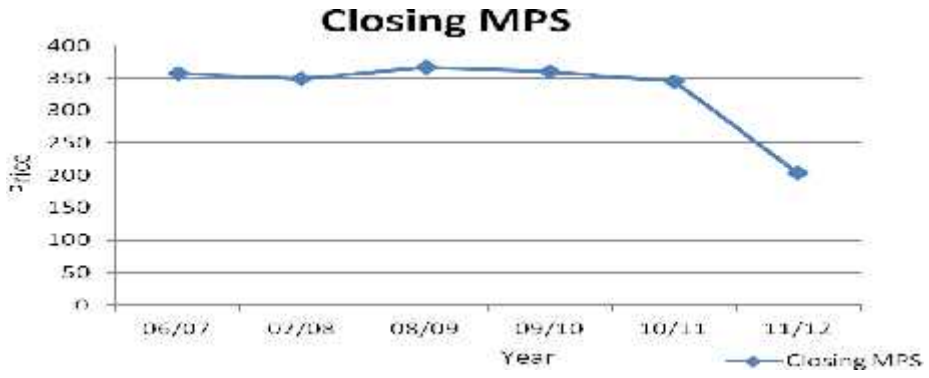


Table 4.1 shows price is maximum in the year 2006/07 and lowest in year 2011/12. In the year 2007/08, 2010/11, 2011/12 the company has distributed stock dividend of 3:1,14:1, and 5:1 respectively which ultimately resulted in decrease of share price in the last two cases

4.1.1.3 REALIZED RETURN (R), EXPECTED RETURN ($\bar{R}$) AND ITS STANDARD DEVIATION (±)

Year-end price and dividend amounts are used to calculate dividend yield and capital gain yield is added to find for each year. Table 4.2 shows the calculation of yearly-realized return, expected return and standard deviation of returns.

Table 4.2Realized return, Standard Deviation and Expected Return of Nepal Insurance Company Limited

F/Y	Closing MPS	Dividend	$R = \frac{D_t + (P_t - P_{t-1})}{P_{t-1}}$	$R-\bar{R}$	$(R-\bar{R})^2$
06/07	357	10	-	-	
07/08	350	122.33	0.3231	0.3108	0.0966
08/09	367	0	0.0486	0.0363	0.0013
09/10	360	0	-0.0191	-0.0314	0.0010
10/11	346	14.57	0.0016	-0.0107	0.0001
11/12	204	40.8	-0.2925	-0.3048	0.0929
			$\sum R$=0.0616		$\sum (R-\bar{R})^2$=0.1919

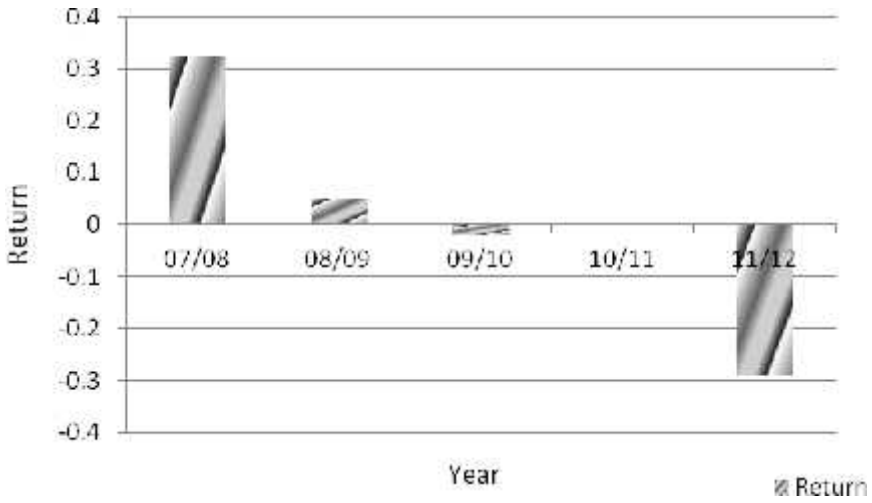
Expected Return ($\bar{R}$)=$\sum R/n$ = 0.0616/5 = 0.0123

Standard Deviation (σ)=$\sqrt{\frac{\sum (R-\bar{R})^2}{n-1}} = \sqrt{\frac{0.1919}{4}}$ =0.2190

Co-efficient of Variation (CV)=$\sigma/\bar{R}$ = 0.2190/0.0123= 17.7634

Table 4.2 result shows that expected return of the common stock of Nepal Insurance Co. Ltd is 1.23% that is low as compared to the market return – 6.85% and investor should bear the risk of 17.7634 and there is variability by 21.90% in the mean return on common stock of Nepal Insurance Co. Ltd.

Figure 4.2 Annual rate of return of Common Stock of Nepal Insurance Company Ltd.



4.1.2 HIMALAYAN GENERAL INSURANCE CO.LTD

4.1.2.1 INTRODUCTION

Himalayan General Insurance Co. Ltd. was incorporated in the year 1988 A.D. Its authorized capital of Rs. 160000000.00. This company was listed in the 1994 in NEPSE. This company has issued capital of Rs. 120000000.00 and has paid-up capital of Rs. 100800000.00 with paid up per share of Rs. 100. In summary

Authorized Capital	:	Rs. 160000000.00
Paid-up Capital	:	Rs. 100800000.00
Issued Capital	:	Rs. 120000000.00
Par value of shares	:	Rs. 100

4.1.2.2 High MPS, Low MPS, Closing MPS, DPS and Stock Dividend of Himalayan General Insurance.

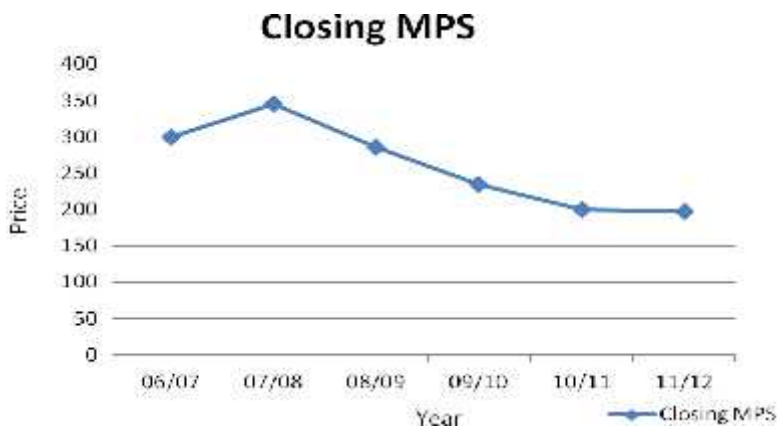
Market price and dividend records of common stock of Himalayan General Insurance Co. Ltd. are shown in Table 4.3. Closing MPS of Himalayan General Insurance is found to be high in the year 2007/08. Year-end price movement and annual dividends paid to shareholders of Himalayan General Insurance Co. Ltd. are also shown in the same Table 4.3.

Table 4.3 MPS and Dividend of Himalayan General Insurance Co. Ltd

F/Y	High MPS	Low MPS	Closing MPS	DPS	Stock Dividend	Total Dividend
06/07	300	198	300	0	0	0
07/08	348	315	345	11	0	11
08/09	375	285	285	10	0	10
09/10	280	226	234	12	2:1	112
10/11	234	198	200	0	0	0
11/12	201	196	197	0	0	0

Source: *NEPSE, website <http:\\www.nepalstock.com> (data are as on mid July of each year)*

Figure 4.3 Year-end Price Movement of common stock of Himalayan General Insurance Co. Ltd



Price is maximum in the year 2007/08 and lowest in year 2011/12. Himalayan General Insurance Co. Ltd has distributed stock dividend in the year 2009/2010. It has distributed cash dividend in the year 2007/08, 2008/09 and 2009/10.

4.1.2.3 REALIZED RETURN (R), EXPECTED RETURN ($\bar{R}$) AND ITS STANDARD DEVIATION (±)

Year-end price and dividend amounts are used to calculate dividend yield and capital gain yield is added to find for each year. Table 4.4 shows the calculation of yearly-realized return, expected return and standard deviation of returns.

Table 4.4 Realized return, Standard Deviation and Expected Return of Himalayan General Insurance Co. Ltd.

F/Y	Closing MPS	Dividend	$R = \frac{D_t + (P_t - P_{t-1})}{P_{t-1}}$	$R - \bar{R}$	$(R - \bar{R})^2$
06/07	300	0	-	-	-
07/08	345	11	0.1867	0.1676	0.0281
08/09	285	10	-0.1449	-0.1640	0.0269
09/10	234	112	0.2140	0.1949	0.0380
10/11	200	0	-0.1453	-0.1644	0.0270
11/12	197	0	-0.0150	-0.0341	0.0012
			$\sum R = 0.0955$		$\sum (R - \bar{R})^2 = 0.1212$

Expected Return ($\bar{R}$) = $\sum R/n$ = 0.0955/5 = 0.0191

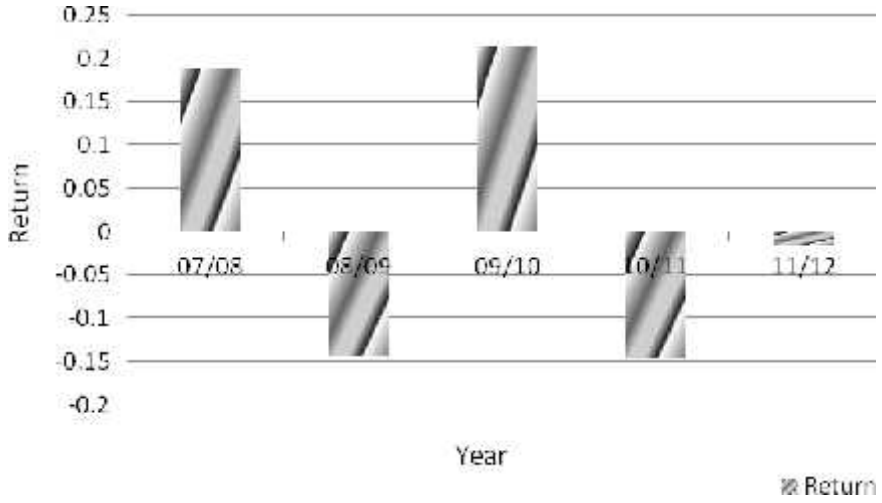
Standard Deviation (σ) = $\sqrt{\frac{\sum (R - \bar{R})^2}{n - 1}} = \sqrt{\frac{0.1212}{4}}$ = 0.1740

Co-efficient of Variation (CV) = $\sigma / \bar{R}$ = 0.1740/0.0191= 9.1149

Table No. 4.4 result shows that expected return of the common stock of Himalayan General Insurance Co. Ltd is 1.91% that is high as compared to the market return -6.85% and investor should bear the risk of 9.1149 and

there is variability by 17.40% in the mean return on common stock of Himalayan General Insurance Co. Ltd.

Figure 4.4 Annual rate of return of Common Stock of Himalayan General Insurance Co. Ltd.



4.1.3 UNITED INSURANCE CO (NEPAL) LTD.

4.1.3.1 INTRODUCTION

United Insurance Co. (Nepal) Ltd. was incorporated in the year 1992 A.D. and listed in NEPSE in the year 1994. This insurance company has authorized capital of Rs. 150000000.00. The par value per share is Rs. 100. In summary,

Authorized Capital	: Rs. 150000000.00
Paid-up Capital	: Rs. 72000000.00
Par value of shares	: Rs. 100

4.1.3.2 High MPS, Low MPS, Closing MPS, DPS and Stock Dividend of United Insurance.

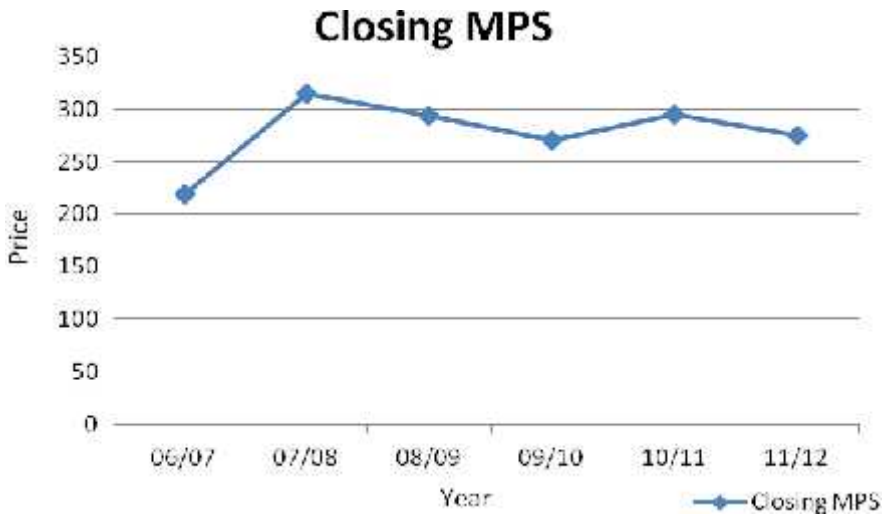
Market price and dividend records of common stock of United Insurance Co. (Nepal) Ltd. are shown in Table 4.5. Closing MPS of United Insurance is found to be high in the year 2007/08. Year-end price movement and annual dividends paid to shareholders of United Insurance Co. (Nepal) Ltd. are also shown in the same Table 4.5.

Table 4.5 MPS and Dividend of United Insurance Co. (Nepal) Ltd.

F/Y	High MPS	Low MPS	Closing MPS	DPS	Stock Dividend	Total Dividend
06/07	220	120	219			
07/08	317	192	315	0	0	0
08/09	326	294	294	0	0	0
09/10	273	184	270	0	0	0
10/11	295	260	295	0	0	0
11/12	295	275	275	0	0	0

Source: *NEPSE, website <http:\\www.nepalstock.com> (data are as on mid July of each year)*

Figure 4.5 Year-end Price Movement of common stock of United Insurance Co. (Nepal) Ltd.



Price is maximum in the year 2007/08 and lowest in year 2006/07. United Insurance Co. (Nepal) Ltd. has not distributed any stock dividend and cash dividend.

4.1.3.3 REALIZED RETURN (R), EXPECTED RETURN ($\bar{R}$) AND ITS STANDARD DEVIATION (±)

Year-end price and dividend amounts are used to calculate dividend yield and capital gain yield is added to find for each year. Table 4.6 shows the calculation of yearly-realized return, expected return and standard deviation of returns.

Table 4.6Realized return, Standard Deviation and Expected Return of United Insurance Co. (Nepal) Ltd.

F/Y	Closing MPS	Dividend	$R = \frac{D_t + (P_t - P_{t-1})}{P_{t-1}}$	$R-\bar{R}$	$(R-\bar{R})^2$
06/07	219	0			
07/08	315	0	0.4384	0.3754	0.1409
08/09	294	0	-0.0667	-0.1297	0.0168
09/10	270	0	-0.0816	-0.1446	0.0209
10/11	295	0	0.0926	0.0296	0.0009
11/12	275	0	-0.0678	-0.1308	0.0171
			$\sum R = 0.3149$		$\sum (R-\bar{R})^2 = 0.1966$

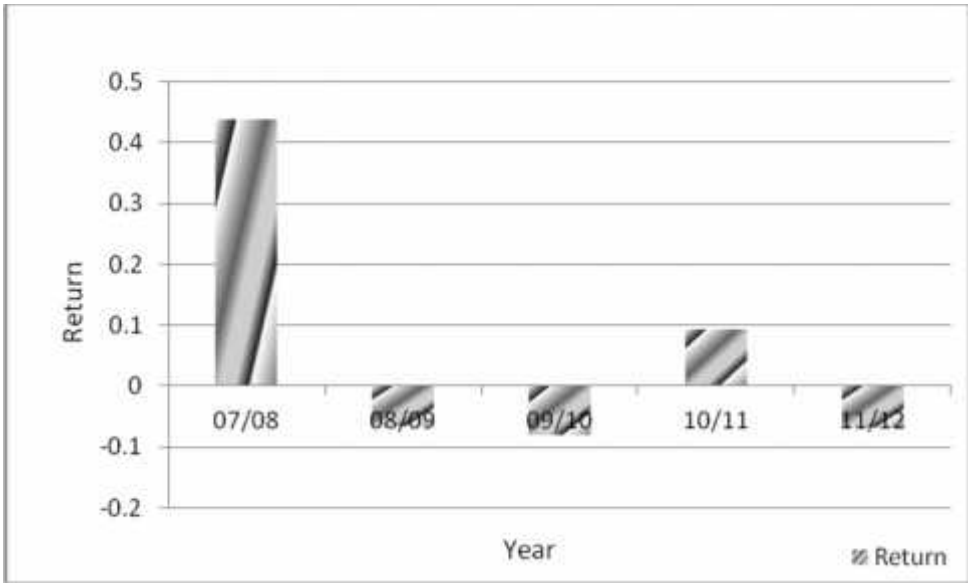
Expected Return ($\bar{R}$) $= \sum R/n = 0.3149/5 = 0.0630$

Standard Deviation (σ) $= \sqrt{\frac{\sum (R-\bar{R})^2}{n-1}} = \sqrt{\frac{.1966}{4}} = 0.2217$

Co-efficient of Variation (CV) $= \sigma/\bar{R} = 0.2217/0.0630 = 3.5207$

Table 4.6 result shows that expected return of the common stock of United Insurance Co. Ltd is 6.30% that is high as compared to the market return -6.85% and investor should bear the risk of 3.5207 and there is variability by 22.17% in the mean return on common stock of United Insurance Co. Ltd.

Figure 4.6 Annual rate of return of Common Stock of United Insurance Co. (Nepal) Ltd.



4.1.4 MARKET RISK AND RETURN

4.1.4.1 INTRODUCTION

The one and only one stock market in Nepal is Nepal Stock Exchange (NEPSE). Price fluctuation in market is represented by the NEPSE Index or Market Index. So, the market return, standard deviation and coefficient of variation is based on the NEPSE index in this research work.

4.1.4.2 DATA OF NEPSE INDEX

Market Portfolio return, its Standard Deviation and Co-efficient of variation is shown in Table 4.11.

Table 4.7 Calculation of Returns, S.D., Expected Returns and C.V. of Market

Year	NEPSE index	$R_m X \frac{NI_t Z NI_{t Z 1}}{NI_{t Z 1}}$	$R_m Z \overline{R_m}$	$(R_m Z \overline{R_m})^2$
06/07	683.95			
07/08	963.36	0.4085	0.4770	0.2276
08/09	749.10	-0.2224	-0.1539	0.0237
09/10	477.73	-0.3623	-0.2938	0.0863
10/11	362.85	-0.2405	-0.1720	0.0296
11/12	389.74	0.0741	0.1426	0.0203
		R_m=-0.3425		$(R_m Z \overline{R_m})^2$=0.3874

Source: *NEPSE, website <http:\\www.nepalstock.com> (data are as on mid July of each year)*

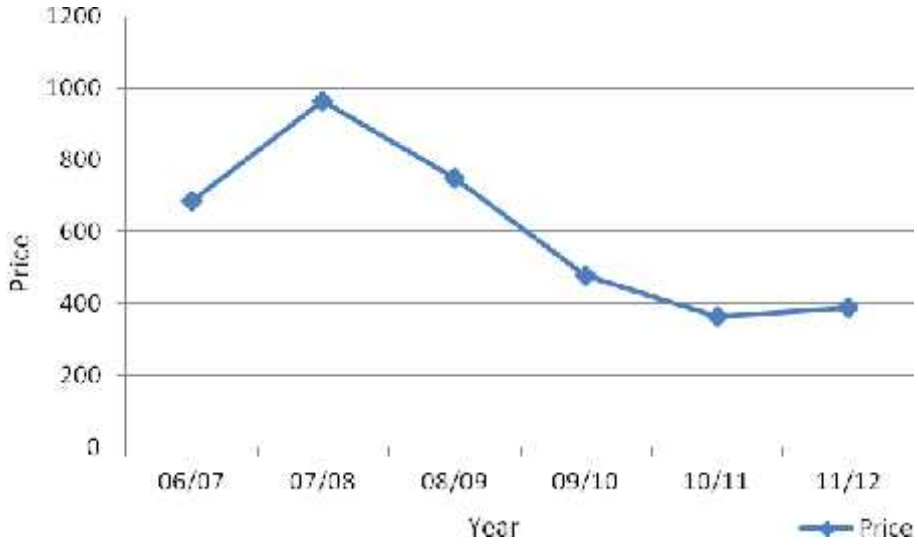
Expected Return ($\overline{R_m}$) = Rm/n = -0.3425/5= -0.0685

Standard Deviation ($\exists$m) = $\sqrt{\frac{\phi(R_m Z \overline{R_m})^2}{n Z 1}} X \sqrt{\frac{0.3874}{4}} X 0.3112$

Co-efficient of Variation (C.V) $X \frac{\pm_M}{\overline{R_M}} XZ \frac{0.3112}{0.0685} XZ 4.5433$

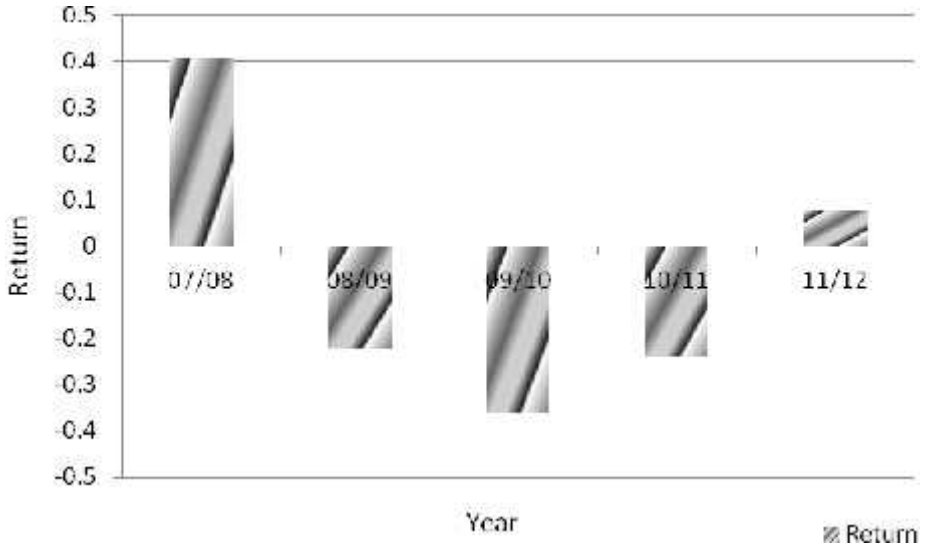
It shows market return is -0.0685% and variation in mean return is 31.12% and risk is -4.5433.

Figure 4.7 Market Index Movements



In the year 2007/08, the NEPSE index was high at 963.36 and was low in the year 2010/11 with index of 362.85. The NEPSE index seems to be fluctuant from the beginning. From the year 2007/08 to 2020/11NEPSE index began to decline to reach 362.85 and then increased to 389.74 in the year 2011/12.

Figure 4.8 Market Return Movements



Market return was also high in the year 2007/08 which was 40.85%. There were three negative returns from market from year 2008/09 to 2010/11 but in average the market return is -6.85% only with the standard deviation of 31.12%.

4.1.4.3 ANALYSIS OF MARKET SENSITIVITY

Analysis of market sensitivity gives very useful insight in the analysis and the selection procedure of common stock in the market which is explained by its beta co-efficient. Higher the beta greater is the sensitivity and higher will be the reaction by the individual common stock with the given movement in the market status. Beta measures the systematic risk, which cannot be eliminated through the means of diversification.Beta co-efficient of market is always 1. This statement can be proved as follows:

$$\beta_i = \frac{Cov(R_i, R_m)}{\sigma_m^2} = \frac{\sigma_i \sigma_m \rho_{im}}{\sigma_m^2} = \frac{\sigma_i \rho_{im}}{\sigma_m}$$

Where, ρ_{im} =Correlation between market return and individual stock's return.

Hence,

$$\beta_m = \frac{Cov(R_m, R_m)}{\sigma_m^2} = \frac{\sigma_m \sigma_m \rho_{mm}}{\sigma_m^2} = \rho_{mm} = 1$$

Hence, Beta Coefficient of market is always equal to 1

Table 4.8 Beta Coefficient for Insurance Company

Company	Beta	Remarks
Nepal Insurance	0.28	
Himalayan General	0.18	Low Beta
United Insurance	0.56	High Beta

Source: *Appendix- I to III*

From table 4.8, it can be concluded that United Insurance Co. Ltd. is more sensitivity to the market than other remaining companies and Nepal Insurance Company is less sensitive than other with the market.

4.2 INTER COMPANY COMPARISON

On the basis of above section 4.1, comparative analysis of return and total risk (σ) are performed here. Expected return, standard deviations of returns, coefficient of variations of each bank for the year 2007/08 to 2011/12 are given in Table 4.13.

Table 4.9 Expected return, S.D. and C.V. of each Company

Company	$\bar{R}$	S.D.	C.V.	Remark/(s)
NICL	0.0123	0.2190	17.7634	Lowest return
HGICL	0.0191	0.1740	9.1149	Lowest Standard Deviation
UICNL	0.0630	0.2217	3.5207	Highest return

Figure 4.9 Expected Return, S.D. and C.V. of each company

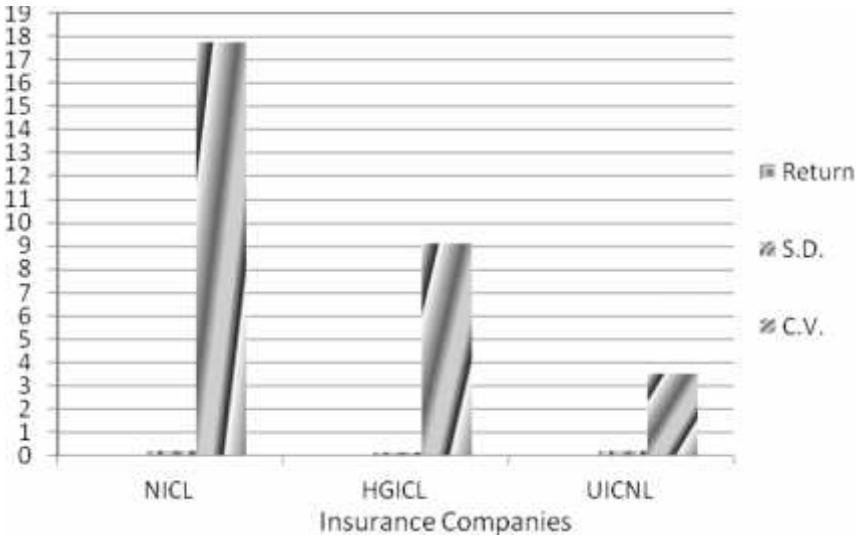


Table 4.10 Systematic and Unsystematic risk of individual Company

Company	Beta	S.D.	Systematic Risk	Unsystematic Risk
NICL	0.28	0.2190	0.0076	0.0404
HGICL	0.18	0.1740	0.0031	0.0272
UICNL	0.56	0.2217	0.0304	0.0188

Source: *Appendix- IV*

Higher the beta, higher the systematic risk. It can be clear from the above table that company high beta has high systematic risk.

4.2.1 MARKET CAPITALIZATION OF INDIVIDUAL COMPANY

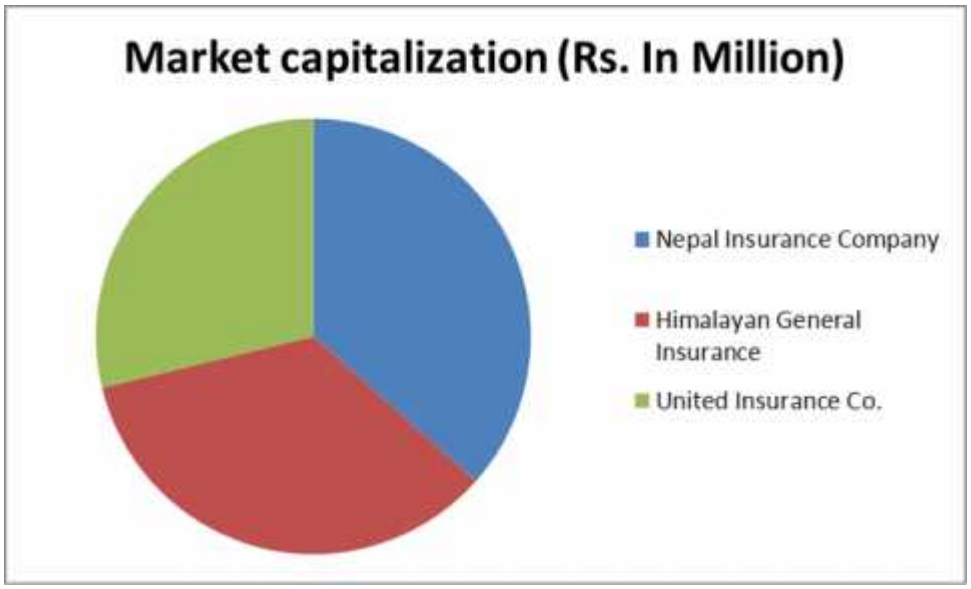
Based on the market capitalization at 2012, mid July, size of each insurance company is presented in Table 4.11. Market capitalization is the total market value at specific time period of the company, industry and market as a whole.

Table 4.11 Market capitalization at mid July 2012

Companies	Market capitalization (Rs. In Million)
Nepal Insurance Company	209.5
Himalayan General Insurance	198.58
United Insurance Co.	165.00

***Source**: NEPSE Trading Report 2012*

Figure 4.10 Market Capitalization at mid July 2011-mid July 2012.



Similarly a comparison is made on the movement of market capitalization. The table 4.16 shows the comparative movement of market capitalization of insurance companies.

4.3 INTER INDUSTRY COMPARISON

To compare size of industries, Table 4.17 and the Figure 4.16 are presented below. We can observe the commercial banking industry has majority value of total market share i.e. 52.36% and insurance companies have only 3.42% market share.

Table 4.12 Market capitalization of each Industry at July 15 2012

Industry	Market Capitalization (Rs. in Million)	Percent
Commercial Bank	192836.17	52.36
Development Bank	23442.72	6.37
Finance Company	24860.41	6.75
Insurance Company	12593.60	3.42
Hotel	6457.91	1.75
Manufacturing & processing Company	11830.16	3.21
Trading Company	1116.90	0.30
Others	75468.42	20.49
Hydro	19655.84	5.34
Total	368262.1	100.00

***Source**: Securities Board, Nepal, Annual Report*

Figure 4.11 Market Capitalization of each industry at July 15,2012

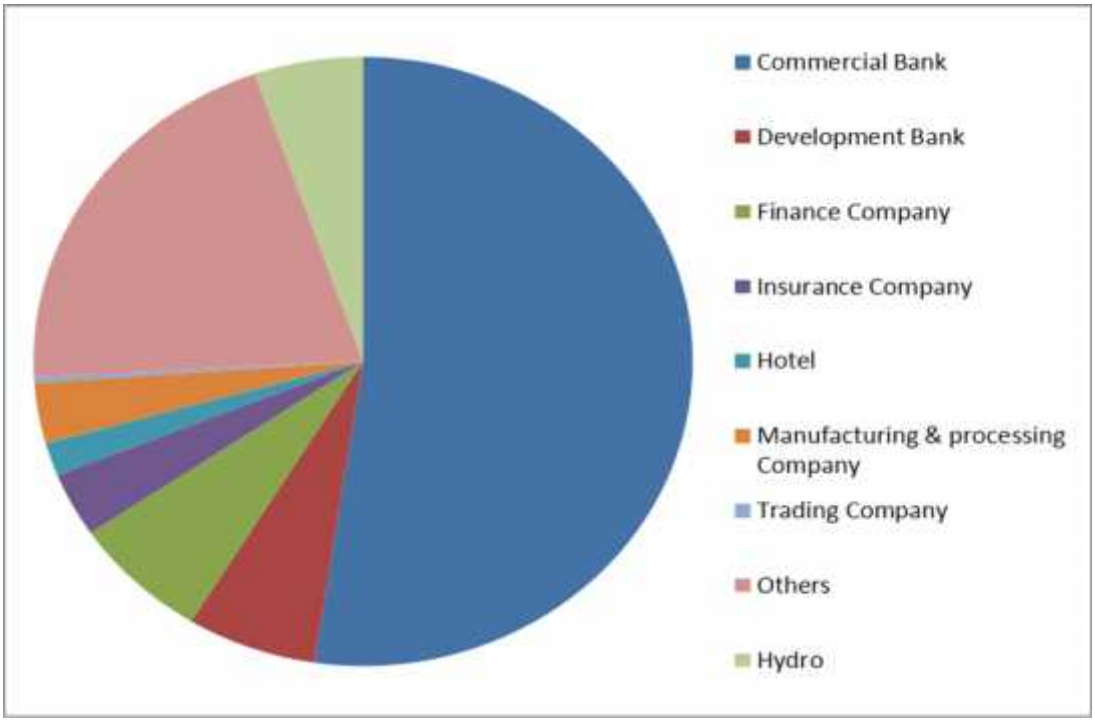


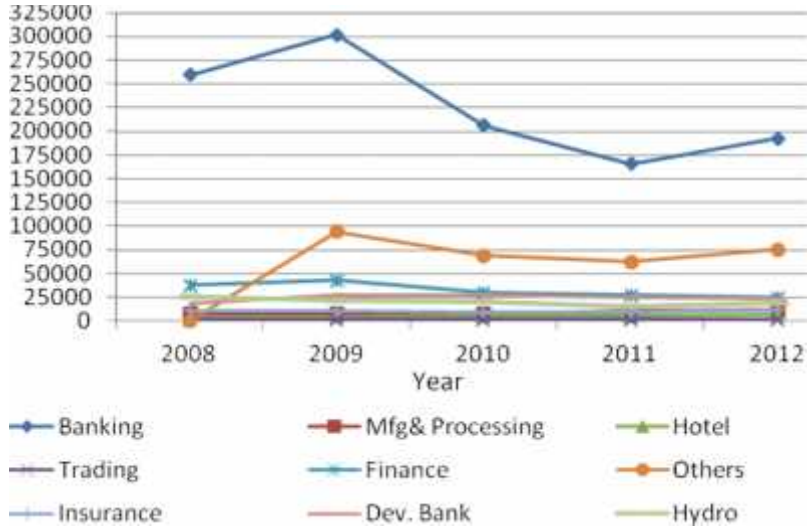
Table 4.13 Industry wise market Capitalization (Rs. in Million)

Industry	2008	2009	2010	2011	2012
Banking	259955.25	302219.29	206282.52	165775.68	192836.17
Mfg& Processing	7516.87	7706.09	7592.03	10495.13	11830.16
Hotel	4809.65	4851.95	5285.58	5448.35	6457.91
Trading	1170.24	1696.36	1617.51	1387.48	1116.90
Finance	37674.43	43007.13	29869.59	27476.98	24860.41
Others	18.67	94369.16	69019.16	62868.42	75468.42
Insurance	11241.41	10537.49	9756.61	9034.67	12593.60
Dev. Bank	17997.78	27137.89	27488.87	25738.89	23442.72
Hydro	25863.26	21413.72	19959.51	15258.75	19655.84

***Source**: SEBO/N, Annual Reports*

Figure 4.12 Industry wise movement of market capitalization

(Rs. in Million)



Before year 2006/07, the different companies that was listed in NEPSE was categorized into eight sectors i.e. Com. Banks, Manufacturing & Processing Company, Hotel, Trading Company, Finance Company, Insurance Company, Dev. Bank and Others. But from the year 2007/08, it was categorized into nine sectors, singling out Hydro from Others.

Table 4.14 Industry wise NEPSE index at closing date of F/Y

F/Y	Commercial Bank	Manuf	Hotel	Others	Hydro	Trading	Insurance	Finance	Dev. Bank	Market
06/07	789.21	348.63	251.47	818.12	847.93	155.37	612.46	471.82	539.66	683.95
07/08	985.65	423.66	370.88	768.26	1323.99	204.08	817.25	1152.74	1285.89	963.36
08/09	780.87	434.32	367.42	738.99	1044.81	295.83	656.41	697.61	772.56	749.10
09/10	456.93	427.89	400.26	540.48	881.00	282.08	548.52	397.38	478.53	477.73
10/11	328.70	591.52	412.59	492.31	673.44	241.97	407.14	303.78	294.15	362.85
11/12	358.57	666.76	489.04	590.98	683.56	191.97	497.86	267.01	245.52	389.74

***Source**: SEBO/N, Annual Reports.*

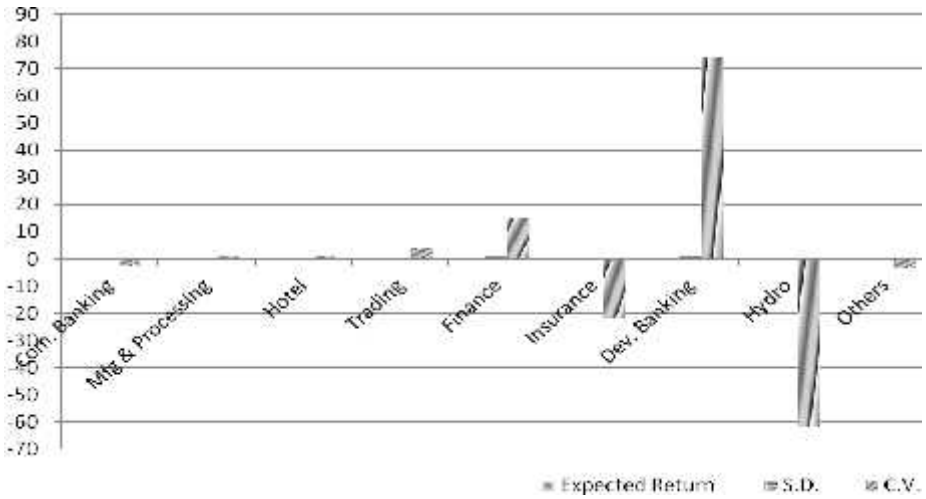
Table 4.15 Expected Return, SD and CV of Industries

Industry	Expected Return	S.D.	C.V.
Com. Banking	-0.1127	0.2742	-2.4322
Mfg & Processing	0.1470	0.1593	1.0832
Hotel	0.1542	0.1936	1.2556
Trading	0.0736	0.2909	3.9547
Finance	0.0523	0.7875	15.0631
Insurance	-0.0123	0.2706	-21.9145
Dev. Banking	0.0105	0.7732	73.8383
Hydro	-0.0054	0.3316	-61.9066
Others	-0.0513	0.1675	-3.2677

Source: *Appendix- V to XIII*

Expected rate of return, Standard Deviation and Co-efficient of variation are taken as a main concern to compare between industries. Return of each industry is calculated on the basis of industry-wise NEPSE index; Year-end industry wise index is given in Table 4.15. Similarly Table 4.16 shows these variables of each industry. Details of the calculation of each variables of each industry are shown in Appendices.

Figure 4.13 Industry wise Expected Return, S.D. and C.V.



From the result ofTable No. 4.16 expected return is found to be high in Hotel Industry i,e, 15.42% with risk (measure by standard deviation) of 19.36%. Expected rate of return of Commercial Bank is low with negetive return of -11.27% and standard deviation is 27.42%. Standard Deviation of Finance Industry is high at 78.75%.

Com.Banking Industry has -11.27%, Manufacturing & Processing Industry has 14.70%, Hotel Industry has 15.42%, Trading Industry has 7.36%, Finance Industry has 5.23%, Insurance has -1.23%, Dev.Bank has 1.05%, Hydro has -0.54%, and others Industry has -0.513% of expected return.

Similarly, Com.Banking Industry has 27.42%, Manufacturing & Processing Industry has 15.93%, Hotel Industry has 19.36%, Trading Industry has 29.09%, Finance Industry has 78.75%, Insurance has 27.06%, Dev.Bank has 77.32%, Hydro has 33.16%, and others Industry has 16.75% of risk (measured by standard deviation).

4.4 PRICING MODEL

In this part of the research, Capital Assets Pricing Model (CAPM) is used as pricing model. In the above section 4.1.6.3, it is already calculated the beta coefficient for individual company. The rate of treasure bill at the year ended 16 July, 2012 is 2.94%. So the price situation on the basis of CAPM model is as below:

Table 4.16 Equilibrium return, Expected return and price evaluation

Company	Beta	$E(R_i)$ XR_f $\Gamma(R_m$ $ZR_f)\wp$	Expected	Price
NICL	0.28	0.20%	1.23%	Underpriced
HGICL	0.18	1.18%	1.91%	Underpriced
UICNL	0.56	-2,54%	6.30%	Underpriced

where,

R_f X Risk free rate of return =0.0294 or 2.94%

$\bar{R}_m$ X Market rate of return = -0.0685 or -6.85%

$E(R_i)$ XEquilibrium rate of return of Capital Assets

From table No. 4.17, beta coefficient of NICL, HGICL and UICNL are less than market beta, so stocks of these companies are defensive.

All company's stock are underpriced so these company are having stock with a good investment opportunities. Their stock value will increased in the future providing investor's high return. Rational and efficient investment decision maker need to analyze other dimensions too.

4.4.1 ANALYSIS OF RISK DIVERSIFICATION

If the portfolio is created, it reduces the unsystematic risk dramatically without losing considerable return. Therefore, a brief analysis of risk and return is extended to portfolio context.

The expected return of a portfolio is simply a weighted average of the expected returns of securities comprising that portfolio. The weights are equal to the proportions of the total funds invested in each security.

"Not putting all eggs in one basket" or spreading the risks means simple diversification. The analysis is based on two assets and the tools for analysis are based on two assets and tools for analysis are presented in CHAPTER III.

Table 4.18 shows the calculation of covariance of the returns of the given two stocks $Cov(R_A, R_B)$ and proportion of stock A(W_A) that minimizes the risk, standard deviation.

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

where,

σ_A^2 = Standard Deviation of Stock A

σ_B^2 = Standard Deviation of Stock B

W_A = Proportion of stock A

W_B = Proportion of stock B

Table 4.17 Portfolio risk and return

S.N.	Portfolio	Weight	Covariance	$\bar{R}_P$	$\pm_P$
1	NICL & HGICL	W(N)=0.67 W(H)=0.33	0.0131	1.45%	17.50%
2	NICL & UICNL	W(N)=0.47 W(U)=0.53	0.039	4.00%	20.94%
3	HGICL & UNICL	W(H)=-0.32 W(U)=0.68	0.0139	4.91%	17.86%

Source: *Appendix- XIV to XVI*

By using diversification, we can eliminate risk. Diversification can only reduce risk but cannot increase return. Portfolio return is simply the average return of individual security's returns. Hence, average of high return is also high.

While creating portfolio between HGICL and UNICL, expected return is very high, 4.91% and their weight is 0.32 and 0.68 respectively with the risk of 17.86%.

Creating portfolio between NICL & HGICL, the risk can be minimized up to 17.50% and return will be 1.45%.

4.4.2 CORRELATION

Most stocks are positively correlated, not perfectly. Here, Correlation between each company is presented below:

Table 4.18 Correlation between each company

	NICL	HGICL	UICNL
NICL	1	0.34	0.80
HGICL		1	0.36
UICNL			1

Source: *Appendix- XVII*

4.5 MAJOR FINDINGS OF THE STUDY

Major findings of the study are summarized as below:

1. Expected return, S.D., and C.V. are as below

Bank	Expected	S.D.	C.V.	Remark/(s)
NICL	0.0123	0.2190	17.7634	Lowest return
HGICL	0.0191	0.1740	9.1149	Lowest Standard Deviation
UICNL	0.0630	0.2217	3.5207	Highest return

2. Expected return of Insurance Industry is found to be of -1.23%, S.D. of Insurance Industry is 27.06% and expected return of Commercial Banking Industry is lowest at -11.27%. Expected return of Hotel Industry is highest at 15.42% and Finance Industry has highest standard deviation of 78.75%.

3. Beta coefficient of the different companies under study are as below:

Company	Beta
NICL	0.28
HGICL	0.18
UICNL	0.56

4. All the companies under study are underpriced.

5. Systematic risk and unsystematic risk of companies are as follow

Company	Systematic	Unsystematic
NICL	0.0076	0.0404
HGICL	0.0031	0.0272
UICNL	0.0304	0.0188

6. While creating portfolio of two assets, expected return on investing HGICL & UNICL is found to be highest i.e. 4.91%.

CHAPTER V

SUMMARY, CONCLUSION AND RECOMMENDATIONS

This chapter deals with the findings and conclusions derived from the study of above study. This chapter consists of three sections: the first section provides the summary of the study, the second section draws the conclusions of the study and the final section gives recommendations to the problem observed on the basis of the findings.

5.1 SUMMARY

The relationship between risk and return described by investor's perception about risk and their demand for compensation. No investor will like to invest in risky assets unless he is assured of adequate compensation for the acceptance of risk. Hence, risk plays a central role in the analysis of investment. A rational investor always seeks to find the optimal portfolio so that this will reduce risk in his/her investment. Investors often ask about the total risk they will be assuming an investment and like to know if the risk premium provided is enough. Higher risk gives higher premium and the trade off between the two assumes a linear relationship between risk and risk premium.

Three samples are taken among 21 listed insurance companies to analyze the risk, return and portfolio analysis in common stock investment. During the research work, a brief review of literature has been conducted. Mathematical and financial tools are used in data analysis. Tables, graphs and diagrams are used to present the data and results. Secondary data are collected from the NEPSE, NRB, and related companies.

Books, Journals, and Masters research works are reviewed for the research purpose. Very limited articles about Nepalese capital market are found. The major research gap found about the estimation of an optimal portfolio between more than two assets.

This research work covers sample of 3 different insurance companies among the population of 21 companies. Secondary data are analyzed during the study.

Secondary data from various sources i.e. website of Insurance Companies, SEBO/N, NEPSE, NRB, Books and Annual reports published by SEBO/N, NEPSE and insurance companies are analyzed. Expected Rate of Return, Standard Deviation, Co-efficient of variation and beta co-efficient of individual insurance companies are calculated. Portfolio risk return and risk between companies are calculated. Sector wise risk return and beta co-efficient are also calculated. Correlation co-efficient between companies is also calculated.

5.2 CONCLUSION

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

From above study, the return is the income received on a stock investment, which is unusually expressed in percentage. Expected return on common stock of UICNL is maximum (i.e. 6.30%). This high return is due to positive response of the investors towards the company which ultimately increased the market price of its stock. Expected return of NICL is minimum (i.e. 1.23%).

Standard deviation measures the unsystematic risk, which is not defined by the market so NICL's unsystematic risk is very high (i.e. 4.04%). Unsystematic risk of UICNL is found to be of very low (i.e. 1.88%). Beta measures the systematic risk. UICNL has highest systematic risk (i.e. β=0.56) and the lowest systematic risk is of HGICL i.e. β=0.18. Investing in the stock

of NICL, HGICL, and UICNL will be the defensive type of investment due to beta less than 1.

CAPM describes the relationship between risk and equilibrium return. In this model, risk free rate plus a premium based on systematic risk of the security is equilibrium rate of return of the stock. Comparing expected rate of return and equilibrium rate of return, NICL, HGICL and UICNL are underpriced. This implies there is chance of increase of stock value in near future for NICL, HGICL and UICNL, so investor can purchase the common stock of NICL, HGICL and UICNL.

Using Markowitz simple diversification, risk could be diversified on investing in two or more assets. Investing on NICL and HGICL, unsystematic risk could be reduced to 17.50%. Before diversification, risk of these companies was 21.90% and 17.40% respectively.

5.3 RECOMMENDATIONS

Following recommendations are forwarded on the basis of the research work. The recommendations are presented separately for investors and institutions

1. Investors

To beat the stock market, proper analysis of individual security, industry and overall market is always required. This is proved by present political situation and declining of NEPSE index. An investor should buy securities when market is rising (NEPSE index) and sell securities when market performance is falling, hold securities, which are performing better than the market.

Investor should invest in common stock of UICNL so that investor could easily forecast rising or falling of his/her wealth position with respect to the market return since systematic risk of the UICNL is high. Higher the risk, higher the return.

In case of portfolio construction among many assets, it is recommended to invest in the assets whose correlation is negative since there will be more reduction of risk. Higher the coefficient of correlation, less degree of risk is reduced.

2. Institutions

NEPSE being a major operative body in the area of secondary market, should keep on developing the different parameters related to the congenial functioning of the stock market. It needs to get into the modernization and further to this it needs to develop efficient and effective channels of information related to investment in companies listed.

Securities Exchange Board/ Nepal being the apex body in our nation for the regulation and development of capital market, it should initiate research and development program, seminars, workshops, training program etc. in interval of time. It should be stricter regarding rules and regulation in securities trading. SEBO/N seems to be more flexible towards corporations.

In order to develop the healthy economic system in the country government should be keeping devising and issuing rules and regulation regarding the operation of stock market. Government needs to manage government securities trading from NEPSE trading floor. Government needs to amend of rules and regulations regarding stock trading time to time. Political stability is must for the economic prosperity and increasing trend of business.

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Appendix I

Calculation of beta coefficient of Nepal Insurance Company Limited

Calculation of covariance between Nepal Insurance Company Limited and Market

F/Y	R_N	R_M	$R_N - \bar{R}_N$	$R_M \; Z\bar{R}_M$	$(R_N - \bar{R}_N)(R_M - \bar{R}_M)$
07/08	0.3231	0.4085	0.3108	0.4770	0.1482
08/09	0.0486	-0.2224	0.0363	-0.1539	-0.0056
09/10	-0.0191	-0.3623	-0.0314	-0.2938	0.0092
10/11	0.0016	-0.2405	-0.0107	-0.1720	0.0018
11/12	-0.2925	0.0741	-0.3048	0.1426	-0.0435
Total	**0.0616**	**-0.3425**			**0.1102**

$\bar{R}_N \; X\frac{R_N}{n}$ = 0.0616/5 = 0.0123

$\bar{R}_M \; X\frac{R_M}{n}$ = -003425/5 = -0.685

$\pm_{M}^{2} \; X\frac{\phi (R_M \; Z\bar{R}_M)^2}{n \; Z1} \; X\frac{0.3874}{5 \; Z1} \; X 0.0696$

$Cov(R_N, R_M) \; X\frac{(R_N \; Z\bar{R}_N)(R_M \; Z\bar{R}_M)}{n \; Z1}$

$X\frac{0.1102}{4}$

$X 0.0276$

Now,

$_{N} \; X\frac{Cov(R_N, R_M)}{\pm_{M}^{2}}$

$X\frac{0.0276}{0.0969}$

$X 0.28$

Appendix II

Calculation of beta coefficient of Himalayan General Insurance Co. Ltd.

Calculation of covariance between Himalayan General Insurance Co. Ltd. and Market

F/Y	R_H	R_M	$R_H - \bar{R}_H$	$R_M Z \bar{R}_M$	$(R_H - \bar{R}_H)(R_M - \bar{R}_M)$
07/08	0.1867	0.4085	0.1676	0.4770	0.0799
08/09	-0.1449	-0.2224	-0.1640	-0.1539	0.0252
09/10	0.2140	-0.3623	0.1949	-0.2938	-0.0573
10/11	-0.1453	-0.2405	-0.1644	-0.1720	0.0283
11/12	-0.0150	0.0741	-0.0341	0.1426	-0.0049
Total	**0.0955**	**-0.3425**			**0.0713**

$\bar{R}_H \; X \frac{R_H}{n}$ = 0.0955/5 = 0.0191

$\bar{R}_M \; X \frac{R_M}{n}$ = -0.3425/5 = -0.685

$\pm_{M}^{2} \; X \frac{\phi (R_M \; Z \bar{R}_M)^2}{n \; Z1} \; X \frac{0.3874}{5 \; Z1} \; X 0.0969$

$Cov(R_H \; , R_M) \; X \frac{(R_H \; Z \bar{R}_H)(R_M \; Z \bar{R}_M)}{n \; Z1}$

$X \frac{0.0713}{4}$

$X 0.0178$

Now,

$_{H} \; X \frac{Cov(R_H, R_M)}{\pm_{M}^{2}}$

$X \frac{0.0178}{0.0969}$

$X 0.18$

Appendix III

Calculation of beta coefficient of United Insurance Co. (Nepal) Ltd.

Calculation of covariance between United Insurance Co. (Nepal) Ltd. and Market

F/Y	R_U	R_M	$R_U - \bar{R}_U$	$R_M Z \bar{R}_M$	$(R_U - \bar{R}_U)(R_M - \bar{R}_M)$
07/08	0.4384	0.4085	0.3754	0.4770	0.1791
08/09	-0.0667	-0.2224	-0.1297	-0.1539	0.0200
09/10	-0.0816	-0.3623	-0.1446	-0.2938	0.0425
10/11	0.0926	-0.2405)	0.0296	-0.1720	-0.0051
11/12	-0.0678	0.0741	-0.1308	0.1426	-0.0187
Total	**0.3149**	**-0.3425**			**0.2178**

$$\bar{R}_U \text{ X} \frac{R_U}{n} = 0.3149/5 = 0.0630$$

$$\bar{R}_M \text{ X} \frac{R_M}{n} = -0.3425/5 = -0.0685$$

$$\pm_M{}^2 \text{ X} \frac{\phi (R_M \text{ Z} \bar{R}_M)^2}{n \text{ Z} 1} \text{ X} \frac{0.3874}{5 \text{ Z} 1} \text{ X} 0.0969$$

$$Cov(R_U, R_M) \text{ X} \frac{(R_U \text{ Z} \bar{R}_U)(R_M \text{ Z} \bar{R}_M)}{n \text{ Z} 1}$$

$$\text{X} \frac{0.2178}{4}$$

$$\text{X} 0.0545$$

Now,

$$_U \text{ X} \frac{Cov(R_U, R_M)}{\pm_M{}^2}$$

$$\text{X} \frac{0.0545}{0.0969}$$

$$\text{X} 0.56$$

Appendix IV

Partitioning of total risk of individual companies

We have,

Total risk = Systematic Risk + Unsystematic risk

$\exists^2 = \wp^2 \exists_M^2$ + Unsystematic risk

y **Unsystematic risk =** $\pm^2 - {}^2\pm_M^2$

where, $\exists^2$ = Total variance of individual company

$\wp$= Beta sensitivity to the market of individual company

$\exists_M^2$ = Total Market variance

For Nepal Insurance Company Ltd.

Unsystematic risk = $0.0480 – (0.28)^2 \times 0.0969$
=0.0404

Systematic risk = (0.28)2 x 0.0969
=0.0076

For Himalayan General Insurance Co. Ltd.

Unsystematic risk = $0.0303 – (0.18)^2 \times 0.0969$
=0.0272

Systematic risk = (0.18)2 x 0.0969
= 0.0031

For United Insurance Co. (Nepal) Ltd.

Unsystematic risk = $0.0492 – (0.56)^2 \times 0.0969$
=0.0188

Systematic risk = (0.56)2 x 0.0969
= 0.0304

Appendix V

Calculation of Returns, S.D., Expected Returns and C.V. of Commercial Banking Industry

Year	NEPSE Index	$R_B \ X \frac{NI_t \ Z NI_{t \ Z 1}}{NI_{t \ Z 1}}$	$R \ Z \bar{R}$	$(R \ Z \bar{R})^2$
06/07	789.21			
07/08	985.65	0.2489	0.3616	0.1308
08/09	780.87	-0.2078	-0.0951	0.0090
09/10	456.93	-0.4148	-0.3021	0.0913
10/11	328.70	-0.2806	-0.1679	0.0282
11/12	358.57	0.0909	0.2036	0.0414
	Total	**-0.5635**		**0.3007**

Expected Return ($\bar{R}$) = R/n =-0.5635/5=-0.1127

Standard Deviation (∃) = $\sqrt{\frac{\phi \ (R \ Z \bar{R})^2}{n \ Z 1}} \ X \sqrt{\frac{0.3007}{5 \ Z 1}} \ X 0.2742$

Co-efficient of Variation (C.V) = $\frac{\exists}{\bar{R}} = \frac{0.2742}{Z 0.1127} \ X Z 2.4332$

Appendix VI

Calculation of Returns, S.D., Expected Returns and C.V. of Manufacturing and Processing Industry

Year	NEPSE Index	$R_P \ X \frac{NI_t \ Z NI_{t\ Z1}}{NI_{t\ Z1}}$	$R \ Z \bar{R}$	$(R \ Z \bar{R})^2$
06/07	348.63			
07/08	423.66	0.2152	0.0682	0.0047
08/09	434.32	0.0252	-0.1218	0.0148
09/10	427.89	-0.0148	-0.1618	0.0262
10/11	591.52	0.3824	0.2354	0.0554
11/12	666.76	0.1272	-0.0198	0.0004
	Total	**0.7352**		**0.1015**

Expected Return ($\bar{R}$) = R/n =0.7352/5=0.1470

Standard Deviation (∃) = $\sqrt{\frac{\phi (R \ Z \bar{R})^2}{n \ Z1}} \ X \sqrt{\frac{0.1015}{5 \ Z1}} \ X0.1593$

Co-efficient of Variation (C.V) = $\frac{\exists}{\bar{R}} = \frac{0.1593}{0.1470} X1.0832$

Appendix VII

Calculation of Returns, S.D., Expected Returns and C.V. of Hotel Industry

Year	NEPSE Index	$R_H X\frac{NI_t Z NI_{t Z1}}{NI_{t Z1}}$	$R Z \bar{R}$	$(R Z \bar{R})^2$
06/07	251.47			
07/08	370.88	0.4748	0.3206	0.1028
08/09	367.42	-0.0093	-0.1635	0.0267
09/10	400.26	0.0894	-0.0648	0.0042
10/11	412.59	0.0308	-0.1234	0.0152
11/12	489.04	0.1853	0.0311	0.0010
	Total	**0.7710**		**0.1500**

Expected Return ($\bar{R}$) = R/n =0.7710/5=0.1542

Standard Deviation (∃) = $\sqrt{\frac{\phi (R Z \bar{R})^2}{n Z1}} X\sqrt{\frac{0.1500}{5 Z1}} X0.1936$

Co-efficient of Variation (C.V) = $\frac{\exists}{\bar{R}} = \frac{0.1936}{0.1542} X1.2556$

Appendix VIII

Calculation of Returns, S.D., Expected Returns and C.V. of Trading Industry

Year	NEPSE Index	$R_T X \frac{NI_t Z NI_{t Z1}}{NI_{t Z1}}$	$R Z \bar{R}$	$(R Z \bar{R})^2$
06/07	155.37			
07/08	204.08	0.3135	0.2399	0.0576
08/09	295.83	0.4496	0.3760	0.1414
09/10	282.08	-0.0465	-0.1201	0.0144
10/11	241.97	-0.1422	-0.2158	0.0466
11/12	191.97	-0.2066	-0.2802	0.0785
	Total	**0.3678**		**0.3384**

Expected Return ($\bar{R}$) = R/n =0.3687/5=0.0736

Standard Deviation (∃) = $\sqrt{\frac{\phi (R Z \bar{R})^2}{n Z 1}} X \sqrt{\frac{0.3384}{5 Z 1}} X 0.2909$

Co-efficient of Variation (C.V) = $\frac{\exists}{\bar{R}} = \frac{0.2909}{0.0736} X 3.9547$

Appendix IX

Calculation of Returns, S.D., Expected Returns and C.V. of Finance Industry

Year	NEPSE index	$R_F \ X\frac{NI_t \ Z NI_{t\ Z1}}{NI_{t\ Z1}}$	$R \ Z \ \bar{R}$	$(R \ Z \ \bar{R})^2$
06/07	471.82			
07/08	1152.74	1.4432	1.3909	1.9345
08/09	697.61	-0.3948	-0.4471	0.1999
09/10	397.38	-0.4304	-0.4827	0.2330
10/11	303.78	-0.2356	-0.2879	0.0829
11/12	267.01	-0.1210	-0.1733	0.0300
	Total	**0.2614**		**2.4803**

Expected Return ($\bar{R}$) = R/n =0.2614/5=0.0523

Standard Deviation (∃) = $\sqrt{\frac{\phi (R \ Z \bar{R})^2}{n \ Z1}} \ X\sqrt{\frac{2.4803}{5 \ Z1}} \ X0.7875$

Co-efficient of Variation (C.V) = $\frac{\exists}{\bar{R}} = \frac{0.7875}{0.0523} X15.0631$

Appendix X

Calculation of Returns, S.D., Expected Returns and C.V. of Insurance Industry

Year	NEPSE index	$R_I X\frac{NI_t Z NI_{t Z1}}{NI_{t Z1}}$	$R Z \bar{R}$	$(R Z \bar{R})^2$
06/07	612.46			
07/08	817.25	0.3344	0.3467	0.1202
08/09	656.41	-0.1968	-0.1845	0.0340
09/10	548.52	-0.1644	-0.1521	0.0231
10/11	407.14	-0.2577	-0.2454	0.0602
11/12	497.86	0.2228	0.2351	0.0553
	Total	**-0.0617**		**0.2929**

Expected Return ($\bar{R}$) = R/n =-0.0617/5=-0.0123

Standard Deviation (∃) = $\sqrt{\frac{\phi (R Z \bar{R})^2}{n Z1}} X\sqrt{\frac{0.2929}{5 Z1}} X0.2706$

Co-efficient of Variation (C.V) = $\frac{\exists}{\bar{R}} = \frac{0.2706}{Z0.0123} XZ2.9145$

Appendix XI

Calculation of Returns, S.D., Expected Returns and C.V. of Other Industry

Year	NEPSE Index	$R_O X \frac{NI_t Z NI_{t Z1}}{NI_{t Z1}}$	$R Z \bar{R}$	$(R Z \bar{R})^2$
06/07	818.12			
07/08	768.26	-0.0609	-0.0096	0.0001
08/09	738.99	-0.0381	0.0132	0.0002
09/10	540.48	-0.2686	-0.2173	0.0472
10/11	492.31	-0.0891	-0.0378	0.0014
11/12	590.98	0.2004	0.2517	0.0634
	Total	**-0.2564**		**0.1123**

Expected Return ($\bar{R}$) = R/n =-0.2564/5=-0.0513

Standard Deviation (∃) = $\sqrt{\frac{\phi (R Z \bar{R})^2}{n Z1}} X \sqrt{\frac{0.1123}{5 Z1}} X0.1675$

Co-efficient of Variation (C.V) = $\frac{\exists}{\bar{R}} = \frac{0.1675}{Z0.0513} XZ3.2677$

Appendix XII

Calculation of Returns, S.D., Expected Returns and C.V. of Development Banking Industry

Year	NEPSE Index	$R_D X \frac{NI_t Z NI_{t Z 1}}{NI_{t Z 1}}$	$R Z \bar{R}$	$(R Z \bar{R})^2$
06/07	539.66			
07/08	1285.89	1.3828	1.3723	1.8831
08/09	772.56	-0.3992	-0.4097	0.1679
09/10	478.53	-0.3806	-0.3911	0.1530
10/11	294.15	-0.3853	-0.3958	0.1567
11/12	245.52	-0.1653	-0.1758	0.0309
	Total	**0.0524**		**2.3915**

Expected Return ($\bar{R}$) = R/n =0.0524/5=0.0105

Standard Deviation ($\exists$) = $\sqrt{\frac{\phi (R Z \bar{R})^2}{n Z 1}} X \sqrt{\frac{2.3915}{5 Z 1}} X 0.7732$

Co-efficient of Variation (C.V) = $\frac{\exists}{\bar{R}} = \frac{0.7732}{0.0105} X 73.8383$

Appendix XIII

Calculation of Returns, S.D., Expected Returns and C.V. of Hydro Power Industry

Year	NEPSE Index	$R_H X \frac{NI_t Z NI_{t Z 1}}{NI_{t Z 1}}$	$R Z \bar{R}$	$(R Z \bar{R})^2$
06/07	847.93			
07/08	1323.99	0.5614	0.5668	0.3213
08/09	1044.81	-0.2109	-0.2055	0.0422
09/10	881.00	-0.1568	-0.1514	0.0229
10/11	673.44	-0.2356	-0.2302	0.0530
11/12	683.56	0.0150	0.0204	0.0004
	Total	**-0.0268**		**0.4398**

Expected Return ($\bar{R}$) = R/n =-0.0268/5=0.0054

Standard Deviation (∃) = $\sqrt{\frac{\phi (R Z \bar{R})^2}{n Z 1}} X \sqrt{\frac{0.4398}{5 Z 1}} X 0.3316$

Co-efficient of Variation (C.V) = $\frac{\exists}{\bar{R}} = \frac{0.3316}{Z 0.0054} X Z 61.9066$

Appendix XIV

Calculation of covariance between Nepal Insurance and Himalayan Insurance and their weights, portfolio risk and return

F/Y	$(R_A - \bar{R}_A)$	$(R_B - \bar{R}_B)$	$(R_A - \bar{R}_A)(R_B - \bar{R}_B)$
07/08	0.3108	0.1676	0.0521
08/09	0.0363	-0.1640	-0.0059
09/10	-0.0314	0.1949	-0.0061
10/11	-0.0107	-0.1644	0.0018
11/12	-0.3048	-0.0341	0.0104
		Total	**0.0522**

We have

$$Cov(R_A, R_B) = \frac{(R_A - \bar{R}_A)(R_B - \bar{R}_B)}{n-1} = \frac{0.0522}{4} = 0.0131$$

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

$$= \frac{(0.2190)^2 - 0.0131}{(0.2190)^2 + (0.1470)^2 - 2 \times 0.0131}$$

$$= 0.67$$

$W_B = 1 - W_A = 1 - 0.67 = 0.33$

Portfolio Return and Standard Deviation of NICL and HGICL

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

$$= 0.67 \times 0.0123 + 0.33 \times 0.0191$$

$$= 0.0145$$

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

$$= \sqrt{(0.67)^2 \times (0.2190)^2 + (0.33)^2 \times (0.1470)^2 + 2 \times (0.67) \times (0.33) \times (0.0131)}$$

$$= 0.1750$$

Appendix XV

Calculation of covariance between Nepal Insurance and United Insurance and their weights, portfolio risk and return

F/Y	$(R_A - \bar{R}_A)$	$(R_B - \bar{R}_B)$	$(R_A - \bar{R}_A)(R_B - \bar{R}_B)$
07/08	0.3108	0.3754	0.1166
08/09	0.0363	-0.1297	-0.0047
09/10	-0.0314	-0.1446	0.0045
10/11	-0.0107	0.0296	-0.0003
11/12	-0.3048	-0.1308	0.0399
		Total	**0.1560**

We have

$$Cov(R_A, R_B) = \frac{(R_A - \bar{R}_A)(R_B - \bar{R}_B)}{n - 1} = \frac{0.1560}{4} = 0.039$$

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

$$= \frac{(0.2190)^2 - 0.039}{(0.2190)^2 + (0.2217)^2 - 2 \times 0.039}$$

$$= 0.47$$

$W_B = 1 - W_A = 1-0.47 = 0.53$

Portfolio Return and Standard Deviation of NICL and UICNL

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

$$= 0.47 \times 0.0123 + 0.53 \times 0.0630$$

$$= 0.040$$

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

$$= \sqrt{(0.47)^2 \times (0.2190)^2 + (0.53)^2 \times (0.2217)^2 + 2 \times (0.47) \times (0.53) \times 0.039}$$

$$= 0.2094$$

Appendix XVI

Calculation of covariance between Himalayan Insurance and United Insurance and their weights, portfolio risk and return

F/Y	$(R_A - \bar{R}_A)$	$(R_B - \bar{R}_B)$	$(R_A - \bar{R}_A)(R_B - \bar{R}_B)$
07/08	0.1676	0.3754	0.0629
08/09	-0.1640	-0.1297	0.0213
09/10	0.1949	-0.1446	-0.0282
10/11	-0.1644	0.0296	-0.0049
11/12	-0.0341	-0.1308	0.0045
		Total	**0.0556**

We have

$$Cov(R_A, R_B) = \frac{(R_A - \bar{R}_A)(R_B - \bar{R}_B)}{n-1} = \frac{0.0556}{4} = 0.0139$$

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

$$= \frac{(0.1740)^2 - 0.0139}{(0.1740)^2 + (0.2217)^2 - 2 \times 0.0139}$$

$$= 0.32$$

$W_B = 1 - W_A = 1-0.32 = 0.68$

Portfolio Return and Standard Deviation of HGICL and UICNL

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

$$= 0.32 \times 0.0191 + 0.68 \times 0.0630$$

$$= 0.049$$

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

$$= \sqrt{(0.32)^2 \times (0.1740)^2 + (0.68)^2 \times (0.2217)^2 + 2 \times 0.32 \times 0.68 \times 0.0139}$$

$$= 0.1786$$

Appendix XVII

Correlation between the insurance companies

We have,

$$\partial_{AB} X \frac{Cov(R_A, R_B)}{\exists_A \exists_B}$$

where, ∂_{AB} = Correlation between Stock A and Stock B

$Cov(R_A, R_B)$ X Covariance between Stock A and Stock B

$\exists_A$ X Standard Deviation of Stock A

$\exists_B$ X Standard Deviation of Stock B

Between Nepal Insurance and Himalayan Insurance

$$\circ_{AB} X \frac{Cov(R_A, R_B)}{\pm_A \pm_B}$$

$$X \frac{0.0131}{0.2190 \mid 0.1740}$$

X0.34

Between Nepal Insurance and United Insurance

$$\circ_{AB} X \frac{Cov(R_A, R_B)}{\pm_A \pm_B}$$

$$X \frac{0.039}{0.2190 \mid 0.2217}$$

X0.80

Between Himalayan Insurance and United Insurance

$$\circ_{AB} X \frac{Cov(R_A, R_B)}{\pm_A \pm_B}$$

$$X \frac{0.0139}{0.1740 \mid 0.2217}$$

X0.36