## CHAPTER ONE

## INTRIDUCTION

### 1.1 Background of the study

Changing nature of competition and increasing pressure of globalization on today's business world, investment management has become the most crucial determinant of the economy. The most important fact of international business operation is continuous change in economic, political and social dimensions. These changes are beyond the control of international business concern. In recent years international investors are attracted towards the financial markets of developing countries. As a result many joint ventures and multinational companies are being established in the country. Most of commercial banks doing well are also joint ventures banks.

The growth of economy depends on availability of funds to finance the increased needs, not only of government and business, but also of individuals. Private domestic investment can be the contributor to economic growth and employment generation in the developing country. For the economic development of any country, public participation plays a vital role. If the people are rich, the country will be rich and people will have enough to invest on development of the country. To the extent that public investment expenditure result in the provision of public services which reduce the cost of production of the private sector, they have a positive effect on private profitability and investment. An investment in any funds is made to have some positive rate of return. Nobody is ready to bear risk without any return but to have returned one must ready to face some risk. To minimize the risk at the given rate of return the concept of portfolio diversification is necessary. Portfolio is simply a collection of securities gathered to achieve certain investment goals. Usually investors diversify their portfolios to have minimum risk and maximum the return. So, to meet the investment goals there should be well-managed portfolio. Most investors hope that if they hold several securities
then even one goes bad; the others will provide some protection from an external loss.

A systematic investment process should be followed to win the stock market. Investment process describes how an investor should go about making decisions with regard to what marketable to invest in, how extensive the investment should be and when the investment should be made. A five-step procedure for making these decisions forms the basis of the investment process:

- Set investment policy
- Perform security analysis
- Construct a portfolio
- Revise the portfolio
- Evaluate the performance of the portfolio.

Among these investment processes the research is focused on security analysis and portfolio selection. Security analysis involves examine of individual securities or group of securities within the broad categories of financial assets. Portfolio construction identifies those specific assets in which to invest determining the proportion of the investor's wealth. Diversification should be done to minimize the risk and maximize the return. Portfolio performance involves determining periodically how the portfolio performs in terms of not only the return earned, but also the risk experienced by the investor.

Financial market facilitates the flow of funds from surplus to deficit units. Those financial markets that facilitate the flow of short-term funds, that is, less than one year are known as money markets, while those that facilitate the flow of long-term funds are known as capital markets. There are two types of market securities. Securities having life less than one year are called money market securities and securities having life of more than one year are called capital market securities. Money market securities generally have higher liquidity
whereas capital market securities are used to generate a higher annual return to investors. "Stock market is a financial market which probably has the greatest glamour and is perhaps the least understood. Some observers consider it as alegalized heaven for gambling and many investors consider stock marker investing as a game in which the sole purpose is pocking winners" ( Lorie and Dodd,1985:27) .

The well functioning stock market allows stockholders to achieve efficient diversification, which reduces risk, which in turn, lowers the risk premium component in the cost of capital. Stock markets lower the cost of capital by liquidating investors' investment. It encourages investors to retain their earning and convert it into cash by selling shares in the stock market. The stock market provides an opportunity to the portfolio managers and public for direct participating and sharing the gain of economic progress.

In Nepalese contest the concept of security market began with the set up of "Nepal Stock Exchange" former known as "Securities Exchange Center" in 1976. This is the only stock market in Nepal. In spite of considerable development of stock market there is lot more to be done for the development of stock market in Nepal. Many investors are still afraid to invest in securities because of inadequate knowledge in this field and most investors are exploited from market intermediaries. For this purpose potential investors must be able to analyze risk and return of individual stock to increase market efficiency and consequently speed up the economic development.

The concept of banking system was introduced in Nepal with the establishment of Nepal Bank ltd. in 1937 A.D. But the financial scenario of Nepal changed with the establishment of joint venture banks in 1984 A.D. Nabil Bank ltd. is the first joint venture bank introduced in Nepal. Since the joint ventures banks introduced in Nepal, the set up of joint ventures banks are increasing day by day and domestic banks like Nepal Bank ltd. and Rastriya Banijya Bank no longer been able to enjoy monopoly. There is cut throat
competition among these banks, which is healthy sign for the economic development of the country.

There always exists perceptible difference among investors in terms of risk and return and more than often, every investors have their own unique way of response pattern while making investment decision. Generally, investors invest their current cash only to those areas where there is high return and low risk. An investor looking for the common stock investment usually pays the price for stock based on his estimation about future dividends and grown in stock price. Investors can earn in the form of dividend or interest income and the appreciation in the price of the stock hold in stock market investment. So common stock represents a commitment on the part of a corporation to pay periodically whatever, its board of directors determine to assign as a cash dividend.

This study occupies an important role in the development of stock market. In the market, stock price can be affected by interest rate, inflation and strengths of the dollar. The risk of a stock can be measured by its price volatility and its beta, banking sector is the most dynamic part of economy, which collects unused funds and mobilizes it in needed sectors. It is the heart of trade, commerce and industry. In Nepal, foreign joint venture commercial bank performs better than other Nepalese commercial banks because of their higher management efficiency and capacity of proper risk management. Nowadays, there are number of commercial banks growing in the country and numbers of joint ventures among them are also significant. Besides commercial bank, development banks are investing their performance in Nepalese banking sector.

However, this study of risk and return is basically focused on analysis of common stock investment of joint venture banks in Nepal and this study analyze the risk and return associated with investment among these banks on the basis of market price of stock and dividend.

### 1.2 Joint Venture Banks

### 1.2.1 Meaning of Joint Venture Banks

A joint venture is the joining of force between two or more enterprises for the purpose of carrying out a specific operation i.e. industrial/commercial investment, production or trade. By this definition, any agreement between two or more than two parties for specific purpose is called joint-venture.

In global perspective, joint-ventures are the modes of credit through partnership among and also form of negotiations between various groups of traders and industries to achieve mutual exchange of goods and services for sharing competitive advantages. From the above definition, it is clear that a JV is a single business deal, which is jointly undertaken by two or more persons or parties with a view to making and sharing profit.

### 1.2.2 Feature of Joint Venture Banks

The specific features of JV are as follows:

- It is confined to a single deal.
- A JV is limited to a single business adventure.
- Participants contribute capital for the JV and share profits and losses in proportion to their capital (investment)
- The work of joint venture may do by all the participants or by one of the participants.

Risk and return analysis is very important part of investment decision making. Investment decision is made by managers, shareholders and lenders. Return is firstly calculated and then risk is also calculated. Finally, they are compared and an approximate decision made.

### 1.2.3 Need of Joint Venture Banks

- Capital Formation
- Monetization of Economy
- Price Stability
- Control in Interest rate
- Availability of Credit
- Implementation of monetary policy
- Development of neglected and deprived sectors
- Safe custody of wealth
- Promotion of Saving
- Transfer of funds
- Exchange of foreign currencies
- Long-term Loan


### 1.3 Focus of the Study

It is concerned with selecting optimal portfolio by risk-averse investors. Risk-averse investors selects efficient portfolio that maximizes return at a given level of risk or minimizes risk at a given level of return. With the collection of those efficient portfolios, the optimal portfolios can be obtained for given investors .The level of risk and return is depended upon the investor's preferences.

### 1.4 Statement of the Problem

Recent trend shows that the general people are interested to invest their small money on the common stock of financial institutions like commercial banks. But due to the lack of proper information and poor knowledge about market status and situation, market intermediaries exploit investors. Sometimes people think that investing in common stocks is intolerably hazardous. Due to this many investors are scared to invest into stocks. This is the main problem that does not allow gearing up the capital market of the nation. The main problem for the individual investors are lack of proper information about market whereas the problem for financial sector is to enhance the goodwill among the public due to frequent collapse of some finance companies being unable to utilize public unds properly. The investors are responsible to make
rational investment decision. For this rational analytical knowledge is essential. The investor's attitude and perception also plays a vital role in rational decision regarding whether the investment should be made or not. We find in Nepal that most of the investor invests their funds in a single security. Rather they can be benefited by investing in portfolio of securities and archiving diversification of risk.

The major problems in the research work are follows:

- How the investment decisions are to be taken?
- What are the factors affecting risks of the securities?
- What are the comparative risk positions of selected Joint venture banks?
- Does the risk and return of JV banks vary significantly?
- What is the systematic risk position in relation to total risk?
- Would portfolio construction within the selected Joint Venture banks be profitable?

Investment on common stock is the main sources of fund for the companies. The investors are the sources of revenue as a customer for the stockbrokers and financial institutions and ultimately they are the backbone of economic development of the nation. So every policy and plan of financial institution $s$ and government also have to encourage them to invest on common stock. For this there is a great need of such institutions, which can give valuable information that accelerates the stock investment and market efficiency.

### 1.5 Objective of the Study

The main objective of the study is to analyze the risk and return of common stock investment of listed companies i.e. joint venture banks. The specifics objectives of the present study are as follows:

- To assess the volatility of different stocks and identity relevant variables that should be considered while deciding investment in stock.
- To evaluate common stocks of selected Joint Venture Banks in terms of risk and return and to perform sector comparison on the basis of market capitalization.
- To make comparative study of selected Joint Venture banks in Nepal, in terms of pricing analyzing the risk and return of the individual share.
- To provide suggestions and recommendations based on data analysis and the findings of the study.


### 1.6 Significance of the Study

This research study will give the reliable information about Nepalese stock market and may contribute in the analytical power of the investors. In Nepalese context, very few studies are made and there are no specific magazines and articles on the topic. So the study will be more significant for the exploring and increasing stock investment. The main significance of the study is as follows:

- This study will provides some knowledge about the Nepalese stock market development along with providing ideas to minimize the risk on stock investment.
- The study will have the clear conception over their investment. They will be able to distinct the right investment among all the investment opportunities.
- This study will be beneficial for all the persons who are directly or indirectly related to the Nepalese stock market.
- The study will be a matter of interest for academicians, students and investors.


### 1.7 Limitation of the Study

Everything has two fold i.e. Bright and Darkness, so as the any research study may not free from its own limitations. Mainly this study is made for the partial fulfillment of M.B.S. level. So there are couple of
limitations which weaken the generalization, the main limitations are inadequate coverage of industries, time taken, reliability of statistical tools used and other variables which are not included in the study. The following are the limitations of the study.

- The study only focuses on selected Joint Venture Banks covering the period of last five years, F/Y 2003/04 to 2008/09.
- The data analyzed are from the fiscal year 2003/04 to 2008/09. At the time of research, fiscal year 2009/2010 is not over so this studies unable to analyze the data of current fiscal year.
- The study depends upon the data published by NEPSE; NEPSE has not published recent data. In spite of lacking data. The study includes the available data as far as possible.
- The study is based on only five Nepalese Join Venture Banks.
- The study is based on secondary data. So the reliability of the conclusion based upon the accuracy of secondary data.
- Time and resources are also the limitations of the study.


### 1.8 Organization of the study

The study has organized into five chapters each denoted to some aspects of study of clearing and settlement system. The title of each chapter is as follows:

Chapter 1: Introduction

The first introduction chapter deals with the introductory framework of the study. This includes background, statement of the problem. Objective of the study, significance of the study, limitation of the study and organization of the study itself.

Chapter 2: Review of Literature

The second chapter includes the review of literature available and review of related theoretical background of the relevant field of study. It includes review of literature where issues, published and unpublished articles, books, thesis, journals, newspaper etc will be reviewed.

Chapter 3: Research Methodology
The third chapter explains the research methodology used or the purpose of the study, which includes research designing, source of data, data gathering procedure, population and sample size of the study, data processing procedure and financial as well as statistical tool available.

Chapter 4: Presentation and Analysis of Data
The fourth chapter, which is the important chapter of the study, will include data classification, analysis and interpretation regarding the primary as well as secondary data.

Chapter 5: Summary, Conclusion and Recommendations

The fifth chapter contains finding summary and conclusions derived from the study is presented. Depending upon the findings, recommendations for further improvements in further improvements in future is prescribed.

## CHAPTER TWO

## REVIEW OF LITERATURE

It is very important to study the materials on the topic of research and that is called review of literature. Review of literature deals with the theoretical aspect of the topic on risk and return on common stock investment in more detail and descriptive manner. This chapter helps to take adequate feedback to broaden the information base and inputs to study. This chapter reviews same basic academic courses books, journals and others related studies.

This chapter has been divided into two main sections. First section deals with conceptual \& theoretical framework and second section deals with reviews of empirical studies undertaken in Nepal.

### 2.1 Conceptual / Theoretical Review

Various books relating to theoretical aspects of portfolio management and risk \& return are taken into consideration. In this research, risk \& return has been taken as special tool to analyze the rate of return that the investment gives.

People, nowadays are seen very much interested towards investing in the shares of various organization. In Nepalese context the major share trading companies are the financial institutions mainly the commercial banks. Besides, the trading prices of these banks shares are also the highest. But though the shares price of various banks can be observed different, this variety in the market price of shares depends up on the risk of investment and the return the investors get from their investments.

Risk loving investors like to invest on the more risky banks only considering the return they get, whereas the security seeking investors like to invest on those banks shares, which are less risky in terms of the return.

Moderate types of investors would like to invest in the medium risk and medium return. So the main focus is given on risk and return.

### 2.1.1 Return

The concept of return has different meaning to different investors. Some investor seek near term cash inflows and gives less value to more distant return such an investor might purchase the stock of other firm that pays a large cash dividends. Other investors are concerned primarily with growth. They would seek projects that offer the promise of long term, higher than average growth of sales, earning and capital appreciation.
"An investor is ready to sacrifice his present consumption for the future return or reward. Investment can be made in various securities. Therefore motivation for the investment is the return. The return is difference between the terminal wealth (what an investor received) and initial wealth (what an investor invest). The invested wealth of investor may be increase or decrease or remains the same in the future. If the terminal wealth is greater then the initial wealth there is positive return from the investment. If the terminal wealth is less than the initial wealth there is negative return from the investment if terminal wealth is equal to initial wealth there is zero return. Investor always wants to higher return other things being the same" ( Manandhar et.al., 2063:42).

Return is the motivating force for the investment. It is also the key method available to investor in comparing the alternative investment. Major purpose of investment is to get a return or income on the funds invested. This rate of return concept is important because it measured the speed at which investor's wealth increases or decreases. The rate of return either can express in terms of rupees or \%. Rupees return is the absolute measure. However \% return is the relative measure which is more useful for the investment decision. Total return combines both capital gain and the dividend. There are different types of returns they are:

## (1) Holding period Return

The rate of return which is earned from the investment of common stock during the holding period is known as holding period return. Holding period may be one day one week, one month six month or one year. This rate of return is measured as follows:

$$
\mathrm{R}=\frac{\text { Ending wealth }- \text { Begining wealth }}{\text { Begining wealth (Or purchase price) }}
$$

An investor can obtained two kinds of income from an investment in a share of stock or a bond.

1. Income from price appreciation (or losses from price depreciation), some times called capital gains (or losses). This quantity is denoted as $\mathrm{p}_{\mathrm{t}}-\mathrm{p}_{\mathrm{t}-1}$
2. Regular return or income earned from cash dividend or coupon interest payments represented by $\mathrm{C}_{\mathrm{t}}$.

The sum of these two sources of income (or loss) equals to the change in the invested wealth during any given holding period. The single percentage rate of return formula can be restated in an appropriate form for almost any investment.

$$
\begin{aligned}
r_{t} & =\frac{\text { price change }+ \text { Cash flow (if any) }}{\text { price at begining or the period }} \\
& =\frac{\left(p_{t}-p_{t-1}\right)+c_{t}}{p_{t-1}}
\end{aligned}
$$

Where,
$P_{t} \quad=$ Market price at the end of the period etc.
$P_{t-1} \quad=$ Price at the beginning of the period $t-1$
$\mathrm{C}_{\mathrm{t}}$ =Cash flow income receive during the t period (Francis, 1998:11).

## (2) Realized rate of Return

The rate of return which is already realized in the past period is known as realized rate of return. It is the fact return, return that was earned or it is historical return.

### 2.1.2 Expected Return

It is the rate of return that is expected to be realized in future. For this, rates of return in the past are used. So it is arithmetic average of returns realized in the past. The expected rate of return must be greater or equals to the required rate of return for the investors to find the investment acceptable (Cheney\& Moses, 1993: 34), it is calculated as follows:


Where,
$\mathrm{R}_{\mathrm{j}} \quad=$ Rate of return on stock j .
$n \quad=$ No. of years.
$\Sigma=$ Summation.

Investment decisions are based on expectations about future. The expected rate of return for any assets is the weighted average rate or return using the probability or each rate of return as the weight. The expected rate of return is calculated by summing the products of the rate of return and their respective probabilities (Francis, 1998: 11).

### 2.1.3 Risk

In the basic sense, risk can be defined as the chance of loss. Assets having greater chances of loss are viewed as more risky than those with lesser chances of loss. More formally, the term risk is used interchangeably with uncertainty to refer to the variability of expected returns associated with a given asset.

Risk is a complicated subject and needs to be properly analyzed. The relationship between risk and return is described by investor perception about risk and their demand for compensation. Generally, Investors are mostly interested in the project yielding higher returns in less risk. Therefore, it is the investors required risk premium that establishes a link between risk and return. In a market dominated by rational investor higher risk will command by rational investor's higher risk will be commanded by rational premium and the trade-off between the two assumed linear relationships between risk and risk premium. "The observe difference in both the levels and variability of the rates of return across. Securities are indicative of the underlying risk and return relation in the market" (Loric, Dodd and Kimpton, 1985:87).
"Risk defines most generally is the probability of the occurrence of unfavorable outcomes. But risk had different meaning in the different context in our context; two measure developments from the probability distribution have been used as initial measure of return and risk. There are the mean and the standard deviation of the probability distribution" (Weston and Brigham, 1982:557).

There are many ways to measure risk. The following three models are commonly used
(Van Horne, 1998:205).

## Beta Coefficient

This is mathematical value that measures the risk of one asset in terms of its effects on the risk of a group of assets, as would be the concern for an investor holding stocks and bonds. It is derived mathematically so that high
beta indicates a high level of risk whereas a low beta represents a low level of risk. Mathematically, it is denotes by " $\beta \mathrm{j}$ ".

## Standard Deviation

This is a measurement of the dispersion of forecast returns when such returns approximate a normal probability distribution. It is a statistical concept and is widely used to measure risk from holding a single asset. The standard deviation is derives so that a high standard deviation represents a large dispersion of return and is a high risk and vice versa. Mathematically, it is denoted by " $\sigma j$ ".

## Subjected Estimates

A subjective risk measure occurs when qualitative rather than quantitative estimates are used to measure dispersion. As an example: an analyst may estimate that a proposal offers a "low" level of risk. This means that, in the analyst's view - the dispersion of return will not be very wide. Similarly, a "high" risk level will accompany a project whose forecast return may very a great deal. With the overall definition of risk as dispersion of return, there are two components of risk may be identified.

## 1. Business Risk

Business risk may be defined as the chance that the firm will not have ability to complete successfully with the assets that it purchases. For an example: the firm may acquire a machine that may not operate properly, that may not produce stable products or that may
face other operating or market difficulties that causes losses. Any operational problems are grouped as business risk.

## 2. Financial Risk

This is the chance that an investment will not generate sufficient cash flows either to cover interest payment on money borrowed to finance it or principal repayment on debt or to provide profits to the firm.

### 2.1.3.1 Sources of Risk

Every investment involves uncertainty that make future investment returns risky. Sources of uncertainty that contribute to investment risk are as follows: (Source: Jack Clark, 1997:308).

## Interest Rate Risk

Interest rate risk is defined as the potential variability of return caused by changes in the market interest rates. In more general terms, if market interest rate rise, then investment values and market prices will fall, and vice versa. This interest rate risk affects the prices of bonds, stocks, real estate gold, puts, calls, futures contracts and other investment a swell.

## Purchasing Power Risk

Purchasing power risk is the variability of return and investor suffers because of inflation. Economists measure the rate of inflation by using a price index. The consumer price index ( CPI ) is a popular price index in the United States. The percentage change in the CPI is widely followed measure, of the rate of inflation.

## Bull-Bear Market Risk

The various market forces make securities price upward and downward. The upward trend of market price (Bull Market) and downward trend of market price (Bear Market) create a long lasting source of investment at risk.

## Management Risk

Management risk is defined as the variability of return caused by decision made by a firm's management and board of directors. Though many top executives earn princely salaries, occupy luxurious offices, and wield enormous power within their organizations, they are mortal and capable of making mistake or a poor decision. Furthermore, errors made by business managers can harm those who have invested in their firms. Forecasting management errors is difficult work that may not be worth the effort and, as a result, imparts needlessly skeptical outlook. Agency theory provides investors with an opportunity to replace skepticism with the informed insight as they endeavor to analyze subjective management risk.

## Default Risk

Default risk is that portion of investments total risks that results from changes in the financial integrity of the investment. It is related to the probability that some or all of the initial investment will not be returned.

## Liquidity Risk

Liquidity risk is associated with uncertainty created by the inability to sell the investment quickly or cash. The return variability will increase if price discount and sales commission are to be given in order to liquidate assets in time. The less the liquidity, the greater will be the risk. So, two factors price and time are associated with liquidity.

## Call - Ability Risk

Some securities are issued with a call provision i.e. a company may call back the securities issued before their maturity. The call ability risk is portion of a securities total variability of return that derives from the possibility that the issue may be called.

## Convertibility Risk

Convertibility risk is that portion of the total variability of return from a convertible bond or convertible preferred stock that reflects the possibility that the investment may be converted into the issuer's common stock at a time or under terms harmful to the investor's best interests.

## Political Risk

Political risk is the portion of assets' total variability of return caused by changes in the political environment (domestic and international as well as internal changes of the company). The current Nepalese political environment has made a significant impact on the investment to increase losses.

## Industry Risk

An industry may be viewed as a group of companies that complete with each other to market a homogeneous product. Industry risk is that portion of an investment total variability of return caused by events that affect the products and firms that make up an industry. The stage of the industry's life cycle, international tariffs and/or quotas on the products produced by an industry
related taxes industry wide labor union problems environmental restriction, raw materials availability and similar factors interact and affect all the firm sin an industry simultaneously. As a result of these commonalties, the prices of the securities issued by competing firms tend to rise and fall together. The uncertainties discussed above are the major sources of investment risk, but by no means do they make up and exhaustive test. If all the uncertainties could be listed, they would add up to total risk or total variability of returns.

### 2.1.3.2 Types of Risk

Total risk or total variation of the rate or return for an individual security or portfolio is measured by the standard deviation or variance of the rate of return. According to Capital Asset Pricing Model (CAPM), total risk can be divided into two parts i.e. systematic risk and unsystematic risk.

## Systematic risk

It is the also called non-diversifiable risk. The systematic risk is market related. In other words, it arises from the changes in the economy and market condition. For example, high inflation, recession, impact of political factors, wars, depression, long-term changes, etc, which are beyond the control of company management. It affects all the firms in the market. The portion of risk is non-diversifiable and cannot be reduced. The systematic risk is rewarded in the form of risk premium. Sometimes, systematic risk is called market risk. Systematic risk affects almost all assets in the economy, at least to some degree, whereas systematic risk affects at most a small number of assets. The principle of diversification has an important implication to a diversified investor, only systematic risk matters. It follows that in deciding whether or not buy a particular individual asset, a diversified investor will only concerned with that asset's systematic risk. This is a key observation and it allows us to say great deal about the risks and returns on individual asset, in particular, it is the basis for a famous relationship between risk and return called the security market line. To develop the SML, we introduce the equally famous Beta coefficient one of the measurement unit of modern finance. Beta coefficient and SML are the key concepts because to get supply us with at least part of the
answer to the question of how to go about determining the required return on an investment.

## Unsystematic risks

The unsystematic risk is non market factors related. In other word, it arises from the project specific factors for example inefficiency of management failure in new product in production, employee strikes, lawsuits and any other event that is unique to the company. It is inherent individual companies or projects. This portion of risk is diversifiable and it is possible to reduce or eliminate through diversification of the investments. It is called unique or asset specific risk.

### 2.1.3.3 Measurement of Risk

There are different types or the statistical tools which we can used to measure the financial risk are as follows;

- Variance $\left(\sigma^{2}\right)$
- Standard deviation ( $\sigma$ )
- Coefficient of variation(C.V.)

Standard deviation (S.D.) and coefficient of variation is generally used to measure the risk. The square root of the variance is known as standard deviation (S. d.). S. d. is calculated as follows;

$$
\text { S.d. }(\sigma)=\sqrt{\text { variance }}=\sqrt{\sigma^{2}}
$$

Where,

$$
\text { Variance }\left(\sigma^{2}\right)=\frac{\Sigma[R-E(R)]^{2}}{n}
$$

Or

$$
\begin{aligned}
& \quad \sum[\mathrm{R}-\mathrm{E}(\mathrm{R})]^{2} \times \mathrm{P} \\
& \mathrm{R}=\text { Rate of return, }
\end{aligned}
$$

$$
\begin{aligned}
& \mathrm{E}(\mathrm{R})=\text { Expected rate of return } \\
& \mathrm{n}=\text { No. of observations or years } \\
& \mathrm{P}=\text { Probability }
\end{aligned}
$$

Coefficient of variation (C.V.), It measures the risk on per unit of return. Coefficient of variation (C.V.) is calculated as follows

$$
\therefore \mathrm{c} . \mathrm{v} .=\frac{\sigma}{\mathrm{E}(\mathrm{R})}
$$

Since, higher the value of variances, S.D. and C.V. shows higher risk.

### 2.1.4 Relationship between the Risk and Return

The relationship between risk and return is described by investor's perception about risk and their demand for compensation. No. investor will take invest in risky assets unless he is assured or adequate compensation for the assumption of risk. Therefore, it is the investors required risk premium that establishes a link between risk and return. There is the positive trade - off between the risk \& return. Higher the risk, higher the return and lower the risk lower the return.

## Figure 2.1 Relationship between Risk \& return



The figure represents a higher premium for higher risk in a linear fashion indicating a premium or $\mathrm{R}_{3}$ for $\mathrm{r}_{3}$ degree or risk, $\mathrm{R}_{2}$ for $\mathrm{r}_{2}$ and so on bucked by the assumption of linear relationship, the risk premium increases or decreases in proportion to a change in level or risk.

### 2.1.5 Portfolio Risk

The riskiness of a portfolio is measured by its standard deviation. But unlike expected return it is not the weighted average of the standard deviation of individual securities included in a portfolio. It is because a fundamental idea implied behind portfolio theory is that riskiness of a single security is completely different from the riskiness of that security held in portfolio. So it is possible for a given security to be quite risk when held in isolation, but not very risky if it is held in a portfolio (Rana, 2000: 120).

The portfolio risk depends not only on the riskiness of the individual security included into portfolio but also on the relationship among those securities. Correlation measure the degree of relationship in which direction two securities move together. The numerical value of correlation ranges from + 1.0 to -1.0 . If two securities tend to move in the same direction, they are positively correlated. If it is negative the securities move in opposite directions. Thus when the return for one security decreases, the return for the other increases the magnitude of the correlation coefficient indicates the degree of relationship between the returns on two securities (Rana, 2000: 190-191).

The standard deviation of a portfolio is given by.

$$
\sigma_{p}=\sqrt{\left[\sum_{i=1}^{\mathrm{n}} \sum_{\mathrm{j}=1}^{\mathrm{n}} \text { Wi Wj covij }\right]}
$$

Where,

$$
\begin{aligned}
& \mathrm{W}_{\mathrm{i}} \quad \text { = Proportion (weight) of investment in security } \mathrm{i} . \\
& \mathrm{W}_{\mathrm{j}} \quad \text { = Proportion (weight) of investment in security } j .
\end{aligned}
$$

$\mathrm{Cov}_{\mathrm{ij}}=$ co-variance of the returns between security I and security j.
n = Number of security included in a portfolio
$\sigma_{\mathrm{p}} \quad=$ Portfolio standard deviation.
The above equation can be simplified in case of two assets portfolio as below;

$$
\sigma_{\mathrm{p}}=\sqrt{\left[\mathrm{W}_{\mathrm{i}}{ }^{2} \sigma_{\mathrm{i}}^{2}+\mathrm{W}_{\mathrm{j}}^{2} \sigma_{\mathrm{j}}^{2}+2 \mathrm{~W}_{\mathrm{i}} \mathrm{~W}_{\mathrm{j}} \mathrm{covij}\right]}
$$

The co-variance of portfolio is calculated as follows;

$$
\operatorname{Cov}_{\mathrm{ij}}=\sum\left[\mathrm{P}_{\mathrm{s}}\left\{\mathrm{R}_{\mathrm{i}}-\mathrm{E}\left(\mathrm{R}_{\mathrm{i}}\right)\right\}\left\{\mathrm{R}_{\mathrm{j}}-\mathrm{E}\left(\mathrm{R}_{\mathrm{j}}\right)\right\}\right]
$$

If we know the correlation coefficient $\left(\mathrm{r}_{\mathrm{ij}}\right)$, then we apply the following relationship for calculating co-variance.

$$
\begin{aligned}
& \operatorname{Cov} \mathrm{ij}=\mathrm{r}_{\mathrm{ij}} \sigma_{\mathrm{i}} \sigma_{\mathrm{j}} \\
& \mathrm{r}_{\mathrm{ij}} \quad=\frac{\operatorname{Cov} \mathrm{ij}}{\sigma_{\mathrm{i}} \sigma_{\mathrm{j}}}
\end{aligned}
$$

In practice, it is unusual to find the firms or securities with extreme correlation (i.e. +1 or -1 ). The correlation does not approach exactly +1 or -1 , but ranges between these two extremes, therefore, the risk can be reduced but not totally eliminated by forming a portfolio.

### 2.1.6 Portfolio Analysis

A portfolio is the combination of two or more than two units with different characteristics. An investment portfolio refers to the investment in two or more assets such as Stocks/Bonds etc. Investors rarely place their entire wealth into a single assets or investment. Rather they construct a portfolio or group of investments, therefore it is needed to extend analysis of risk and return to include portfolio. Portfolio is formed mainly for the reason of minimizing
risk on investment in aggregate. It helps to earn the same return at the less amount of risk.

The return on the security could be regarded as being linearly related to a single index like the market index. Therefore, the market index should be consist of all the securities trading on the market. However, a popular average can be treated as a surrogate for the market index. Acceptance of the idea of a market index, Sharpe argued, would obviate the need for calculating the thousand of covariance between individual securities could be attributed to movements in a single underlying factor being measured by the market index. The simplification of the maskowitz model has come to be known as the market model or simple index model (SIM).

The desirability of any securities is direct related to its excess between to beta ratio. Where the average return is the expected return on the securities, risk less rate of interest is the return on a risk less assets, the beta is the expected change in the rate of return on security associated with a one percent change in the market return. If securities are rank by access return to beta from highest to lowest, the ranking represents the desirability of any securities inclusion in a portfolio. The no. of securities related depends on a unique cut off rate such that all securities with higher ratio of an access return will be included and all securities with lower rate excluded. (Bhalla, 2004: 590-601)

### 2.1.7 Expected Return of Portfolio

Expected return of the portfolio is the weighted average expected returns of assets included in the portfolio. Where the weights are the proportion of investment initially made in each asset included in the portfolio. The expected return of portfolio is calculated as follows:

$$
\mathrm{E}\left(\mathrm{R}_{\mathrm{p}}\right)=\sum_{\mathrm{i}=1}^{\mathrm{n}} \mathrm{~W}_{\mathrm{i}} \mathrm{E}\left(\mathrm{R}_{\mathrm{i}}\right)
$$

Where,
$\mathrm{E}\left(\mathrm{R}_{\mathrm{p}}\right)=$ Expected portfolio return
$\mathrm{i} \quad=$ Security
$\mathrm{n} \quad=$ No. of securities in a portfolio
$\mathrm{E}\left(\mathrm{R}_{\mathrm{i}}\right)=$ Expected return on stock i
$\mathrm{W}_{\mathrm{i}} \quad=$ Weight of stock i

### 2.1.8 Capital Market Line (CML)

The separation theorem of J. Tobin (1985) states that portfolio consist of risk - free assets and assets on the market portfolio. A rational investor will select an optimal portfolio on the capital market line (CML) which maximizes investor's preference. Capital market line (CML) represents the equilibrium relationship between the expected return and the standard deviation of efficient portfolios. The line of efficient portfolios is called efficient frontier. The efficient frontier that can be constructed without borrowing or landing is convex towards the Y axis in risk return space. However, if borrowing and lending opportunities are included in the analysis, a linear of investment opportunities are called the Capital market line (CML).

Figure 2.2 Capital Market Line


The equation for the capital market line (CML) can be expressed as;

$$
\mathrm{E}\left(\mathrm{R}_{\mathrm{p}}\right)=\mathrm{R}_{\mathrm{f}}+\frac{\left[\mathrm{E}\left(\mathrm{R}_{\mathrm{m}}\right)-\mathrm{R}_{\mathrm{f}}\right]}{\sigma_{\mathrm{m}}} \times \sigma_{\mathrm{p}}
$$

Where,
$\mathrm{E}\left(\mathrm{R}_{\mathrm{p}}\right)=$ Expected return on a portfolio
$\mathrm{R}_{\mathrm{f}} \quad=$ Risk free rate
$\mathrm{E}\left(\mathrm{R}_{\mathrm{m}}\right)=$ Expected return on a market portfolio
$\sigma \mathrm{p}=$ Standard deviation of market portfolio
The slope of CML shows the an extra return over the risk free rate of return

Slope of CML $=\frac{\left\lfloor E\left(R_{m}\right)-R_{f}\right\rfloor}{\sigma_{m}}$

### 2.1.9 Capital Assets Pricing Model (CAPM)

William F. Sharpe has presented his famous magnum opus capital assets pricing model in 1961. The CAPM was developed from portfolio theory as a more practical means of enabling investors to establish the rate of return, which they require from their investment. The model is based upon the concept of risk being analyzed between "systematic" and unsystematic risk". It is assumed that investors are widely diversified and therefore, investors can ignore the unsystematic (specific) risk, as it would be removed by a wide level of diversification. The measure of systematic risk relating to security can be measured by calculating the beta (B) factor for a security. Beta is the relative measure of systematic risk of a given security relative to the risk of the market portfolio. If beta, measuring only the systematic risk is substituted for total risk in capital market line diagram depicted above, the relationship between the return and beta is now called security market line (SML)

Figure 2.3 Security Market Line


The below equation showing the security market line (SML), explained by the CAPM is as follows;
$\mathrm{E}\left(\mathrm{R}_{\mathrm{i}}\right)=\mathrm{R}_{\mathrm{f}}+\left[\mathrm{E}\left(\mathrm{R}_{\mathrm{m}}\right)-\mathrm{R}_{\mathrm{f}}\right] \mathrm{b}_{\mathrm{i}}$

Where,
$\mathrm{E}\left(\mathrm{R}_{\mathrm{i}}\right)=$ Required rate of return on stock i.
$\mathrm{R}_{\mathrm{f}} \quad=$ Risk free rate of return.
$E\left(R_{m}\right)=$ Expected rate of return on market portfolio.
$b_{i} \quad=$ Beta or systematic risk index of stock i.

The concept of beta is the ratio of covariance of stock return and market return to the variance of the market return. Beta is an index of systematic risk. Higher value of beta shows the higher systematic risk and lower value of beta shows the lower systematic risk. It can be calculated as follows;

$$
\mathrm{b}_{\mathrm{i}}=\frac{\operatorname{Cov}_{i m}}{\sigma^{2} m}
$$

Where,

$$
\mathrm{b}_{\mathrm{i}}=\text { Beta of stock i. }
$$

$\mathrm{Cov}_{\mathrm{im}}=$ co-variance between the return of stock of $\&$ market return (m).
$\sigma^{2} m=$ variance of the market return.

Alternatively, the value of beta is calculated as follows;
$\mathrm{b}_{\mathrm{i}}=\frac{\sigma_{i} \times r_{i m}}{\sigma m}$

Where,
$b_{i} \quad=$ Standard deviation of stock i.
$\mathrm{r}_{\mathrm{im}}=$ Correlation between the return.
$\sigma_{\mathrm{m}}=$ Standard deviation of market return.

### 2.1.10 Investment

In general sense, investment means to pay out money to get more but in the broadest sense, investment a present commitment for the future benefits. While the commitment takes place with certainty, the future benefits are shrouded in uncertainty. The uncertainty creates risk to investors and they desire to minimize return by minimizing such risk. Therefore, taking decision about proper investment is crucial to the investor and it requires a specific investment decision process, analysis of securities, identification of overpriced, under priced securities, making appropriate investment strategies as well as construction of efficient portfolio.

Investment is concerned with the management of an investor's wealth, which are the sum of current income and the present value of all future income. The term investment is conceptualized as income, saving or other collected fund. It covers wide range of activities. T is commonly known fact that an investment is possible only when there are adequate saving. Therefore both saving and investment are interrelated. Investment is an exchange of financial claim stocks and bonds etc. investment if the employment of funds with the rim
of achieving additional income or growth in value it involves the commitment of resources that have been saved or pot away from current consumption in the hope that some benefit will occur in future. Investment involves long term commitment and waiting for a reward.
"Investment is a commitment of funds made in the expectation of some positive rate or return. If the investment is property undertaken the return will be comminute with the risk the investor assumes". Return risk and time are the elements of investment (Fisher and Jordan, 1995:104).

### 2.1.11 Common Stock

Common stock represents equity, or an ownership position in a corporation. It is a residual claim, in the sense that creditors and preferred stockholders must be paid as scheduled before common stockholders are, in principal,, entitled to any value remaining after all other claims have been satisfied. The great advantage of the corporate form of organization is the limited liability of its owners. Common stocks are generally 'full paid and nonassessable'; meaning that common stockholder may lose their initial investment but not more than that. That is if the corporation fails to meet its obligations, the stockholders cannot be forced to give the corporation the funds that are needed to pay off the obligations. However, such failure will result in the stockholders having lost an amount equal to the price previously paid to buy the shares.

Common stock holders of a corporation are its residual owners, their claim to income and asset comes after creditors and preference share holders have been paid in full. As a result, a stockholders return on investment is less certain than the return to lender or to preference stock holder. On the other hand, the share of the common stock can be authorized either with or without per value. The par value of the stock is merely a stated figure in the corporate character and is of little economic significance. A company should not issue stock at a price less than par value because stock holders who bought stock for
less than par value would be liable to creditors for the difference between the below pre price they paid and the par value (Van Horne, 1997:98).

But in Nepal, as per the provision of Nepal Company Act 2057, no common stocks are allowed to issue without par value. The par value must be either Rs. 10 or Rs. 100. Common stock has one important investment characteristics and is important speculative characteristics. Their investment value and average market price tend to increase regularly but persistently over the decreases 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 fluctuation in both directions, as most people to speculate or gamble i.e. give way to hope fear and greed.

### 2.1.11.1 Return on Common Stock

The cash payoffs to owners of common stocks are of two kinds:
I. Cash dividend
II. Capital gain (loss)

If current price of a share is Po, the expected price aty the end of a year is P1 and that the expected dividend per share is Div1, the rate of return that investors expect from this share over the next year is defined as the expected dividend per share Div1 plus the expected price appreciation per share ( $\mathrm{P} 1-\mathrm{Po}$ ), all divided by the price at the start of the year Po which can be shown in the form of,

$$
R=\frac{\operatorname{Div}_{1}+\mathrm{P}_{1}-P_{0}}{\mathrm{P}_{0}}
$$

The return form holding an investment over some period, say a year is simply any cash payments received due to ownership, plus the change in market price. Thus, the return comes from two sources: income and price appreciation.

For common stock, we may define single-period return as:

$$
\mathrm{R}=\frac{\mathrm{D}_{\mathrm{t}}+\left(P_{t}-P_{t-1}\right)}{\mathrm{P}_{\mathrm{t}-1}}
$$

Where,
$\mathrm{R}=$ Actual/expected return
$\mathrm{T}=$ Particular time period in the past (future)
$\mathrm{D}_{\mathrm{t}}=$ Dividend received during the year t
$\mathrm{P}_{\mathrm{t}}=$ Stocks price at time period t.
$\mathrm{P}_{\mathrm{t}-1}=$ Stocks price at time period $_{\mathrm{t}-1}$

The above mentioned formula can be used to find out both actual singleperiod returns (when based on historical data) as well as expected single period (when based on future expected dividends and prices).
(The term in the numerator of above equation represents the capital gain or loss during period.)
"Holding period return measure mentioned above is useful with an investment horizon of one year or less. For longer periods, it is better to calculate rate of return as an investment yield. The yield calculation is present value-based and this considers the time value of money" (Barely and Myers, 1994:84).

### 2.1.11.2 The Risk on Common Stock

"Most people view risk in the manner we just described a chance of loss. In reality, risk occurs when we cannot be certain about the outcome of a particular activity or event, so we are not sure what will occur in the future. Consequently, risk result from the fact that an action such is investing can produce more than one outcome in future. To illustrate the risks of financial
assets, suppose someone has a large amount of money to invest for one year. Someone could buy a Treasury security that ha an expected return equal to 8 percent. The rate of return expected from this investment can be determined quite precisely, because the chances of the government defaulting of treasury securities is negligible; the outcome essentially is guaranteed, which means this is a risk-free investment. On the other hand, someone could buy the common stock of a newly formed company that has developed technology to extract petroleum from the mountains in South America ha yet to be proven economically feasible, so it is not known what returns the common stockholders will receive in the future. Experts who have analyzed the common stock of the company have determined that the expected or average long-run, return for such an investment is 30 percent; each year, the investment could yield a positive return as high a 900 percent, but there is also the possibility that the company will not survive, in which can the entire investment will be lost. Here the return investors receive each year cannot be determined precisely because more than one outcome is possible-this is a risky investment. Because of significant danger of actually earning considerably less than the expected return, investors probably would consider the stock to be quite risky. But there is also very good chance the actual return will be greater than expected, which, of course is an outcome we gladly accept. So, when we think of investment risk, along with the chance of actually receiving more than expected, we should consider the chance of actually receiving more than expected. If we should consider investment risk form this perspective, than we can define risk as the chance of receiving an actual return other than expected, which simply means, there is variability in the returns or outcomes from the investment. Therefore, investment risk can be measured by the variability of the investments returns. However, we can define risk more precisely, and it is useful to do so" (Weston and other, 1995:182-183).

### 2.2 Review of Related Studies

These days information highway or the internet has become to the most easily accessible mediums to gain information in any subject matter. In the study period different web site related to our topic has been viewed some articles related to our topic explained as under.

Do investors dislike risk? In economics in general and investment in particular, the standard assumption is that investors are rational investors prefer certainty to uncertainty. It is easy to say that investors dislike risk but more precisely, we would say that investor's are risk - averse. Risk - averse investors is one who will not assume risk simply for its own sake and will not incur any given level of risk unless there is an expectation of adequate compensation of having done so,. Note carefully that it is not irrational to assume risk even very large risk, as long as we expect to be compensated for it. In fact, investor can not reasonably expect to earn larger returns without assuming larger risk.

Investors deal with risk by choosing (simplicity or explicitly) the amount of risk they are willing to incur. Some investors choose o incur high levels of risk with the expectation of high level of return. Other investors are unwilling to assume much risk and they should not expect to earn large returns.

We have said that investors would like to maximize their returns. Can we also say that investors, in general, will choose to minimize their risk? No! The reason is that there are cost to minimize the risk specifically a lower expected return. Taken to its logical conclusion, the minimization of risk would result in every one holding risk - free assets such as saving accounts and treasury bills. Thus, we need to think in terms of expected return risk trade off that result from direct relationship between the risk and expected return of an investment.
"Investor need to think about the time period involved in their investment plans. The objectives being purchased may require a policy
statement that speaks to specific planning horizons. In the case of an individual investor this could be a year or two in anticipation of a down payment on a home purchase or a life time if planning for retirement. Generally speaking the longer the time horizon the more risk can be incorporated into the financial planning" (www.google.com).
"The U.S. department of labor, pension and welfare benefits administration states that since 1926, the average annual returns of short - term US treasury bills, which roughly equals the returns of other cash equivalents such as saving accounts has been 3-8 percent. The annual return of long term government bonds over the same period has been 5.3 percent. Large - company stocks on the other hand, have averaged an annual return of 11.2 percent with these statistics available why wouldn't everyone at all times be 100 percent invested in stock? The answer is of course, that while over the long-terms stocks have out performed. There have been many short - term period in which they have under performed. Add in fact have had negative returns. Exactly when short term periods of under performance will occur is unknown and thus there is more risk in owning stocks if one has short - term horizon than if there exists a long- term horizon." (www.google.com).
"The type of equity securities with which most people are familiar is stock. When investors buy stock, they become owner of the company's assets. If a company is successful, the price that investors are willing to pay for its stock will often go up. Shareholders who bought stock at a lower price then stand to make a profit. It a company doesn't do well, however its stock may decrease involve and shareholders can lose money. The rise in the price of the stock is termed appreciation or" capital gain" the stock holder is also entitled to dividends, which may be paid out from the company's profit. Therefore, there have two sources of income from stock investment i.e. dividends \& appreciation in the value of investment. Some stocks pay most of their earnings as divided and may have little appreciation. These stocks sometimes referred to as income stocks. Other sometimes referred to as income stocks. Other stocks may pay out little or no dividend, preferring to re - invest the earning with tin
the company. Since all the investor's potential earnings come from appreciation. These stocks are sometimes referred to as a growth stocks. Stocks prices referred to as a growth stocks. Stocks prices are also subject to both general economics and industry - specific market factors. There is no guarantee of a return from investing in stocks and hence there is risk, incurred in investing in this type of security. As owners shareholders generally have the right to vote on electing the board of directors and other certain matters of the particular significance to the company. Under the federal securities laws, most companies must send to shareholders proxy statement providing and information on the business experience and compensation of nominees to the board of director and on any other matter submitted for shareholder's vote. This information is required so that stock holders can make an informed decision on whether to elect the nominees or on how to vote on matters submitted for their consideration. Stock investment is typically common stock, which is the basic ownership share of the company. Some company also offers the preferred stock, which is another class of stocks preferred stock typically offers a certain rate of return (although it is still not guaranteed) and pays dividends before dividend are paid for common stock. If a company does really well, preferred stock holders may received the same dividend as any other year while common stock holders reap the rewards of a great year."

One of the fundamental issues in finance is what the factors are that affect the expected return on assets. The sensitivity of expected return to those factors and reward for bearing this sensitivity. There is a long history of testing in this area and it is clearly one of the most investigated areas in finance.

Almost all of the testing I am aware of involves using realized return as a proxy for expected returns. The use of average realized returns as a proxy for expected returns tend to cancel out over the period of a study and realized returns are therefore and unbiased estimate of expected returns. However, I believe that there is ample evidence that this belief is misplaced. There are periods longer than 10 years during which stock market realized returns are on average less than the risk free rate (1973 to 1984). There are periods longer than 50 yeas in which risky long - terms bonds on average under perform the
risk - free rate (1927 to 1981). Having risky assets with an expected return above the risk - free rate is an extremely weak condition for realized returns to be an appropriate proxy for expected return and 11 and 50 years is an and fully long time for such a recent past, the united states has had stock market return higher than 30 percent per year while, Asian market have had negative returns. (Edwin, 1999: 100).

Views expressed by different persons in their articles regarding risk and return of common stock of commercial banks are presented overviewed here in the topic.

Khagendra Prasad Ojha (2000) in his research paper, "Financial performance and common stock pricing Concludes that "An investment in common of a corporate firm neither ensure annual return nor ensure the return of principle.

Therefore investment in common stock is very sensitivity on the ground of the risk. Dividend to common stockholder is paid only if the firm makes an operating profit after tax and preference dividend. The company can return the principle in case of its liquidation only to extent of the residual assets after satisfying to all of its creditors and preferential shareholders. Besides this investor have to sacrifice the return on their investment in common stock which could be earned investing fund else where in the next best opportunity".

Study focused on the financial performance. Where the financial activities involve decision regarding.

- Forecasting and planning of financial requirement.
- Investment decision.
- Financial decision.

Further Ojha added that the stock price in Nepal determined more by other factor's rather than the financial performance of the concerned company.

Manohar Krishna Shrestha (2059B.S.) expressed his view in relation with subject to certain extent with the topic "shareholders democracy and General meeting feedback portfolio Analysis" Shrestha's findings are as follows:

- Top -level decision often by passes the interest of shareholders.
- The annual general meeting has become a plant-form for shareholders to express their opinion and grievance in front of the management and board of directors.

Many general meetings feedback reveals no serious response to the feelings of shareholders. Thus, it reflects, unwillingness of the management and board to change their traditionally held activities towards shareholders.

Pradhan and Balampaki (2004) conducted a study on " Fundamental of Stocks Return in Nepal" based on pooled cross sectional data of 40 listed companies in NEPSE Ltd and traded in the stock market. The study examines if dividend yield, capital gain yield and total yield are related to earning yield, book to market ratio and cash flow yield. Pradhan and Balampaki have summarized the following results.

- Earnings yield and cash flow yield have significant positive impact on dividend yield, and an insignificant impact on book to market value, whereas, size has negative impact on dividend yield. In the case of earnings yield and cash flow yield, cash flow yield has been found to be more informative than earnings yield.
- Capital gain yield is positive influenced by earnings yield and size, whereas, the same is negatively influenced by book to market value and cash flow yield. Book to market value has been found to be statistically strong in predicting capital gain yield.
- Similarly, total yield is positively determined by earnings yield and size, whereas, the same is negatively determined by book to market value has been found to be more informative than other variables.
- The positive relationship exists among earnings yield, book to market value and cash flow yield. However, the size is negatively related to these three variables.

Radhe Shyam Pradhan (1999) expressed his view in relation with subject to certain extent with the topic. "Stock market behavior on a small capital markets a case in Nepal". Pradhan has summarized the following findings.

- Dividend per share and market price per share was positively correlated.
- There are positive relationship between dividend payout and liquidity.
- Higher the earning on the stocks. Larger the portion of dividend per share to market price per share.


### 2.3 Review of Thesis

The risk and return is not a new concept for financial analysis in Nepal. It is slow growing capital market. However, few studies are made regarding this topic. Some studies related to the topic of risk and return has been conducted for the fulfillment of master degrees in T.U. The only relevant subject matters are reviewed in these studies which are as follows.

Sapkota (2001) in his dissertation entitled on "Risk and Return Analysis in Common Stock Investment" had focused to analyze the risk and return of the common stock in Nepalese stock market. This study is concentrated on the common stock of commercial bands. Mr. Sapkota found that the banking sector is the biggest one in terms of market capitalization an turnovers. Expected return on the common stock of Nepal Bank Ltd is maximum (i.e. 66.99\%) and common stock of Nepal SBI Bank Ltd. is found minimum. Common stock of NBL is the most risky and common stock of Nepal SBI is the most risky and common stock of Neapl SBI is least risky. He has concluded that common stock of Nepal Bangladesh Bank is the best one for investment. On the other hand, portfolio return between the common stock of Nepal Grindlays Bank and

Nepal SBL is 26.66 percent but portfolio standard deviation is only 14.97 percent, which is less than single stocks standard deviation.

In addition, he also recommended reducing the risk; investors should diversity this fund proper construction of portfolio never creates any considerable less. Private investors should try and work out their attitude towards the risk of various investment and HMG needs to manage the trading of government securities in NEPSE.

Acharya (2002) in his thesis paper "An analysis of risk and return associates with common stock investment of joint venture banks in Nepal" concluded that generally average inventors are risk averse. They prefer to invest on such investment, which provided higher return at the given level of risk. It is widely known that investment on portfolio generates higher and constants return as compared to single assets. The reason is that the lower return on one asset off set the higher return from other assets. It is obvious that investor can avoid risk by adopting portfolio but the situation in Nepal is different. The evidence shows that most of the investors prefer to invest in single security rather than portfolio. Concept of portfolio should be developed in their mind.

In addition Acharya added, "stock market investment is not easy. Naturally it is very risk job because return on stock investment is not swell. Chance of heavy loss and gain are fifty. It is more risk in short term than long term so investor must prepare their mentality accordingly.

Upadhaya (2002), in his thesis papare, "Risk and Return on common stock investment of commercial bank in Nepal." studies the performance of listed company. In his research paper he applies the five year data from 1997 to 2002. He focused on; "In general, most people see stock market investment as a black art that they know little about. Many people have unrealistically optimistic and pessimistic expectations, about stock market investment or perhaps a fear of the unknown. Nepalese stock market is in emerging state. Its
development is accelerating since the political charge in 1990 in effect of openness and other part is the stock market is influence due to the Maoist problem faced by the county. And investor lacks information and poor knowledge. Nepalese individual investor can not analyze the securities as well as market properly."

In addition, Updhaya added that: proper analysis of individual security, Industry and over all market is always needed. General knowledge about economic, political and technological trend will be advantageous. To win the market, shares should be hold when the market is rising and hold safer investment when it is falling.

Joshi (2004) has conducted a research on "Risk and return analysis of common stock of five listed commercial banks." The main objective of the scholar's study was to assess the risk associated with return on common stock investment of the basis of selected tools. For the study, the researcher is used five years data 1998-2002. He has used arithmetic mean to calculate the return, standard deviation and coefficient of variations, which are used to measure unsystematic risk and beta coefficient. The measurement explains sensitivity or volatility of the stock with market and individual banks. Correlation is a statistical tool i.e. is used to measure relationship between risk and return. The researcher also used t-test to calculate hypothesis. The major findings of his study are that banking sector has the expected return is 21.77 percent, risk is 36.1 percent and CV is 1.66 , similarly finance and insurance sector has 21.77 percent and 1.66 , hotel sectors has 10.16 percent, 72.4 percent, 7.123 , trading sectors has 6.68 percent, 80.68 percent, 11.76, other sectors has -16.61 percent, 50.45 percent and 3.037. Market expected return of 10.2 percent and risk of 39.57 percent, CV of 3.88 . SCB has maximum market capitalization and NBBL has the minimum market capitalization. Market capitalization as well as NEPSE index has heavily influenced by banking sector. If investors wish to generate higher return then they should bear higher risk and invest in the share of SCBL and if they are risk averters and they want to invest in single assets.

They can invest in the share of NBL or HBL because these two stocks have lower risk that of portfolio risk.

Neupane (2008) in his thesis paper "Risk and Return Analysis of Common Stock Investment of listed commercial banks" concluded that all the commercial banks are very much risky with fluctuated rate of return. He pointed out that findings of the different banks beta coefficient of all the banks are very much volatile except EBL stock. His study shows that all commercial banks under study required rate of return is less than expected rate of return, so all stocks are underpriced. It shows that all the banks have stock with good investment opportunity. It is also concluded that NIBL and EBL is higher portfolio return and HBL and EBL is lower portfolio risk

Moreover, he concluded that NIBL and EBL have higher portfolio return and HBL and EBL have lower portfolio risk. It shows that EBL has high proportion of unsystematic risk i.e. $77.18 \%$ and HBL has high proportion of systematic risk i.e. $97.49 \%$ which cannot be minimized from internal factor. Common stock of EBL is best among these banks.

### 2.4 Research Gap

The previous researchers MBS students have conducted their thesis in the similar topic the present researcher has selected, there is fundamental difference between those and focused only on the risk and return aspect of selected joint Venter commercial banks from investors perspectives. This research has further tried to identify the correlation among returns of the joint Venter commercial banks under study which plays a significant role in risk reduction by portfolio construction and systematic and unsystematic risk has been identified for each bank which is not done by previous researchers. Most of the previous researches reviewed have been carried out with less than seven year data. Here, in this research seven years data has been taken for analysis. Similarly, the number of sample firms takes by the previous researchers is five or more. But this research has been conducted with reference to three sample
firms which give more clear vision for all the investors who invest in common stock investment of joint Venter commercial banks listed in NEPSE. However, almost effort has been put upon to save it from allegation of being copy of previous research works done in the similar topic.

## CHAPTER THREE

## RESEARCH METHODOLOGY

The research methodology is the systematic way of solving research problems. This chapter refers to the overall research processes, which is a researcher conducts during his/her study. It includes research design, sources of data, analytical tools, and procedures of collection and analysis of data. Research is systematic and organizational effort to investigate a specific problem that needs a solution. This process of investigation involves a series of well though out activities of gathering, recording, analyzing and interpreting the data with the purpose of finding answer to the problems. This research is on the basis of historical data using both financial and a statistical tool performs detail analysis of different variables. Results are presented in simple way. Detail research methods are described in following headings.

### 3.1 Research Design

Research design is necessary to fulfill the objectives of well-set research. Research design may be defined as framework, plan and structure for collecting, analyzing and evaluating data. It is a procedure and techniques, which provide ways for research viability. This research is belongs to risk and return analysis so that this research is based on recent historical data, which covers the five years period data F/Y2003/04 to 2008/09. It deals with the common stocks of commercial banks on the basis of available information. As the title of the study suggests, it is more analytical and empirical but less descriptive.

### 3.2 Population and Sample

Population of the study is all the listed commercial bank of Nepal. But for the study overall a listed common stock has been considered as the population and samples are the common stock of five listed commercial banks.

At present twenty six commercial banks are operating in Nepal. Among them twenty commercial banks are listed in the NEPSE, among those five joint venture banks are taken as sample. They are Standard Chartered Bank limited (SCBNL), Nepal Arab Bank limited (NABIL), Himalayan Bank limited (HBL), Everest Bank Limited (EBL) and Nepal SBI Bank Limited.

### 3.3 Sources of Data

The data required for the research is collected from the secondary sources. During the study, informal opinion survey has also been taken with the individuals, bank officials. Security board of Nepal, staff of Nepal stock exchange and stockbrokers. Data related to the market prices of stocks, market prices of stocks, market capitalization, movement of NEPSE index etc. it is taken from the trading report published by NEPSE and the website of Nepal Stock Exchange (i.e. www.nepalstock.com). Annual report of commercial banks and their financial statement are also collected from the respective sample banks. NEPSE periodicals, articles and previous research report etc. has also been considered.

### 3.4 Data Collection Procedure

The main source of data is secondary data. During the study the data has been taken from Nepal stock Exchange (NEPSE), individual investors and stockbrokers. The main source of data is annual trading report published by NEPSE, securities Board and other concerned listed companies' annual report, journals and Nepal Rastra Bank's annual, Quarterly Publications and others.

### 3.5 Method of Data Analysis

To achieve the objectives of research, this study has used various financial and statistical tools that are necessary to find out results. The following tools shall analyze the data presented in the study.

### 3.5.1 Market Price of Stock (p)

Market price of stock is the basic variable of the study. Among high, low and closing price, each year closing price has been taken as market price of the stock, which has specific time span of one year and the study has in annual basis. Closing price is used as market price of stock. Due to the variance in price with in a year, it is difficult to predict the market price. Although average price could be used as market price. It is also so complicated to collect the day's price of five year period. On the other hand average of high and low privet is assumed not to be reliable and representative information. Therefore, it is appropriate to use closing price as a market price.

### 3.5.2 Dividend

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

Total dividend amount $=$ cash dividend + stock dividend $\% \times$ Next years MPS

Symbolically,

$$
D_{T}=D_{C}+\frac{S D}{S E} \times P_{s}
$$

Where,
$\mathrm{D}_{\mathrm{T}}=$ Total Dividend amount
$\mathrm{D}_{\mathrm{C}}=$ Cash dividend amount
$\mathrm{SD}=$ Stock Dividend
$\mathrm{SE}=$ Existing stock
$\mathrm{P}_{\mathrm{s}}=$ Next year's Market price of stock

### 3.5.3 Return on Common stock Investment (R)

This is the annual realized return received on an investment and any change in market price, usually expressed in a percentage of the beginning price of the investment.

$$
\mathrm{R}_{\mathrm{t}}=\mathrm{D}_{\mathrm{t}}+\left(\mathrm{P}_{\mathrm{t}-} \mathrm{p}_{\mathrm{t}-1}\right)
$$

Where,
$\mathrm{R}_{\mathrm{t}}=$ Annual realize return on common stock at time t
$\mathrm{D}_{\mathrm{t}}=$ Cash dividend received at time t
$\mathrm{p}_{\mathrm{t}} \quad=$ Price of stock at time t
$\mathrm{p}_{\mathrm{t}}=$ Price of stock time $\mathrm{t}-1$

### 3.5.4 Expected rate of return on common stock $E\left(\mathbf{R}_{\mathrm{j}}\right)$

One of the major aims of the study is to determine the expected return on the investment in common stock. Generally, this rate is obtained by the arithmetic mean of the part year returns.

$$
E\left(R_{j}\right) \operatorname{Or} \bar{R}_{j}=\frac{\Sigma R_{j}}{n}
$$

Where,
$\mathrm{E}\left(\mathrm{R}_{\mathrm{j}}\right)=$ Expected rate of return on stock j
$\mathrm{n} \quad=$ No. of years that the return is taken
$\Sigma=$ Sign of Summation

### 3.5.5 Standard Deviation ( $\sigma_{j}$ )

Standard deviation is a statistical measure and is widely used to measure risk from holding a single asset. It is also a statistical measure of the variability of a set of observations. The standard deviation represents a large dispersion of return and is a high risk and vice versa. The symbol is called ( $\sigma$ ) sigma. It is the measure the total risk on stock investment.

$$
\sigma_{\mathrm{j}}=\frac{\sqrt{\Sigma\left(R_{j}-\bar{R}_{j}\right)^{2}}}{n}
$$

Where,
$\sigma_{j}=$ Standard deviation on of return stock j during the time period.
$\mathrm{R}_{\mathrm{j}}=$ Return on stock J
$\mathrm{n}=$ Number of years that the returns are taken.

### 3.5.6 Co-efficient of Variation (C. V.)

It is the relative measurement of risk with return. It measures the risk per unit of return. It provides a more meaningful basis for comparison when the expected returns on two alternatives are not the same. The higher coefficient of variation, higher the risk. It is calculated as
$\mathrm{C} . \mathrm{Vj}=\frac{\sigma_{j}}{\mathrm{E}(\mathrm{Rj})}$
Where,
C. $V_{\cdot j}=$ Co-efficient of variation of stock J.
$\sigma_{j}=$ Standard deviation of return on stork J.
$\boldsymbol{R}_{j} \quad=$ Expected rate of return on stock j.

## 3. 5.7 Portfolio Return ( $\mathbf{R}_{\mathrm{p}}$ )

A portfolio is a bundle or a combination of individual assets or securities. The return of a portfolio is equals to the weighted average of the returns of individual assets (or securities) in the portfolio with weight being equal to the proportion of investment in each asset.

$$
R_{P}=\sum_{j=1}^{n} \quad w_{j R} j_{j}
$$

Where,
$\mathrm{R}_{\mathrm{p}}=\quad$ Portfolio return.
$\mathrm{W}_{\mathrm{j}}=$ proportion of investment in stock J
$\mathrm{R}_{\mathrm{j}}=$ Return on stock J
$\mathrm{n} \quad=\quad$ No of securities included in a portfolio

J $\quad=\quad$ Stock or security J

## 3. 5.8 Portfolio Risk( $\sigma_{p}$ )

Portfolio risk is measure in terms of variance or standard deviation. The variance (or s.d.) of a portfolio is not simply the weighted average of variance (or s.d.) of individual securities. Portfolio risk doesn't consider only the riskiness of the individual stocks. It is also affected by the association (relationship) of movement of returns of two securities. The portfolio risk (or s.d.) in case of two assets is given below:

$$
\sigma \mathrm{p}=\sqrt{\sigma^{2} A \cdot \mathrm{w}^{2} A+\sigma^{2} \mathrm{~B} \cdot \mathrm{w}^{2} \mathrm{~B}+2 \cdot \mathrm{w}_{\mathrm{A}} \cdot \mathrm{w} \cdot \mathrm{~B}{ }^{\sigma} \cdot{ }_{\mathrm{A}} \cdot \mathrm{\sigma}_{\mathrm{B}} \cdot \mathrm{r} \mathrm{AB}}
$$

Where,
$\sigma_{\mathrm{p}}=\quad$ Portfolio standard deviation
$\sigma_{A}{ }^{2}=\quad$ Variance of return a stock A.
$w_{A}=$ Weight of A
$\sigma_{B}{ }^{2}=\quad$ Variance of return on stock B.
$w_{B}=$ weight of B
$\sigma_{A}=\quad$ standard deviation of stock A
$\sigma_{B}=$ standard deviation of a sock B.
$r_{A B}=$ correlation of stock A and stock B.

### 3.5.9 Risk minimizing Portfolio

The proportion of investment in two securities included in a portfolio, has the lowest level of risk is known as risk minimizing portfolio. Let's assume there are securities $\mathrm{X} \& \mathrm{Y}$ in a portfolio. We can use the following formula for estimating the optimal weights of securities $\mathrm{X} \& \mathrm{Y}$ :

$$
w_{x}=\frac{\sigma_{y}^{2-} \operatorname{CoV}_{x y}}{\sigma_{x}^{2}+\sigma^{2} y-2 \operatorname{Cov}_{x y}}
$$

$$
\text { And } W_{y}=1-W_{x}
$$

Where,

$$
\begin{aligned}
\mathrm{W}_{\mathrm{x}} & =\text { weight of } \mathrm{x} \\
\mathrm{~W}_{\mathrm{y}} & =\text { weight of } \mathrm{y} \\
\sigma_{y}^{2} & =\quad \text { variance of return on stock } \mathrm{y} \\
\sigma_{x}^{2} & =\quad \text { Variance of return on stock } \mathrm{x} \\
\operatorname{cov}_{x y} & =\quad \text { co-variance between the return of stock } \mathrm{x} \& \mathrm{y} .
\end{aligned}
$$

### 3.5.10 Required Rate of return $E\left(\mathbf{R}_{\mathrm{j}}\right)$

Required rate of return is minimum expected rate of return needed to induce an investor to invest his/her fund. It is always more than risk less rate of return. Normally, when an individual investment is given higher return, i.e. realized rate of return then its required rate of return, this type of investment is known as under priced investment. Such under priced assets should be
purchased. On the other hand, if realized rate or return is less than required rate of return of a particular asset, it is said to be overpriced assets, such assets should be purchased, instead if one is holding such asset, if should be sold immediately. The required rate of return is calculated by using following formula.

$$
\mathrm{E}\left(\mathrm{R}_{\mathrm{j}}\right) \quad=\quad \mathrm{R}_{\mathrm{f}}+\left[\left(\mathrm{R}_{\mathrm{m}}\right)-\mathrm{R}_{\mathrm{f}}\right] \mathrm{b}_{\mathrm{j}}
$$

Where,

| $\mathrm{E}\left(\mathrm{R}_{\mathrm{j}}\right)$ | $=$ | Required rate of return on stock J |
| :--- | :--- | :--- |
| $\mathrm{R}_{\mathrm{f}}$ | $=$ | Risk-free rate of return. |
| $\mathrm{E}\left(\mathrm{R}_{\mathrm{m}}\right)$ | $=$ Expected market portfolio return. |  |
| bj | $=$ Beta coefficient of stock j |  |

### 3.5.11 Beta Coefficient ( $\mathbf{b}_{\mathbf{j}}$ )

Beta coefficient shows the market sensitivity of stock. Higher the beta, greater the sensitivity and reaction to the market movement. Beta coefficient of a particular stock will be less than equal or more than 1, but the beta for market will be always 1 .

$$
\mathrm{b}_{\mathrm{j}}=\frac{\mathrm{CoV}_{\mathrm{jm}}}{\sigma_{\mathrm{m}}^{2}}
$$

Where,

| bj | $=\quad$ Beta coefficient of stock j. |
| :--- | :--- | :--- |
| $\operatorname{Cov}_{\mathrm{jm}}$ | $=\quad$ co-variance of stock j and market return. |
| $\sigma_{m}{ }^{2}$ | $=\quad$ Variance of the market. |

### 3.5.12 Portfolio Beta ( $b_{p}$ )

Portfolio beta is the weighted average of the beta of individual security. It is calculated as follows:

$$
\mathrm{b}_{\mathrm{p}} \quad=\sum_{\mathrm{j}=1}^{\mathrm{n}} \quad \mathrm{w}_{\mathrm{j}} \mathrm{~b}_{\mathrm{j}}
$$

Or

$$
\mathrm{bp}=b_{\mathrm{A}}{ }^{\mathrm{w}} \mathrm{~A}+\mathrm{b}_{\mathrm{B}}{ }^{\mathrm{W}} \mathrm{~B}+\ldots \ldots+\mathrm{b}_{\mathrm{n}} \mathrm{w}_{\mathrm{n}}
$$

Where,
$\mathrm{b}_{\mathrm{p}} \quad=\quad$ Portfolio beta
J $\quad=\quad$ stock j
$\mathrm{n}=$ No. of securities, included in a portfolio
$\mathrm{W}_{\mathrm{j}} \quad=\quad$ weight of proportion of investment in stock j.
bj $=$ Beta of stock j

### 3.5.13 Correlation Coefficient ( $\mathrm{r}_{\mathrm{xy}}$ )

Correlation measures the degree of two securities more together. The numerical value of correlation ranges from +1.0 to -1.0 . If the sign is positive, the securities tend to move up and down together If two securities more in the some direction, they are positively correlated. If the sign is negative, they are negatively correlated. That means when the returns of one securities is decreases the return of another securities is increases. The magnitude of correlation coefficient indicates the relationship between the return of two assts. the correlation coefficient can be expressed symbolically as follows:
$r_{x y}=\frac{\operatorname{Cov}(x, y)}{\sigma_{x} \cdot \sigma_{y}}$

### 3.5.14. Partitioning of Total Risk into Systematic and unsystematic risk

| Total | Systematic | Unsystematic |  |
| :--- | :--- | :--- | :--- |
| Risk $=$ | Risk | + | Risk |
| $\sigma_{i}^{2}$ | $=\beta_{i}{ }^{2} \sigma_{m}^{2}$ | + | $\sigma_{e i}^{2}$ |

Thus, Systematic risk $(S R)=\beta_{i}^{2} \sigma_{m}^{2}$

And, unsystematic Risk $=$ Total Systematic

$$
\begin{aligned}
\left(\sigma_{e i}^{2}\right) & =\text { Risk } \quad-\quad \text { Risk } \\
& =\sigma_{i}^{2} \quad-\quad \beta_{i}^{2} \sigma_{m}^{2}
\end{aligned}
$$

Where
$\sigma_{i}^{2}=$ Variance of $\mathrm{i}^{\text {th }}$ assets
$\beta_{i}=$ Beta or systematic risk index of $\mathrm{i}^{\text {th }}$ assets.
$\sigma_{m}^{2}=$ market variance
$\left(\sigma_{e i}^{2}\right)=$ unsystematic risk or residual variance

## CHAPTER FOUR

## DATA PRESENTATION AND ANALYSIS

This chapter is the main body part of the study. In this chapter the effort has been made to analyze "Risk and Return on Common Stock Investment of joint venture Banks in Nepal." Detail data of MPS and dividend of each bank and NEPSE index of each industry is presented and their interpretation and analysis is done. With reference to various readings and literature review in the preceding chapter, efforts are made to analysis and diagnose the recent Nepalese stock market movement, with a special reference to joint venture bank. The analysis of data consists of organizing tabulating and assessing financial and statistical result from different tables and diagrams are drawn to make the result more simple and understandable.

### 4.1 Analysis of Individual Joint Venture Commercial Bank

Among twenty six commercial banks operating in Nepal, only twenty one of them are listed in NEPSE, among those study has taken five sample of Joint Venture commercial banks including Standard Chartered Bank Nepal Ltd, NABIL Bank Ltd, Himalayan Bank Ltd, Nepal, Everest Bank Ltd and SBI Bank Ltd. Data of FY 2002/03 to FY 2008/09 of each five Joint Venture commercial banks are introduced and their common stocks risk and return are analyzed here.

### 4.1.1 Standard Chartered Bank Nepal Limited (SCB)

This is a bank established as a joint venture. It was established in 2043/10/16(1986) and in the same date it started its operation under the Commercial Bank Act 2031 (1974) and the Company Act 2021 (1965). It has earned a lot of popularity in the banking field. The Grind lays Bank has been replaced by the Standard Chartered Bank Nepal limited. Now, the Authorized capital of the bank is Rs. 52,37,6511680 and total paid up value Rs. $93,19,66400$ with 9319664 numbers of shares. The par value of as hare was

NRs. 100 .The bank was listed on Nepal stock exchange in B.S. 2045/03/21 (1988 A.D.)

### 4.1.1.1 MPS, Dividend and EPS data of SCB

Market price, dividend records and EPS of common stock of SCB Bank shown in table 4.1 and Closing price is taken into account for the purpose of calculating realized return for the years. The total dividend includes cash as well as stock (Bonus) dividend. The total dividend is calculated in column five.

## Table 4.1

## MPS, dividend and EPS data of SCB

| Fiscal Year | Closing <br> MPS | Cash DPS | Stock <br> Dividend | Total <br> Dividend | EPS |
| :--- | :--- | :--- | :--- | :--- | :--- |
| $2002 / 03$ | 1640 | 110 | 10 | 284.5 | 148.32 |
| $2003 / 04$ | 1745 | 110 | - | 110 | 143.55 |
| $2004 / 05$ | 2345 | 120 | - | 120 | 143.14 |
| $2005 / 06$ | 3775 | 130 | 10 | 720 | 175.84 |
| $2006 / 07$ | 5900 | 80 | 50 | 3495 | 167.37 |
| $2007 / 08$ | 6830 | 80 | 50 | 3495 | 131.2 |
| $2008 / 09$ | 6010 | 50 | 50 | 3055 | 109.99 |

Data source: Annual report of SCB

Assuming Next year MPS is 6010

Total dividend amount $=$ cash dividend + stock dividend $\% \times$ Next years MPS

- Rs. 110 + 10\% Rs. 1745 = Rs 284.5

Accounting to table 4.1 shows that, SCB is paying cash dividend every year. Highest total dividend is paid in the year 2006/07 i.e. Rs. 3495 and lowest is in the year 2003/04 i.e. Rs.110. The closing MPS of SCB is maximum of Rs. 6830 in the year 2007/08 and minimum of Rs. 1640 in the year 2002/03. MPS is in increasing trend from starting year 2002/03 to the ending year 2007/08. EPS
of SCB is maximum of Rs. 175.89 in the year 2005/06 and minimum of Rs. 109.99 in the year 2008/09. There is fluctuating trend.

Figure 4.1


MPS and EPS movement is shown in the figure 4.1, MPS of SCB is increasing in 2002/03 to Rs. 1640 from Rs. 6830 in 2007/08 then after year $2008 \backslash 09$ MPS decreasing Rs. 6010. The MPS is higher in 2007/08 and it is lower in 2002/03. EPS of SCB is fluctuating trend.

### 4.1.1.2 Realized Return (R), Expected Return $(\bar{R})$ Standard Deviation ( $\sigma$ ) and coefficient of Variation (C.V) of SCB

Realized return for each year are calculated for the basis of closing price of MPS and dividend amounts of respective year. Table 4.2 shown the calculation of year wise realized rate of return, expected rate of return, standard deviation and coefficient of variation of return

## Table 4.2

## RRR, ERR, S. D and C.V. of common stock of SCB.

| Fiscal <br> year | Closing <br> MPS | Total <br> Dividend | $R=\frac{P_{t}-P_{t-1}+D_{t}}{P_{t-1}}$ | $R-\bar{R}$ | $(R-\bar{R})^{2}$ |
| :--- | :--- | :--- | :--- | :--- | :--- |
| $2002 / 03$ | 1640 | 284.5 | - | - | - |
| $2003 / 04$ | 1745 | 110 | 0.1311 | -0.5283 | 0.2791 |
| $2004 / 05$ | 2345 | 120 | 0.4126 | -0.2468 | 0.0609 |
| $2005 / 06$ | 3775 | 720 | 0.9168 | 0.2574 | 0.0663 |
| $2006 / 07$ | 5900 | 3495 | 1.4887 | 0.8293 | 0.6877 |
| $2007 / 08$ | 6830 | 3085 | 0.6805 | 0.0211 | 0.0005 |
| $2008 / 09$ | 6010 | 3055 | 0.3272 | 0.3322 | 0.1104 |
| Total |  |  | $\sum \mathrm{R}=3.9569$ |  | $\sum(R-\bar{R})^{2}=1.2049$ |

We have
Expected Return $(\bar{R})=\frac{\sum R}{n}$

$$
=\frac{3.9569}{6}=0.6594
$$

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

$$
=\sqrt{\frac{1.2049}{6-1}}=0.4909
$$

Variance

$$
\begin{aligned}
(\sigma)^{2}= & \frac{\Sigma(R-\bar{R})^{2}}{n-1} \\
& =\frac{1.2049}{6-1}=0.24098
\end{aligned}
$$

Co-efficient of variation (C.V.) $=\frac{\sigma}{\bar{R}}$

$$
\begin{aligned}
& =\frac{0.4909}{0.6594} \\
& =0.7445
\end{aligned}
$$

The Expected return of SCB is 0.6594 with the total risk (measured by S.D.) of 0.4909 . The C.V. of SCB is 0.7445 which denotes that to get per unit return 0.7445 risk must be sacrifice. So, higher the C.V. higher will be the risk. It can be shown clearly in the diagram 4.1.

Diagram 4.1


The Diagram 4.1 shows that the annual return of C.S. of SCB in several years. There is fluctuating trend in several years. The highest return is in the year 2006/07 i.e. 1.4887 which shows highest return profitable and lowest return of 2003/04 i.e. 0.1311 .

### 4.1.2 Nepal Arab Bank Ltd (NABIL)

Nepal Arab Bank limited (NABIL), the first joint venture bank in Nepal, was established in 1984. The Dubai Bank Limited was the foreign partner (50\%) to the Nepalese promoter (Financial Institutions) and general public. However, the share owned by Dubai bank limited has been
transferred to Emirates Bank of international Ltd, UAE and later on sold to National Bank Ltd, Bangladesh. At present National Bank limited, Bangladesh is managing the entire banking business under the provision of joint venture agreement (Technical service Agreement between NABIL and National Bank Limited, Bangladesh).

### 4.1.2.1 MPS, Dividend and EPS data of NABIL.

Market price, dividend records and EPS of common stock of NABIL's Bank shown in table 4.1 and Closing price is taken into account for the purpose of calculating realized return for the years. The total dividend includes cash as well as stock (Bonus) dividend. The total dividend is calculated in column five.

Table 4.3

MPS, dividend and EPS data of NABIL.

| Fiscal <br> Year | Closing <br> MPS | Cash <br> DPS | Stock <br> Dividend | Total <br> Dividend | EPS |
| :--- | :--- | :--- | :--- | :--- | :--- |
| $2002 / 03$ | 740 | 50 | 0 | 50 | 84.66 |
| $2003 / 04$ | 1000 | 65 | 0 | 65 | 92.61 |
| $2004 / 05$ | 1505 | 70 | 0 | 70 | 105.49 |
| $2005 / 06$ | 2240 | 85 | 0 | 85 | 129.21 |
| $2006 / 07$ | 5050 | 100 | 40 | 2210 | 137.08 |
| $2007 / 08$ | 5275 | 60 | 40 | 2019.60 | 108.31 |
| 2008109 | 4889 | 35 | 50 | 2484.5 | 106.76 |

Data source: Annual report of NABIL.
Assuming Next year MPS is 4899
Total dividend amount $=$ cash dividend + stock dividend $\% \times$ Next years MPS

- Rs. $50+0 \%$ Rs. $1000=$ Rs 50

Table 4.3 shows that, NABIL is paying market price, earning per share, cash and stock dividend every year. Highest total dividend is paid in the year 2008/09 i.e. Rs. 2484.5 and lowest is in the year 2002/03 i.e. Rs.50. The closing MPS of NABIL is maximum of Rs. 5275 in the year2007/08 and minimum of Rs. 740 in the year 2002/03.

Figure 4.2


MPS and EPS movement is shown in the figure 4.2. MPS of NABIL is increasing in the year 2002/03 to Rs. 740 from Rs. 5275 in the year 2007/08 then after decreasing in year 2008/09. The MPS is higher in 2007/08 and it is lower in 2002/03. EPS of NABIL is increasing trend in 2002/03 to $2006 \backslash 07$ and then after year 2007/08 decreasing. There is fluctuating trend.

### 4.1.2.2 Realized Return ( $\boldsymbol{R}$ ), Expected Return $(\bar{R})$ Standard Deviation ( $\sigma$ ) and coefficient of Variation (C.V) of NABIL

Realized returns for each year are calculated for the basis of closing price of MPS and dividend amounts of respective year. Table 4.4 shown the calculation of year wise realized rate of return, expected rate of return, standard deviation and coefficient of variation of return.

Table 4.4

RRR, ERR, S. D and C.V. of common stock of NABIL.

| Fiscal <br> year | Closing <br> MPS | Total <br> Dividend | $R=\frac{P_{t}-P_{t-1}+D_{t}}{P_{t-1}}$ | $R-\bar{R}$ | $(R-\bar{R})^{2}$ |
| :--- | :--- | :--- | :--- | :--- | :--- |
| $2002 / 03$ | 740 | 50 | - | - | - |
| $2003 / 04$ | 1000 | 65 | 0.4392 | -0.3349 | 0.1122 |
| $2004 / 05$ | 1505 | 70 | 0.575 | -0.1991 | 0.0396 |
| $2005 / 06$ | 2240 | 85 | 0.5449 | -0.2292 | 0.0525 |
| $2006 / 07$ | 5050 | 2120 | 2.2411 | 1.467 | 2.1521 |
| $2007 / 08$ | 5275 | 2019.60 | 0.4445 | -0.3296 | 0.1086 |
| $2008 / 09$ | 4899 | 2484.51 | 0.3997 | -0.3744 | 0.1402 |
| Total |  |  | $\sum \mathrm{R}=4.6444$ |  | $\sum(R-\bar{R})^{2}=2.6$ |

We have

Expected Return $(\bar{R})=\frac{\sum R}{n}$

$$
=\frac{4.6444}{6}=0.7741
$$

Standard deviation $(\sigma)=\sqrt{\frac{\Sigma(R-\bar{R})^{2}}{n-1}}$

$$
=\sqrt{\frac{2.6052}{6-1}}=0.7218
$$

Variance $\quad(\sigma)^{2}=\frac{\Sigma(R-\bar{R})^{2}}{n-1}$

$$
=\frac{2.6052}{6-1}=0.52104
$$

Co-efficient of variation (C.V.) $=\frac{\sigma}{\bar{R}}$

$$
\begin{aligned}
& =\frac{0.7218}{0.7741} \\
& =0.9324
\end{aligned}
$$

The Expected return of NABIL is 0.7741 with the total risk (measured by S.D.) of 0.7218 . The C.V. of NABIL is 0.9324 which denotes that to get per unit return 0.9324 risk must be sacrifice. It can be shown clearly in the diagram 4.2

## Diagram 4.2



The Figure 4.2 shows that the annual rate of return of C.S. of NABIL in several years. There is fluctuating trend in several years. The highest return is in the year 2006/07 i.e. 2.2411 which shows highest return profitable and lowest return of 2008/09 i.e. 0.3997.

### 4.1.3 Himalayan Bank Limited (HBL)

Himalayan Bank Ltd is a joint venture bank with Habib bank Ltd. of Pakisthan was established in 1992 under the company Act. 1964. This is first joint venture bank managed by Nepali chief executive. The operation of the
bank started from February 1993. Bank's authorized capital, issued capital and paid up capital is Rs, 1,00,00,00,000, Rs. 65,00,00,000 and Rs. 42,90,00,000 respectively. The par value of per share is Rs. 100.00. The bank was listed in NEPSE in 2050/03/21 (1993 A.D.). The main objectives of the bank is to provide modern banking facilities like tele banking to the businessman, industrialists, other professional and to provide loans on agriculture and industrial sectors. Now its 20 percent equity share hold by Habib Bank and 80 percent equity hold by Nepali Promotes, Financial institutions organized institutions, General public and others.

### 4.1.3.1 MPS, dividend and EPS data of HBL.

Market price, dividend records and EPS of common stock of HBL's Bank shown in table 4.5 and Closing price is taken into account for the purpose of calculating realized return for the years. The total dividend includes cash as well as stock (Bonus) dividend. The total dividend is calculated in column five.

Table 4.5

## MPS, dividend and EPS data of HBL.

| Fiscal <br> Year | Closing <br> MPS | Cash DPS | Stock <br> Dividend | Total <br> Dividend | EPS |
| :--- | :--- | :--- | :--- | :--- | :--- |
| $2002 / 03$ | 836 | 1.32 | 23.68 | 200.23 | 49.45 |
| $2003 / 04$ | 840 | - | 20 | 184 | 49.05 |
| $2004 / 05$ | 920 | 11.57 | 20 | 231.58 | 47.91 |
| $2005 / 06$ | 1100 | 30 | 5 | 117 | 59.24 |
| $2006 / 07$ | 1740 | 15 | 25 | 510 | 60.66 |
| $2007 / 08$ | 1980 | 25 | 20 | 396.25 | 62.74 |
| $2008 / 09$ | 1760 | 12 | 31.56 | 567.456 | 61.90 |

Data source: Annual Report of HBL

Assume next year MPS is 1760 .

Total dividend amount $=$ cash dividend + stock dividend $\% \times$ Next years MPS

- Rs. $1.32+23.68 \%$ Rs. $840=$ Rs 200.23

Accounting to table 4.5 shows that, HBL is paying market price, earning per share, cash and stock dividend every year. HBL is not paying cash dividend in the year 2003/04 . HBL is paying stock dividend every year. Highest total dividend is paid in the year 2008/09 i.e. Rs. 567.456 and lowest is in the year 2005/06 i.e. Rs.117. The closing MPS of HBL is maximum of Rs. 1980 in the year 2006/07 and minimum of Rs. 836 in the year 2002/03

Figure 4.3


MPS and EPS movement is shown in the figure 4.3, MPS of HBL is increasing in 2002/03 to Rs. 836 from Rs. 1980 in 2007/08. Then after MPS of HBL decreasing in year 2008/09. The MPS is higher in 2007/08 and it is lower in 2002/03. EPS of HBL in the fluctuating trend.

### 4.1.3.2 Realized Return (R), Expected Return ( $\bar{R}$ ), Standard deviation ( $\sigma$ ) and co-efficient of variation (C.V.) of HBL

Realized return for each year are calculated for the basis of closing price of MPS and dividend amounts of respective year. Table 4.6 shown the calculation of year wise realized rate of return, expected rate of return, standard deviation and coefficient of variation of return.

## Table 4.6

## RRR, ERR, S.D. and C.V. of C.S. of HBL

| Fiscal year | Closing <br> MPS | Total <br> Dividen <br> d | $R=\frac{P_{t}-P_{t-1}+D_{t}}{P_{t-1}}$ | $R-\bar{R}$ | $(R-\bar{R})^{2}$ |
| :--- | :--- | :--- | :--- | :--- | :--- |
| $2002 / 03$ | 836 | 200.23 | - | - | - |
| $2003 / 04$ | 840 | 184 | 0.2249 | -0.1927 | 0.0371 |
| $2004 / 05$ | 920 | 231.58 | 0.3709 | -0.0467 | 0.0022 |
| $2005 / 06$ | 1100 | 117 | 0.3229 | -0.00947 | 0.0089 |
| $2006 / 07$ | 1740 | 510 | 1.0455 | 0.6279 | 0.3943 |
| $2007 / 08$ | 1980 | 396.25 | 0.3656 | -0.0519 | 0.0027 |
| $2008 / 09$ | 1760 | 567.456 | 0.1755 | -0.2421 | 0.0586 |
| Total |  |  | $\sum \mathrm{R}=2.5054$ |  | $\sum(R-\bar{R})^{2}=0.5038$ |

We have,

$$
\begin{aligned}
\operatorname{Expected} \operatorname{Return}(\bar{R}) & =\frac{\Sigma R}{n} \\
& =\frac{2.5054}{6} \\
& =0.4176 \text { i.e. } 41.76 \% \\
\text { Variance }(\sigma)^{2} & =\frac{\Sigma(R-\bar{R})^{2}}{n-1} \\
& =\frac{0.5054}{6-1}=0.1008
\end{aligned}
$$

Standard Deviation $(\sigma)=\sqrt{\frac{\Sigma(R-\bar{R})^{2}}{n-1}}$

$$
=\sqrt{\frac{0.5038}{6-1}}
$$

$$
=0.3174 \text { or, } 31.74 \%
$$

Coefficient of Variation (C.V.) $=\frac{\sigma}{\bar{R}}$

$$
\begin{aligned}
& =\frac{0.3174}{0.4176} \\
& =0.7601
\end{aligned}
$$

The expected return of HBL is 0.4176 with the total risk (measured by S.D.) of $0.3174 \mathrm{The} \mathrm{C} . \mathrm{V}$. of HBL is 0.7601 which indicates that 0.7601 risks must be bearded to get per unit return. It can be shown clearly in the diagram 4.3

## Diagram 4.3



Diagram 4.3 shows Annual returns of HBL in the Six years. There is fluctuating return in several years. The highest return is in the year 2006/07 i.e. 1.0455 and lowest return of 2008/09 i.e. 0.1755.

### 4.1.4 Everest Bank Limited (EBL)

Everest Bank Limited (EBL) started its operations in 1994 joint venture with Punjab National Bank (PNB), holding 20\% equity in the bank, is the largest nationalized bank in India with its presence virtually in all the important centers at India. The bank has Rs. 1,000,000,000/- authorized capital, Rs. 843,200,000/- issued capital and Rs. 831,400,000/- paid up capital as of the end of fiscal year 2064/65 The par value per share is Rs. 100. It was listed on NEPSE in 1905 A.D. The bank is providing customer friendly service through a network of 28 branches. The bank has been conferred with "Bank of the year 2006, Nepal" by the banker a publication of financial times, London. Overall management of the bank is managed by foreign counterpart.

### 4.1.4.1 MPS, Dividend and EPS data of EBL.

Market price, dividend records and EPS of common stock of HBL's Bank shown in table 4.7 and Closing price is taken into account for the purpose of calculating realized return for the years. The total dividend includes cash as well as stock (Bonus) dividend. The total dividend is calculated in column five.

## Table 4.7

## MPS, Dividend and EPS data of EBL

| Fiscal <br> Year | Closing <br> MPS | DPS | Stock <br> Dividend | Total <br> Dividend | EPS |
| :--- | :--- | :--- | :--- | :--- | :--- |
| $2002 / 03$ | 445 | 20 | - | 20 | 29.9 |
| $2003 / 04$ | 680 | 20 | - | 20 | 45.58 |
| $2004 / 05$ | 870 | - | 20 | 275.8 | 54.22 |
| $2005 / 06$ | 1379 | 25 | - | 25 | 62.78 |
| $2006 / 07$ | 2430 | 10 | 30 | 636.4 | 78.4 |
| $2007 / 08$ | 3132 | 20 | 30 | 265.5 | 91.82 |
| $2008 / 09$ | 2445 | 30 | - | 30 | 99.99 |

Data source: Annual report of EBL

Assuming next year MPS is 2455.

Total dividend amount $=$ cash dividend + stock dividend $\% \times$ Next years MPS

- Rs. $20+0 \%$ Rs. $450=$ Rs 20

According to table 4.7, there is no cash dividend in the year 2004/05. And it is paying stock dividend in year 2004/05, 2006/07 and 2007/08. In the year 2006/07 and 2007/08 it is paying both cash and stock dividend. Highest total dividend is paid in the year 2006/07 i.e. Rs.636.4. The closing MPS of EBL is maximum of Rs. 3132 in the year 2007/08 and minimum of Rs. 445 in the year 2002/03. EPS is increasing trend.

Figure 4.4


MPS and EPS movement is shown in the figure 4.4, MPS of EBL which is in increasing trend from 200/03. The price is minimum is in the year 2002/03 i.e. Rs. 445 and maximum in the year 2007/08 i.e. Rs.3132. It is shown that there is rapid growth from 2003/04 and 2007/08 and there is deceasing from year 2008/09. Overall price of the EBL seems as satisfactory with their growth in the market price. EPS of EBL is increasing in every year.

### 4.1.4.2 Realized return ( $\boldsymbol{R}$ ), expected return $(\bar{R})$, standard deviation ( $\sigma$ ) and coefficient of variation (C.V.) of EBL

Rate of return for each year are calculated for the basis of closing price of MPS and dividend amounts of respective year. Table 4.8 shown the calculation of year wise rate of return, expected rate of return, standard deviation and coefficient of variation of return.

## Table 4.8

## RRR, ERR, S.D. and C.V. of EBL

| Fiscal year | Closing <br> MPS | Total <br> Dividend | $R=\frac{P_{t}-P_{t-1}+D_{t}}{P_{t-1}}$ | $R-\bar{R}$ | $(R-\bar{R})^{2}$ |
| :--- | :--- | :--- | :--- | :--- | :--- |
| $2002 / 03$ | 445 | 20 | - | - | - |
| $2003 / 04$ | 680 | 20 | 0.5730 | 0.0247 | 0.0006 |
| $2004 / 05$ | 870 | 275.8 | 0.685 | 0.1367 | 0.0187 |
| $2005 / 06$ | 1379 | 25 | 0.6138 | 0.0655 | 0.0043 |
| $2006 / 07$ | 2430 | 636.4 | 1.2236 | 0.6753 | 0.4560 |
| $2007 / 08$ | 3132 | 265.5 | 0.3981 | -0.1502 | 0.0226 |
| $2008 / 09$ | 2445 | 30 | -0.2066 | -0.7549 | 0.5699 |
| Total |  |  | $\sum \mathrm{R}=3.2899$ |  | $\sum(R-\bar{R})^{2}=1.0721$ |

We have,

$$
\begin{aligned}
& \operatorname{Expected} \operatorname{Return}(\bar{R})=\frac{\Sigma R}{n} \\
&=\frac{3.2899}{6} \\
&=0.5483 \text { or } 54.83 \% \\
& \text { Variance } \quad \begin{aligned}
\left(\sigma^{2}\right) & =\frac{\Sigma(R-\bar{R})^{2}}{n-1} \\
& =\frac{1.0721}{6-1} \\
& =0.2144
\end{aligned}
\end{aligned}
$$

Standard deviation $(\sigma)=\sqrt{\sigma^{2}}$

$$
\begin{aligned}
= & \sqrt{0.2144} \\
& =0.4631
\end{aligned}
$$

Coefficient of variation (C.V.) $=\frac{\sigma}{\bar{R}}$

$$
\begin{aligned}
& =\frac{0.4631}{0.5483} \\
& =0.8446
\end{aligned}
$$

The expected return of EBL is 0.5483 with total risk (measured by S.D.) of 0.4631 . The C.V. of EBL is 0.8446 which indicates the investor needs to sacrifice 0.8446 unit of risk for per unit return.

## Diagram 4.4



Diagram 4.4 shows realized rate of returns of EBL Bank in the six years. There is fluctuating returns. Realized rate of returns of EBL which is positive in the year 2003/04 to 2007/08 and negative in following year 2008/09. The
highest return is in the year 2006/07 i.e. 1.2236 and lowest return of 2008/09 i.e. -0.2066 .

### 4.1.5 Nepal SBI Bank Ltd. (SBI)

Nepal SBI Bank Ltd. (SBI) is the fifth joint venture in the financial sector sponsored by three institutional promoters, namely State Bank of India, Employees Provident Fund and Agricultural Development Bank of Nepal through a Memorandum of Understanding signed on 17th July 1992. SBI was incorporated on April 28, 1993. SBI commenced operation with effect from July 7, 1993. The bank has an Authorized Capital of Rs. 1,000,000,000, issued capital Rs. $877,500,000$ and paid of capital Rs. 874,527,840. The local promoters are Employees Provident Fund and Agricultural Development Bank/Nepal. The management team and the Managing Director who is also the CEO of the Bank are deputed by State Bank of India. State Bank of India (50\%) and Nepalese institution (20\%) where the general public holds (30\%) of total equity. The overall management of the bank is handled by the foreign part. The bank has been actively trading at Nepal Stock Exchange. The bank has 22 branches as of fiscal year 2007/08.

### 4.1.5.1 MPS, Dividend and EPS data of SBI Bank Ltd.

Market price, dividend records and EPS of common stock of SBI Bank shown in table 4.9 and Closing price is taken into account for the purpose of calculating realized return for the years. The total dividend includes cash as well as stock (Bonus) dividend. The total dividend is calculated in column five.

Table No 4.9
MPS, Dividend and EPS data of SBI Bank Ltd

| Fiscal | Closing | Cash DPS | Stock | Total | EPS |
| :--- | :--- | :--- | :--- | :--- | :--- |


| Year | MPS |  | Dividend | Dividend |  |
| :--- | :--- | :--- | :--- | :--- | :--- |
| $2002 / 03$ | 255 | 8 | - | 8 | 11.47 |
| $2003 / 04$ | 307 | - | - | - | 14.26 |
| $2004 / 05$ | 335 | - | - | - | 13.29 |
| $2005 / 06$ | 612 | 5 | - | 5 | 18.27 |
| $2006 / 07$ | 1176 | 12.59 | 35 | 541.44 | 39.35 |
| $2007 / 08$ | 1511 | - | - | - | 28.33 |
| $2008 / 09$ | 1900 | 12.11 | 30 | 582.11 | 36.18 |

Data source: annual report of SBI Bank Ltd.

Assuming next year MPS is 1900

Total dividend amount $=$ cash dividend + stock dividend $\% \times$ Next years MPS

- Rs. $8+0 \%$ Rs. $307=$ Rs 8

According to table 4.9, there is no cash dividend in the year 2003/04, 2004/05 and 2007/08. And it is paying stock dividend in year 2006/07 and 2008/09. In the year 2006/07 and 2008/09 it is paying both cash and stock dividend. Highest total dividend is paid in the year 2008/09 i.e. Rs. 582.11 and EPS of SBI is maximum in the year 2006/07 i.e. Rs. 39.35 and minimum in the year 2002/03 i.e.11.47. MPS is in increasing trend from starting year 2002/03.The closing MPS of SBI is maximum of Rs. 1900 in the year 2008/09 and minimum of Rs. 255 in the year 2002/03.

Figure 4.5


MPS and EPS movement is shown in the figure 4.5, MPS of SBI which is in increasing trend from 200/03. The price is minimum is in the year 2002/03 i.e. Rs. 255 and maximum in the year 2008/09 i.e. Rs.1900. It is shown that there is rapid growth from 2003/04 and 2008/09. EPS of SBI bank is increasing trend in year $2003 \backslash 04$ to $2006 \backslash 07$ then after decreasing in year 2007/08 to 2008/09.

### 4.1.5.2 Realized return ( $\boldsymbol{R}$ ), Expected Return $(\bar{R})$ standard Deviation ( $\sigma$ ) and coefficient of Variation (C.V) of SBI

Realized returns for each year are calculated for the basis of closing price of MPS and dividend amounts of respective year. Table 4.10 shown the calculation of year wise realized rate of return, expected rate of return, standard deviation and coefficient of variation of return.

Table 4.10

## RRR, ERR, S.D and C.V. of SBI Bank Ltd.

| Fiscal <br> Year <br> MPS | Closing <br> Dividend | $R=\frac{P_{t}-P_{t-1}+D_{t}}{P_{t-1}}$ | $R-\bar{R}$ | $(R-\bar{R})^{2}$ |  |
| :--- | :--- | :--- | :--- | :--- | :--- |
| $2002 / 03$ | 255 | 8 | - | - | - |
| $2003 / 04$ | 307 | - | 0.2039 | -0.4412 | 0.1947 |
| $2004 / 05$ | 335 | - | 0.0912 | -0.5539 | 0.3068 |
| $2005 / 06$ | 612 | 5 | 0.8418 | 0.1967 | 0.0387 |
| $2006 / 07$ | 1176 | 541.44 | 1.8063 | 1.1612 | 1.3484 |
| $2007 / 08$ | 1511 | - | 0.2849 | -0.3602 | 0.1297 |
| $2008 / 09$ | 1900 | 582.11 | 0.6427 | -0.0024 | 0.000006 |
| Total |  |  | $\sum \mathrm{R}=3.8708$ |  | $\sum(R-\bar{R})^{2}=2.0183$ |

We have,

$$
\begin{aligned}
\operatorname{Expected} \text { Return }(\bar{R}) & =\frac{\Sigma R}{n} \\
& =\frac{3.8708}{6} \\
& =0.6451 \text { or } 64.51 \% \\
\text { Variance }\left(\sigma^{2}\right) \quad & =\frac{\Sigma(R-\bar{R})^{2}}{n-1} \\
& =\frac{2.0183}{6-1} \\
& =0.4037
\end{aligned}
$$

Standard deviation

$$
(\sigma)=\sqrt{\sigma^{2}}
$$

$$
\begin{aligned}
& =\sqrt{0.4037} \\
& =0.6354
\end{aligned}
$$

Coefficient of Variation (C.V.) $=\frac{\sigma}{\bar{R}}$

$$
=\frac{0.6354}{0.6451}=0.9849
$$

The expected return of SBI bank is 0.6451 with the total risk (measured by S.D.) of 0.6354.The C.V. of SBI bank is 0.9849 which indicates that 0.9849 risks must be bearded to get per unit return. It can be shown clearly in the diagram 4.5.

## Diagram 4.5



Diagram 4.5 shows returns of SBI Bank in the six years. There is fluctuating return in several years. The highest annual return is in the year 2006/07 i.e. 1.8063 and lowest return of 2004/05 i.e. 0.0912.

### 4.2 Inter-Bank Comparison

According to the result obtained from the section 4.1 and comparative analysis of return, standard deviation of returns, coefficient of variation of each bank for the Fiscal year 2003/04 to 2008/09 are given in table 4.11.

Expected Return, standard deviation and C.V. of sample Banks

|  |  |  | Remarks |  |  |  |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| Sample <br> Banks | Expected <br> Return <br> E(r) | Standard <br> Deviation <br> $(\sigma)$ |  | E(r) | $\sigma$ | C.V. |
| SCB | 0.6594 | 0.4909 | 0.7445 |  |  | Lowest |
| NABIL | 0.7741 | 0.7218 | 0.9324 | Highest | Highest |  |
| HBL | 0.4176 | 0.3134 | 0.7601 | Lowest | Lowest |  |
| EBL | 0.5483 | 0.4631 | 1.2459 |  |  | Highest |
| SBI | 0.6451 | 0.6354 | 0.9849 |  |  |  |

Source: Table 4.2, table 4.4, table 4.6, table 4.8 and table 4.10
From the above table, it has been shown that NABIL enjoys greater return than other banks but at the same time HBL has lower return. SCB has higher total risk compensating the higher return where as HBL has the lowest total risk compensating for the lowest return. The evidence proves that "the higher the return, higher the risk and vice-versa". However, if we consider coefficient of variation (C.V.), that risk on per unit of return of EBI is greater i.e.1.2459. Investor of EBI must bear 1.2459 risks to get a unit rate of return. Where as C.V. of SCB is lowest.

To take an investment decision on single assets common stock, coefficient of variation (C.V.) is the most appropriate basis. As per the coefficient of variation (C.V.), invest on the common stock of SCB because it has the lowest risk on per unit of return. So, rational investor should invest on common stock of SCB. Besides this, the investment decision also depends upon personal preferences. In conclusion for a risk taker investor, common stock of NABIL is appropriate. For a risk -averter investor, the common stock of HBL is appropriate or preferable.

To make the comparison easily understandable diagram 4.6: Expected return, standard deviation and coefficient of variation of each bank.

## Diagram 4.6

 coefficient of variation of each individual bank. It is showing the comparison of these banks in terms of risk, return and coefficient of variation.

### 4.3 Inter -sector comparison

Here a comparison is made on the size of the industry to make the analysis simple as well as understandable for this purpose market capitalization of each industry is taking into account. The following table 4.12 shows market capital of different sector during the fiscal year 2008/09.

Table 4.12

## Market capitalization of different sector

| S.N. | Sector | Market Capitalization (Rs.) <br> in million | Percent(\%) |
| :--- | :--- | :--- | :--- |
| 1. | Commercial Bank | 302219.29 | 58.92 |
| 2. | Development Bank | 27137.89 | 5.29 |
| 3. | Finance company | 43007.13 | 8.38 |
| 4 | Insurance company | 10537.49 | 2.08 |
| 5 | Hotel | 4851.95 | 0.95 |
| 6 | Mfg.\&Proc. company | 7706.09 | 1.50 |
| 7 | Trading company | 1696.36 | 22.50 |
| 8 | Other company | 115782.88 | 100.00 |
| Total |  | 512939.07 |  |

Source: Annual report, SEBON
By the end of the fiscal year 2008/09, the market capitalization of the listed securities reached to Rs. 512939.07 million. The capitalization was Rs. 366247.5 million in the fiscal year 2007/08. The highest market capitalization recorded in the fiscal year 2008/09 was Rs. 612542.7 million on August 31, 2008 and the lowest was Rs. 334305.2 million on January 21, 2009. By the end of the fiscal year 2008/09, the percentage contribution of market capitalization on nominal GDP is estimated to be 53.43. The percentage of market capitalization of "banking sector" on the total market capitalization is highest $58.92 \%$ as compared to other sectors and market capitalization of "Trading Company" is very low $0.30 \%$.

The following chart presents the market capitalization of listed securities during the fiscal year 2008/09.


### 4.4 NEPSE Index

### 4.4.1 Overall NEPSE Index

NEPSE index follows the value weighted formula where market capitalization is the basis for calculating index. NEPSE index is calculated by considering all listed shares including that of promoter shares of all listed companies in NEPSE.

Table 4.13
Overall NEPSE Index

| Fiscal Year | Overall NEPSE Index |
| :--- | :--- |
| $2002 / 03$ | 204.86 |
| $2003 / 04$ | 222.04 |
| $2004 / 05$ | 286.67 |
| $2005 / 06$ | 386.83 |
| $2006 / 07$ | 683.95 |
| $2007 / 08$ | 963.4 |
| $2008 / 09$ | 749.10 |

Source: Annual report, NEPSE
Accounting to table 4.13 Overall NEPSE Index increasing in the year 2002/03 to 2007/08. NEPSE Index highest in the year 2007/08 and lowest

NEPSE Index in year 2002/03.NEPSE Index is decreasing trend most of the time during the fiscal year 2008/09. The trend of overall NEPSE index can be viewed from the following figure 4.6.

Figure 4.6


### 4.4.2 Inter Industry Comparison on the Basis of NEPSE Index

Table 4.14

Sector wise NEPSE index of different sector during the fiscal year 2002/03 to 2008/09.

|  | Fiscal Year |  |  |  |  |  |  |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| Sector | $2002 / 03$ | $2003 / 04$ | $2004 / 05$ | $2005 / 06$ | $2006 / 07$ | $2007 / 08$ | $2008 / 09$ |
| Commercial <br> bank | 199.90 | 231.97 | 304.64 | 437.49 | 789.21 | 985.70 | 780.87 |
| Mfg. | 250.13 | 255.58 | 276.50 | 301.11 | 348.63 | 423.70 | 434.32 |
| Hotel | 196.68 | 184.41 | 178.00 | 180.77 | 251.47 | 370.90 | 367.42 |
| Others | 48.56 | 142.61 | 347.65 | 410.00 | 818.12 | 768.30 | 738.9 |
| Hydro Power | - | - | - | - | 847.93 | 1324.00 | 1044.81 |
| Trading | 94.56 | 95.01 | 123.20 | 148.11 | 155.37 | 204.10 | 295.83 |
| Insurance | 240.64 | 237.62 | 320.24 | 381.25 | 612.46 | 817.3 | 656.41 |
| Finance | 208.14 | 195.99 | 228.39 | 261.37 | 471.82 | 1152.7 | 697.61 |
| Dev. Bank | 246.72 | 190.03 | 237.86 | 294.40 | 539.66 | 1285.9 | 772.56 |

Source: Annual Trading Report/NEPSE, Year 2002/03-2008/09
In above table 4.14 shows the sector wise NEPSE index of different sector during the fiscal year 2002/03to 2008/09 which contains specially nine sectors (sector is mentioned in above table). Hydropower sector is also started to trading from 2006/07 which was remained closed before some years. We can find from the above data the index of Commercial banks, Others sector and Development bank is high than remaining sector. Mfg. \& processing, Hotel \& Trading sectors index is comparatively low than the other sector and fiscal year 2008/09 NEPSE index is low then other year.

The following table 4.14 show the calculative value of each sector's expected return $(\bar{R})$ standard deviation ( $\sigma$ ) and coefficient of variation (C.V).

## Table 4.15

Expected retune ( $\bar{R}$ ), standard deviation ( $\sigma$ ) and coefficient variation (C.V) of different sectors.

| S.N | Name of the company | Expected <br> Return | Standard <br> Deviation | Coefficient of variation |
| :---: | :---: | :---: | :---: | :---: |
| 1 | Commercial bank | 0.2925 | 0.3323 | 1.1361 |
| 2 | Mfg.\& proc. company | 0.0985 | 0.0762 | 0.7736 |
| 3 | Hotel | 0.1499 | 0.2083 | 1.3896 |
| 4 | others | 0.7417 | 0.8421 | 1.1354 |
| 5 | Hydro Power | 0.1753 | 0.5463 | 3.1164 |
| 6 | Trading | 0.2193 | 0.1691 | 0.7711 |
| 7 | Insurance | 0.2116 | 0.2853 | 1.3483 |
| 8 | Finance | 0.3508 | 0.6634 | 1.8911 |
| 9 | Development bank | 0.2829 | 0.6278 | 2.2192 |

Source: Appendix table 1A, 1B, 1C, 1D, 1E, 1F, 1G, 1H, 1I)
From the above table, it has been shows the different sector expected return, standard deviation and coefficient of variation. Inter industry comparison on the basis of Nepse index of different sector Maximum expected return and standard deviation is "other sector" and minimum expected return and standard deviation is "manufacturing and processing company". The evidence proves that "the higher the return, higher the risk and vice-versa". However, if we consider coefficient of variation (C.V.), that risk on per unit of return. To take an investment decision on single assets common stock, coefficient of variation (C.V.) is the most appropriate basis. As per the coefficient of variation (C.V.), invest on the common stock of "Trading

Company" because it has the lowest risk on per unit of return Trading Company.

To make the comparison easily understandable diagram 4.7: Expected return, standard deviation and coefficient of variation of each sector.

## Diagram 4.7



Diagrams 4.7 clarify the expected return, standard deviation and coefficient of variation of each sector. It is showing the comparison of these sector in terms of risk, return and coefficient of variation.

### 4.5 Analysis of market Risk and return

There is only one stock exchange in Nepal. Nepal Government under programmed initiated to reform capital markets converted securities exchanges centre into Nepal stock exchange in 1983. Nepal stock exchanges in short NEPSE, is a non-profit organization operating under securities exchange Act 1983. The government, NRB and NIDC, owns it. NEPSE prepares daily NEPSE index based on the market capitalization of all listed securities. Overall market movement is represented by market index (i.e. NEPSE index). Market
returns, standard deviation and coefficient variations are shown in following table 4.16.

Table 4.16

Market return, standard deviation and c.v.

| Fiscal year | NEPSE <br> Index | $\begin{gathered} \mathbf{R}_{\mathbf{m}} \\ \frac{N E P S E_{t}-N E P S E_{t-1}}{N E P S E_{t-1}} \end{gathered}$ | $\left(R_{m}-\bar{R}_{m}\right)$ | $\left(R_{m}-\bar{R}_{m}\right)^{2}$ |
| :---: | :---: | :---: | :---: | :---: |
| 2002/03 | 204.86 | - | - | - |
| 2003/04 | 222.04 | 0.0839 | -0.1959 | 0.0384 |
| 2004/05 | 286.67 | 0.2911 | -0.0113 | 0.0002 |
| 2005/06 | 386.83 | 0.3494 | 0.0696 | 0.0048 |
| 2006/07 | 683.95 | 0.7681 | 0.4883 | 0.2384 |
| 2007/08 | 963.40 | 0.4086 | 0.1288 | 0.0166 |
| 2008/09 | 749.10 | -0.2224 | -0.5022 | 0.2522 |
| Total |  | $\Sigma R_{m}=1.6787$ |  | $\Sigma$ $\left(R_{m}-\bar{R}_{m}\right)^{2}=0.5506$ |

## Source: SEBON

We have,

Expected market return, $\mathrm{E}\left(\mathrm{R}_{\mathrm{m}}\right)$ or $\overline{\mathrm{R}}_{\mathrm{m}}=\frac{\Sigma R_{m}}{n}$

$$
\begin{aligned}
& =\frac{1.6787}{6} \\
& =0.2798
\end{aligned}
$$

Standard deviation $\left(\sigma_{\mathrm{m}}\right)=\sqrt{\frac{\Sigma(\mathrm{Rm}-\overline{\mathrm{R}} \mathrm{m})^{2}}{n-1}}$

$$
\begin{aligned}
& =\sqrt{\frac{0.5506}{6-1}} \\
& =0.3318
\end{aligned}
$$

Coefficient Variation (C.V.) $=\frac{\sigma_{m}}{\overline{\mathrm{R}}_{\mathrm{m}}}$

$$
=\frac{0.3318}{0.2798}=1.1855
$$

Table 4.16 shows the return of market in several years. There is highest return of market in the year 2006/07 i.e. 0.7681 and there is negative return of market in the year 2008/09 i.e. -0.2224 . The expected return of the market is 0.2798 with the total risk (measured by S.D.) of 0.3318 . C.V of market is 1.1855 which means, 1.1855 risks must be sacrificed to get per unit market return.

Diagram 4.8


From Diagram 4.8 shows the market return movement in F/Y 2002/03 to $\mathrm{F} / \mathrm{Y}$ 20007/08 is positive trend and in the fiscal year 2008/09 market return movement is negative.

### 4.6 Market Sensitivity

Market sensitivity of stock is measured by beta coefficient. The systematic risk measured by beta is a degree of sensitivity of stocks return to market movement. Higher the beta represents greater sensitivity and higher reaction to the market movement and Vice- versa. The beta coefficient of market is always 1. The percentage of risk that is correlated with market is said to be systematic portion of risk. As market changes guide this portion of risk, it is out of reach to get under control. Thus beta is systematic risk which can not be eliminated through the means of diversification. Here calculation of Beta coefficient of the common stock of NABIL and other banks are shown in Appendix.

Table 4.17

Beta coefficient of the common stock of NABIL.

| Fiscal Year | $\left(R_{i}-\overline{R_{i}}\right)$ | $\left(R_{m}-\overline{R_{m}}\right)$ | $\left(R_{i}-\overline{R_{i}}\right)\left(R_{m}-\overline{R_{m}}\right)$ |
| :--- | :--- | :--- | :--- |
| $2003 / 04$ | -0.3349 | -0.1959 | 0.0656 |
| $2004 / 05$ | -0.1991 | 0.0113 | -0.0023 |
| $2005 / 06$ | -0.2292 | 0.0696 | -0.0159 |
| $2006 / 07$ | 1.467 | 0.4883 | 0.7164 |
| $2007 / 08$ | -0.3296 | 0.1288 | -0.0425 |
| $2008 / 09$ | -0.3744 | -0.5022 | 0.1880 |
| Total |  |  | $\sum\left[\left(R_{i}-\overline{R_{i}}\right)\left(R_{m}-\overline{R_{m}}\right)\right.$ <br> $=0.9093$ |

We have,

$$
\begin{aligned}
\operatorname{cov}\left(R_{i}, R_{m}\right)= & \frac{\sum\left[\left(R_{i}-\overline{R_{i}}\right)\left(R_{m}-\bar{R}_{m}\right)\right]}{n-1} \\
= & \frac{0.9093}{6-1}=0.1819
\end{aligned}
$$

and ,

$$
\begin{aligned}
\beta i= & \frac{\operatorname{cov}\left(R_{i}, R_{m}\right)}{\sigma_{m}^{2}} \\
& =\frac{0.1819}{0.1101}=1.6521
\end{aligned}
$$

Where,
$\mathrm{n}=$ Number of observation $=6$
$\mathrm{R}_{\mathrm{i}}=$ Return on stock 'i' (i.e. NABIL)
$\mathrm{B}_{\mathrm{i}}=$ Beta of NABIL's common stock.
$\mathrm{R}_{\mathrm{m}}=$ Return of Market
$\sigma_{\mathrm{m}}{ }^{2}=$ Variance of market

Since, the beta coefficient of NABIL is 1.6521 which is more than 1 . It can be concluded that the common stock of NABIL is aggressive stock. The common stock of NIBL is more volatile stock in the market. Similarly the beta coefficient of SCBNL, HBL, EBL and SBI is calculated at appendix at the end of this study (See appendix table $2 A, 2 B, 2 C, 2 D$ ).

Table 4.18

## Beta coefficient of each bank

| Name of the bank | Beta coefficient $\left(\beta_{\mathrm{i}}\right)$ |
| :--- | :--- |
| SCB | 0.6530 |
| NABIL | 1.6521 |
| HBL | 0.8211 |
| EBL | 1.2552 |
| SBI | 1.1181 |

The above table shows the beta of different listed commercial banks. Except Himalayan bank limited (HBL), Standard chartered bank (SCB) the beta coefficient of others banks are greater than 1. This indicates that one percentage change in the market return will causes more than one percentage change in stock's return.

The beta coefficient of common stock of NABIL Bank ltd. is higher than other banks. That is 1.6521 which is greater than 1 . Therefore the return of NABIL's stock is highly sensitive with market. $1 \%$ increase in market return will raise NABIL's stock return by $1.6521 \%$. Similarly SCB, HBL, SBI and EBL have also positive beta, which implies that the stocks return move in the same direction to market.

### 4.7 Price Evaluation of Selected Banks

CAPM is model that assumes stock's required rate of return is equal to the risk free rate plus its risk premium where risk is measured by the beta coefficient. Beta coefficient play vital role in CAPM approach. If the required rate of return is less than expected rate of return, the stock is said to be under
priced and required rate of return is more than expected rate of return, the stock is said to be over priced. For this analysis the risk free rate of return is needed, which is taken from the interest rate of Treasury bill issued by Nepal Rastra Bank. NRB issued treasury bill, 91 days and 364 days time duration. Table 4.16 shows the required rate of return, expected return and price evaluation. 91 days duration treasury bill rate is taken as a risk free rate from website of NRB. Which is approximately 7.551 percent in date 07/04/2010.

Table 4.19

## Calculation of Required Rate of Returns and Price Evaluation by CAPM Model

| Sampal <br> Bank | $\mathrm{R}_{\mathrm{f}}$ | $\mathrm{E}\left(\mathrm{R}_{\mathrm{m}}\right)$ | $\operatorname{Beta}\left(\beta_{\mathrm{j}}\right)$ | $\begin{array}{lll} \mathrm{E}\left(\mathrm{R}_{\mathrm{j}}\right)=\quad \mathrm{R}_{\mathrm{f}} & + \\ {\left[\mathrm{E}\left(\mathrm{R}_{\mathrm{m}}\right)-\mathrm{R}_{\mathrm{f}}\right] \beta_{\mathrm{j}}} & \end{array}$ | E (R) | Price <br> Evaluation |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| SCB | 0.076 | 0.2798 | 0.6530 | 0.2091 | 0.6594 | Under price |
| NABIL | 0.076 | 0.2798 | 1.6521 | 0.4127 | 0.7741 | Under price |
| HBL | 0.076 | 0.2798 | 0.8211 | 0.2433 | 0.4176 | Under price |
| EBL | 0.076 | 0.2798 | 1.2552 | 0.3318 | 0.5483 | Under price |
| SBI | 0.076 | 0.2798 | 1.1181 | 0.3039 | 0.6451 | Under price |

Where,
$\mathrm{E}(\mathrm{R})=$ Expected rate of return (from table 4.11)
$\mathrm{R}_{\mathrm{j}} \quad=$ Risk free rate of return (0.076)
$\mathrm{E}\left(\mathrm{R}_{\mathrm{m}}\right)=$ Market rate of return (0.2798)
$B_{j} \quad=$ Beta of individual sample Banks (From table 4.18)
The stocks of these joint venture commercial bank are underpriced. The under priced stocks value will be increased in the near future providing the investors higher return. So investor should buy these stocks and who are holding they shouldn't sell. The over priced stocks value will be decreased in future providing the investors lower return. So investor should sell these stocks.

### 4.8 Correlation Between Banks

Covariance and correlation are closely related. The correlation measure the degree of relationship of movement of securities return. Correlation coefficient always lies between +1 and -1 . Returns of securities are very perfectly together when the correlation coefficient is +1 and in perfectly opposite direction when it is -1 . A zero correlation coefficient implies that there is no relationship between the returns of securities. Correlation between the returns of the two securities plays a significant role in risk reduction by portfolio construction. The table no. 4.20 presented below shows the various consolations between each sample banks.

Table 4.20
Correlation Matrix

| Sample | SCB | NABIL | HBL | EBL | SBI |
| :--- | :--- | :--- | :--- | :--- | :--- |
| SCB | 1 | 0.7070 | 0.6484 | 0.2428 | 0.8813 |
| NABIL |  | 1 | 0.9817 | 0.7613 | 0.8879 |
| HBL |  |  | 1 | 0.8128 | 0.8341 |
| EBL |  |  |  | 1 | 0.5209 |
| SBI |  |  |  |  | 1 |

Source: Appendix Table 3A, 3B, 3C, 3D, 3E, 3F, 3G, 3H, 3I, 3J
Above table no. 4.20 shows that correlation between sample bank's stocks. There is positive correlation between various banks. If correlation between stocks is +1 , any part of risk can not be reduced by diversification. On the other hand, If correlation between stocks are -1 , the proper combination of two stocks can reduces all the risk. So in conclusion it can be say that as long as correlation between securities return is negative, construction of portfolio is benefit able.

Among the above correlation combination, combination between SCB and EBL a is much more beneficial than any other combination because this combination has the lowest correlation.

### 4.9 Portfolio Analysis

Portfolio indicates the combination of more than one asset with different characteristics. The idea of portfolio is relevant when taking decision about the investment. Investor can diversify their unsystematic risk by adopting portfolio. It will be a great use to reduce risk to some extent. The portfolio earning of an assets measured by expected returns of portfolio i.e. E (Rp), risk by the standard deviation of portfolio i.e. $\left(\sigma_{p}\right)$. The expected return of portfolio is simply a weighted average of the expected return of individual securities held in the portfolio. The weights are equals to the proportion of total fund invested in each security.

The portfolio theory has two assumption (i) investors are risk averser (ii) the return of securities are normally distributed. This means the mean and variance analysis is the foundation of portfolio decision.

### 4.9.1 Analysis of Diversification

The analysis is based on two assets portfolio and the tools for analysis are already mentioned in the research methodology. It is already stated that correlation between the return of the two securities plays a vital role in risk reduction by portfolio construction. The negative relationship between two returns is acceptable in portfolio return. If the correlation is perfectly negative $(-1)$, Then the combination of securities reduces unsystematic risk to zero. If correlation is perfectly positive or equal to 1 then the portfolio can not reduce any part of risk. Here the portfolio of common stock of SCB (say stock A,)NIBL (say stock B), HBL (say stock C) EBL, (say stock D) and SBI(say stock E ) is analyzed.

Table 4.21

Covariance between Stocks

| $\operatorname{COV}\left(R_{\mathrm{A}} \mathrm{R}_{, \mathrm{B}}\right)$ | 0.2505 |
| :--- | :--- |
| $\operatorname{COV}\left(\mathrm{R}_{\mathrm{B},} \mathrm{R}_{\mathrm{C})}\right.$ | 0.2249 |
| $\operatorname{COV}\left(\mathrm{R}_{\mathrm{C},} \mathrm{R}_{\mathrm{D}}\right)$ | 0.1194 |
| $\operatorname{COV}\left(\mathrm{R}_{\mathrm{D},} \mathrm{R}_{\mathrm{E}}\right)$ | 0.1533 |
| $\operatorname{COV}\left(\mathrm{R}_{\mathrm{A},} \mathrm{R}_{\mathrm{E}}\right)$ | 0.2749 |

Source: Appendix Table 3A, 3D, 3E, 3H, 3J
Where,
$\operatorname{COV}\left(\mathrm{R}_{\mathrm{A}} \mathrm{R}_{, \mathrm{B}}\right)=$ Covariance returns of SCB and NAIBL
$\operatorname{COV}\left(R_{B} R_{, C}\right)=$ Covariance returns of NABIL and HBL
$\operatorname{COV}\left(\mathrm{R}_{\mathrm{C}} \mathrm{R}_{, \mathrm{D}}\right)=$ Covariance returns of HBL and EBL
$\operatorname{COV}\left(R_{D}, R_{E}\right)=$ Covariance returns of $E B L$ and SBI
$\operatorname{COV}\left(\mathrm{R}_{\mathrm{E}} \mathrm{R}_{, \mathrm{A}}\right)=$ Covariance returns of SBI and SCB
Table 4.22

## Expected Return and Standard Deviation of Sample Bank

| Sample Banks | Expected <br> Return E(R) | Standard <br> Deviation $(\sigma)$ |
| :--- | :--- | :--- |
| SCB | 0.6594 | 0.4909 |
| NABIL | 0.7741 | 0.7218 |
| HBL | 0.4176 | 0.3134 |
| EBL | 0.5483 | 0.4631 |
| SBI | 0.6451 | 0.6354 |

Source: Table 4.11

### 4.9.1.1 Portfolio of stock SCB (A) and NAIBL (B)

The optimal portfolio weight of stock A and B, which minimizes the risk, is given below:

$$
\begin{aligned}
w_{A}= & \frac{\sigma_{B}^{2}-\operatorname{cov}_{(A, B)}}{\sigma_{A}^{2}+\sigma_{B}^{2}-2 \operatorname{cov}_{(A, B)}} \\
& =\frac{0.5209-0.2505}{0.2409+0.5209-2 \times 0.2505} \\
& =\frac{0.2704}{0.2608} \\
& =1.0368 \\
w_{B}= & 1-w_{A} \\
& =1-(1.0368) \\
& =-0.0368
\end{aligned}
$$

Where,
$\mathrm{W}_{\mathrm{A}}=$ optimal weight to invest in stock of SCB
$\mathrm{W}_{\mathrm{B}}=$ optimal weight to invest in stock of NABIL
$\sigma_{A}^{2}=$ Variance of SCB
$\sigma_{B}^{2}=$ Variance of NABIL
$\operatorname{COV}(\mathrm{A}, \mathrm{B})=$ Co-variance of SCB and NABIL
As we know that the proportion of stock in the portfolio is constructed with $103.68 \%$ of SCB and $-3.68 \%$ of NABIL common stock that will minimize risk and ideal proportion. In above proportion, equity shareholder can minimize risk to get maximum return.

## Portfolio Return

It is combination of two or more securities or assets and portfolio return is simply a weighted average of the expected return on individual stock return. Expected Return on portfolio $E\left(R_{P}\right)$ i.e. $E\left(R_{A}\right)=E\left(R_{A}\right) \times W_{A}+E\left(R_{B}\right) \times W_{B}$

$$
\begin{aligned}
= & 0.6594 \times 1.0368+0.7741 \times(-0.0368) \\
& =0.6552
\end{aligned}
$$

$$
=65.52 \%
$$

Where,
$E\left(R_{P}\right)=$ Expected Return on Portfolio of stock SCB and NABIL
$\mathrm{E}\left(\mathrm{R}_{\mathrm{A}}\right)=$ Expected Return of SCB
$E\left(R_{B}\right)=$ Expected Return of NABIL

## Portfolio Risk

Portfolio risk is a function of the proportions invested in the common stocks. It is measured by standard deviation and calculated by using following formula.

$$
\begin{aligned}
\sigma_{p} \text { i.e. } \sigma_{A} & =\sqrt{W_{A}{ }^{2} \sigma_{A}^{2}+w_{B}^{2} \cdot \sigma_{B}^{2}+2 W_{A} W_{B} \times \operatorname{Cov}\left(A_{i} B\right)} \\
& =\sqrt{(1.0368)^{2} \times(0.4909)+(-0.0368)^{2} \times(0.7218)+2 \times(1.0368) \times(-0.0368) \times(0.2505)} \\
& =0.4904 \\
& =49.04 \%
\end{aligned}
$$

Where,
$\sigma_{P}=$ The standard deviation of portfolio return of stock SCB and NABIL
From the above calculation the portfolio return and risk for SCB and NABIL are $65.52 \%$ and $49.04 \%$ respectively.

### 4.9.1.2 Portfolio of Stock NABIL (B) and HBL (C)

The optimal portfolio weight of stock $B$ and $C$, which minimized the risk, is given below.

$$
\begin{aligned}
w_{B} & =\frac{\sigma_{C}^{2}-\operatorname{cov}_{(B, C)}}{\sigma_{B}^{2}+\sigma_{C}^{2}-2 \operatorname{cov}_{(B, C)}} \\
& =\frac{0.1007-0.2249}{0.5214+0.1007 \times 0.2249} \\
& =\frac{-0.1242}{0.3972} \\
& =-0.3127 \\
w_{C} & =1-w_{B} \\
& =1-(-0.3127) \\
& =1.3127
\end{aligned}
$$

Where,
$\mathrm{W}_{\mathrm{B}}=$ optimal weight to invest in stock of NABIL
$\mathrm{W}_{\mathrm{C}}=$ optimal weight to invest in stock of HBL
$\sigma_{B}^{2}=$ Variance of NABIL
$\sigma_{C}^{2}=$ Variance of HBL
$\operatorname{COV}(\mathrm{B}, \mathrm{C})=$ Co-variance of NABIL and HBL
As we know that the proportion of stock in the portfolio is constructed with $-31.27 \%$ of NABIL and $131.27 \%$ of HBL common stock that will minimize risk and ideal proportion. In above proportion, equity shareholder can minimize risk to get maximum return.

## Portfolio Return

It is combination of two or more securities or assets and portfolio return is simply a weighted average of the expected return on individual stock return. Expected Return on portfolio $E\left(R_{P}\right)$ i.e. $E\left(R_{B}\right)=E\left(R_{B}\right) \times W_{B}+E\left(R_{C}\right) \times W_{C}$

$$
\begin{aligned}
& =0.7741 \times-0.3127+0.4176 \times(1.3127) \\
& =0.3061 \\
& =30.61 \%
\end{aligned}
$$

Where,
$E\left(R_{P)}=\right.$ Expected Return on Portfolio of stock NABIL and HBL
$E\left(R_{B}\right)=$ Expected Return of NABIL
$\mathrm{E}\left(\mathrm{R}_{\mathrm{C}}\right)=$ Expected Return of HBL

## Portfolio Risk

Portfolio risk is a function of the proportions invested in the common stocks. It is measured by standard deviation and calculated by using following formula.

$$
\begin{aligned}
\sigma_{p} \text { i.e. } \sigma_{B} & =\sqrt{W_{B}^{2} \sigma_{B}^{2}+w_{C}^{2} \cdot \sigma_{C}^{2}+2 W_{B} W_{C} \times \operatorname{Cov}(B, C)} \\
& =\sqrt{(-0.3127)^{2} \times(0.5209)+(1.3127)^{2} \times(0.3174)+2 \times(-0.3127) \times(1.3127) \times(0.2249)} \\
& =0.19959 \\
& =19.59 \%
\end{aligned}
$$

Where,
$\sigma_{P}=$ The standard deviation of portfolio return of stock SCB and NABIL
From the above calculation the portfolio return and risk for SCB and NABIL are $30.61 \%$ and $19.95 \%$ respectively.

### 4.9.1.3 Portfolio of Stock HBL(C) and EBL(D)

The optimal portfolio weight of stock C and D , which minimized the risk, is given below.

$$
\begin{aligned}
w_{C}= & \frac{\sigma_{D}^{2}-\operatorname{cov}_{(C, D)}}{\sigma_{C}^{2}+\sigma_{D}^{2}-2 \operatorname{cov}_{(C, D)}} \\
& =\frac{0.2144-0.1194}{0.1008+0.2144-2 \times 0.1194} \\
& =\frac{0.095}{0.0764} \\
& =1.2435 \\
w_{D} & =1-w_{C} \\
& =1-(1.2435) \\
& =-0.2435
\end{aligned}
$$

Where,
$\mathrm{W}_{\mathrm{C}}=$ optimal weight to invest in stock of HBL
$W_{D}=$ optimal weight to invest in stock of EBL
$\sigma_{C}^{2}=$ Variance of HBL
$\sigma^{2}{ }_{D}=$ Variance of EBL
$\operatorname{COV}(\mathrm{C}, \mathrm{D})=$ Co-variance of HBL and EBL
As we know that the proportion of stock in the portfolio is constructed with $124.34 \%$ of HBL and $-0.2435 \%$ of EBL common stock that will minimize
risk and ideal proportion. In above proportion, equity shareholder can minimize risk to get maximum return.

## Portfolio Return

It is combination of two or more securities or assets and portfolio return is simply a weighted average of the expected return on individual stock return. Expected Return on portfolio $E\left(R_{P}\right)$ i.e. $E\left(R_{C}\right)=E\left(R_{C}\right) \times W_{C}+E\left(R_{D}\right) \times W_{D}$

$$
\begin{aligned}
& =0.4176 \times 1.2435+0.5483 \times(-0.2435) \\
& =0.3858 \\
& =38.58 \%
\end{aligned}
$$

Where,
$E\left(R_{P)}=\right.$ Expected Return on Portfolio of stock HB Land EBL
$\mathrm{E}\left(\mathrm{R}_{\mathrm{C}}\right)=$ Expected Return of HBL
$\mathrm{E}\left(\mathrm{R}_{\mathrm{D}}\right)=$ Expected Return of EBL

## Portfolio Risk

Portfolio risk is a function of the proportions invested in the common stocks. It is
measured by standard deviation and calculated by using following formula.

$$
\begin{aligned}
\sigma_{p} \text { i.e. } \sigma_{C} & =\sqrt{W_{C}{ }^{2} \sigma_{C}^{2}+w_{D}^{2} . \sigma_{D}^{2}+2 W_{C} W_{D} \times \operatorname{Cov}(C, D)} \\
& =\sqrt{(1.2435)^{2} \times(0.1008)+(-0.2435)^{2} \times(0.2144)+2 \times(1.2435) \times(-0.2435) \times(0.1194)} \\
& =0.3103 \\
& =31.03 \%
\end{aligned}
$$

Where,
$\sigma_{\mathrm{P}}=$ The standard deviation of portfolio return of stock HBL and EBL
From the above calculation the portfolio return and risk for HBL and EBL are 38.59\% and $49.04 \%$ respectively.

### 4.9.1.4 Portfolio of Stock EBL (D) and SBI (E)

The optimal portfolio weight of stock D and E , which minimized the risk, is given below.

$$
\begin{aligned}
w_{D} & =\frac{\sigma_{E}^{2}-\operatorname{cov}_{(D, E)}}{\sigma_{D}^{2}+\sigma_{E}^{2}-2 \operatorname{cov}_{(D, E)}} \\
& =\frac{0.4037-0.1533}{0.2144+0.40 .7-2 \times 0.1533} \\
& =\frac{0.2504}{0.3115} \\
& =0.8039 \\
w_{E} & =1-w_{D} \\
& =1-0.839 \\
& =0.1961
\end{aligned}
$$

Where,
$\mathrm{W}_{\mathrm{D}}=$ optimal weight to invest in stock of EBL
$\mathrm{W}_{\mathrm{E}}=$ optimal weight to invest in stock of SBI
$\sigma_{\mathrm{D}}^{2}=$ Variance of EBL
$\sigma_{\mathrm{E}}^{2}=$ Variance of SBI
$\operatorname{COV}(\mathrm{D}, \mathrm{E})=$ Co-variance of EBL and SBI
As we know that the proportion of stock in the portfolio is constructed with $80.39 \%$ of EBL and $19.61 \%$ of SBI common stock that will minimize risk and ideal proportion. In above proportion, equity shareholder can minimize risk to get maximum return.

## Portfolio Return

It is combination of two or more securities or assets and portfolio return is simply a weighted average of the expected return on individual stock return. Expected Return on portfolio $E\left(R_{P}\right)$ i.e. $E\left(R_{D}\right)=E\left(R_{D}\right) \times W_{D}+E(R E) \times W_{E}$

$$
\begin{aligned}
& =0.5483 \times 0.8039+0.6451 \times 0.1961 \\
& =0.5673
\end{aligned}
$$

$$
=56.73 \%
$$

Where,
$\mathrm{E}\left(\mathrm{R}_{\mathrm{P}}=\right.$ Expected Return on Portfolio of stock EBL and SBI
$E\left(R_{D}\right)=$ Expected Return of EBL
$E\left(R_{E}\right)=$ Expected Return of SBL

## Portfolio Risk

Portfolio risk is a function of the proportions invested in the common stocks. It is measured by standard deviation and calculated by using following formula.

$$
\begin{aligned}
\sigma_{p} \text { i.e. } \sigma_{D} & =\sqrt{W_{D}{ }^{2} \sigma_{D}^{2}+w_{E}^{2} \cdot \sigma_{E}^{2}+2 W_{D} W_{E} \times \operatorname{Cov}(D, E)} \\
& =\sqrt{(0.8039)^{2} \times(0.2144)+(-0.1961)^{2} \times(0.4033)+2 \times(0.8039) \times(0.1961) \times(0.1533)} \\
& =0.4499 \\
& =44.99 \%
\end{aligned}
$$

Where,
$\sigma_{\mathrm{P}}=$ The standard deviation of portfolio return of stock EBL and SBI
From the above calculation the portfolio return and risk for EBL and SBL are $56.73 \%$ and $44.99 \%$ respectively.

### 4.9.1.5 Portfolio of Stock SBI (E) and SCB (A)

The optimal portfolio weight of stock E and A , which minimized the risk, is given below.

$$
\begin{aligned}
w_{E} & =\frac{\sigma_{A}^{2}-\operatorname{cov}_{(E, A)}}{\sigma_{A}^{2}+\sigma_{E}^{2}-2 \operatorname{cov}_{(E, A)}} \\
& =\frac{0.2409-0.2749}{0.2409+0.4037-2 \times 0.2749} \\
& =\frac{-0.034}{0.0953} \\
& =-0.3561 \\
w_{A}= & 1-w_{E} \\
& =1-(-0.3561) \\
& =1.3561
\end{aligned}
$$

Where,
$\mathrm{W}_{\mathrm{A}}=$ optimal weight to invest in stock of SCB
$\mathrm{W}_{\mathrm{E}}=$ optimal weight to invest in stock of SBI
$\sigma_{\mathrm{A}}^{2}=$ Variance of SCB
$\sigma_{\mathrm{E}}^{2}=$ Variance of SBI
$\operatorname{COV}(\mathrm{E}, \mathrm{A})=$ Co-variance of SBI and SCB
As we know that the proportion of stock in the portfolio is constructed with $-0.3561 \%$ of SCB and $135.61 \%$ of SBI common stock that will minimize risk and ideal proportion. In above proportion, equity shareholder can minimize risk to get maximum return.

## Portfolio Return

It is combination of two or more securities or assets and portfolio return is simply a weighted average of the expected return on individual stock return. Expected Return on portfolio $E\left(R_{P}\right)$ i.e. $E\left(R_{E}\right)=E\left(R_{A}\right) \times W_{A}+E\left(R_{E}\right) \times W_{E}$

$$
\begin{aligned}
& =0.6594 \times 1.3561+0.6451 \times(-0.3561) \\
& =0.6645 \text { or } 66.45 \%
\end{aligned}
$$

Where,
$E\left(R_{P}\right)=$ Expected Return on Portfolio of stock SBI and SCB
$\mathrm{E}\left(\mathrm{R}_{\mathrm{A}}\right)=$ Expected Return of SCB
$\mathrm{E}\left(\mathrm{R}_{\mathrm{E}}\right)=$ Expected Return of SBI

## Portfolio Risk

Portfolio risk is a function of the proportions invested in the common stocks. It is
measured by standard deviation and calculated by using following formula.

$$
\begin{aligned}
\sigma_{p} \text { i.e. } \sigma_{E} & =\sqrt{W_{A}^{2} \sigma_{A}^{2}+w_{E}^{2} \cdot \sigma_{E}^{2}+2 W_{A} W_{E} \times \operatorname{Cov}(A, E)} \\
& =\sqrt{(1.3561)^{2} \times(0.2409)+(-0.3561)^{2} \times(0.4037)+2 \times(1.3561) \times(-0.3561) \times(0.2749)} \\
& =0.4778 \\
& =47.78 \%
\end{aligned}
$$

Where,
$\sigma_{\mathrm{P}}=$ The standard deviation of portfolio return of stock SBI and SCB
From the above calculation the portfolio return and risk for SCB and SBI are 66.45\% and $47.78 \%$ respectively.

Table 4.23
Portfolio Return and Risk and C.V. of each Banks

| Bank | Portfolio return $E\left(R_{P}\right)$ | Portfolio risk $\left(\sigma_{\mathrm{P}}\right)$ | Portfolio <br> C.V | Remark |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  |  | $\mathrm{E}\left(\mathrm{R}_{\mathrm{P}}\right)$ | $\left(\sigma_{P}\right)$ | C.V. |
| SCB and NABIL | 0.6552 | 0.4904 | 0.7485 |  | Highest |  |
| NABIL and HBL | 0.3061 | 0.1959 | 0.6520 | Lowest | Lowest | Lowest |
| HBL and EBL | 0.3858 | 0.3103 | 0.8043 |  |  | Highest |
| EBL and SBI | 0.5673 | 0.4499 | 0.7931 |  |  |  |
| SBI and SCB | 0.6645 | 0.4778 | 0.7190 | Highest |  |  |

As per the above table portfolio of stock SBI and SCB enjoys greater returns then other portfolio but at same time NABIL and HBL has lower return. Portfolio of stocks SCB and NABIL has higher portfolio risk comparison of other bank and lower Portfolio risk of stocks NABIL and HBL. But in terms Portfolio C.V. of NABIL and HBL is best because it provides the lowest amount of risk on per unit of return. So rational investors invest on portfolio of stock NABIL and HBL .However a risk - lover investor invest on portfolio of stock SBI and SCB to get the highest return.

### 4.10 Systematic and unsystematic risk and its proportion

Systematic risk is the part of total risk and can not be diversified through the creation of portfolio. This risk creates from the systematic factors or market factors or macro economic factors like inflation, GDP, intt. rate as extra. It equality affects to the all company's common stock. However, unsystematic risk in diversifiable risk and can be minimized through the creation of portfolio. This risk creates from micro economic factors or unique factors to a company like inefficiency, Strikes sales policy, and production policy as extra.

The proportion of systematic and unsystematic risk indicates the percentage of systematic risk created from systematic or market factors and percentage of unsystematic risk created from company related factors.

Table 4.24

## Systematic and unsystematic risk and its proportion

| Stock | Systematic <br> risk | Unsystematic <br> risk | Proportion of <br> systematic risk | Proportion of <br> unsystematic <br> risk |
| :--- | :--- | :--- | :--- | :--- |
| SCB | 0.0469 | 0.1940 | 0.1947 | 0.8053 |
| NABIL | 0.3005 | 0.2205 | 0.5763 | 0.4237 |
| HBL | 0.0742 | 0.0266 | 0.7361 | 0.2639 |
| EBL | 0.1735 | 0.0909 | 0.8092 | 0.1908 |
| SBI | 0.1376 | 0.2661 | 0.3408 | 0.6592 |

The above table shows the systematic and unsystematic risk and it's proportion of different listed joint Venter commercial bank's common stock. The proportion of systematic risk of C.S. of EBL is higher than other banks i.e. $80.92 \%$. This means it indicates that out of total risk on stock of HBL's $80.92 \%$ is undiversifiable risk and created from systematic factors or market factors and the remaining $19.08 \%$ risk is diversifiable created from company related factors as well as the proportion of systematic risk of stock of SCB is lowest i.e. $19.47 \%$. This means the remaining $80.53 \%$ risk is diversifiable risk created from the company related factor's such as management inefficiency, strike, company's other different policies and such extras.

### 4.11 Major findings of the study

Major findings of the above calculation are presenting as follows:

- The expected return on common stock of NABIL is maximum i.e. $77.41 \%$, which is very high rate of return. Similarly, the expected rate of return of the C.S. of HBL is found minimum i.e. 41.76 \% other common stock having higher return of the C.S. of SCB, EBL and SBI is 65.59\%a $54.83 \%$ nd $64.51 \%$ respectively on the basis of sector wise comparison, the expected return of other sector is found higher i.e. $74.17 \%$ and that of manufacturing sector is found lower i.e.9.85\%.
- The S.D. of HBL is lower i.e. 0.3134 \& that of NABIL is higher i.e. 0.7218. So, the HBL C.S. is low risky whereas NABIL's C.S. is high risky. The S.D. of C.S. of SCB EBL, and SBI are $0.4909,0.4631$ and 0.6354 respectively. According to sector wise comparison, the S.D. of other sector is found higher i.e. 0.8421 and that of manufacturing sector is found lower that 0.0762 .
- The C.V. of SCB is lower that 0.7445 where as the C.V. of EBL is found higher that 1.2459 , the other common stock having higher C.V. of common stock of NABIL, HBL and SBI is $0.9324,0.7601$ and 0.9849 respectively. So, rational investor should invest on common stock of SCB.
- In the context of market capitalization, the commercial banking sector contributes the highest proportion i.e. $58.92 \%$ and the trading sector contributes the lowest proportion i.e. $0.30 \%$, similarly, the market capitalization of the development bank is finance company, insurance company, hotel, manufacturing and other company's is $5.29 \%, 8.39 \%$, $2.08 \% 0.94 \%, 1.50 \%$ and $22.57 \%$ respectively.
- In the context of market sensitivity, the return of C.S. of NABIL is found highly sensitive to the market during the study period. It is
because that it has high beta i.e. 1.6521 which is greater than 1. Similarly, the C.S. of SCB, HBL, EBL and SBI have positive beta, which implies that, the stock return move in the same direction but more then market return.
- By evaluating pricing situation for Capital Structure of five joint venture banks, it has been found that all C.S's expected rate of return is greater than required rate of return, all the bank's stock price evaluation is found under price.
- According to the correlation coefficient of NABIL's with other banks C.S. is found $>0$ and $\leq 1$. It implies that the return of the NABIL's C.S. and other bank's C.S moves in the same direction.
- The portfolio S.D of portfolio A is lower i.e. 0.6742 and that of C is higher i.e. 0.8070 the portfolio A is low risky whereas portfolio C is high risky. The portfolio S.D. of portfolio B is 07023.
- The expected returns on portfolio of stock $\operatorname{SBI}(\mathrm{E})$ and $\operatorname{SCB}(\mathrm{A})$ is maximum i.e. $66.61 \%$ which is high rate of return. Similarly, the expected returns on portfolio of stock $\operatorname{NABIL}(\mathrm{B})$ and $\operatorname{HBL}(\mathrm{C})$ is minimum i.e.30.61\%.
- The standard deviation of portfolio return of stock NABIL and HBL is lower i.e. 0.1959 and that of portfolio return of stock SCB and NABIL is higher i.e. 0.4904 . So, the portfolio of stock NABIL and HBL is low risky where as portfolio stock SCB and NABIL is high risky.
- The C.V. of portfolio stock SBI and SCB is lower i.e. 0.7190 whereas the C.V. of Portfolio stock HBL and EBL is higher i.e. 0.8043 .
- Systematic risk can not be diversified through creation of portfolio. It is occurred due to market factor. Unsystematic risk can be diversified through creation of portfolio. It is occurred due to internal management
factor. This study shows that EBL has high proportion of unsystematic risk i.e. $19.08 \%$ which can be minimized from internal management. Where as SCB has high proportion of systematic risk i.e. 80.92\%. This can not be minimized from internal management. C.S. of EBL is best among these banks due to its highest proportion of unsystematic risk.
- Most of the investors invest only keeping the return in the mind but they are found unable to calculate the risk factors of the security. Most of the Nepalese private investors invest in single security. Some of the investors use their fund in two or more securities. But it is found that they don't make any analysis of portfolio before selecting security. They invest their fund in different securities on the basis of expectation and assumption of individual securities rather than analysis of the effect of portfolio. It seems that they don't have knowledge of the risk diversification by using portfolio of their investment.


## CHAPTER-FIVE

## SUMMARY, CONCLUSION AND RECOMMENDATION

### 5.1 Summary

Risk and return analysis is the Fundamental part of Investment decision Investment decision is not a gamble and joke, but it is seriousness. It contains the different types of process as well as fundamental and technical analysis. Investment decision is made by the shareholders, creditors and managers. For making the investment decision, at first, Return is calculated and associated risk is also calculated. Finally, they are compared and a rational investment decision is made.

Therefore in recent days, risk and return is the central focus of finance. Before investment on any securities the risk and return analysis is performed. Being the speculative nature, common stock is taken for analyzing risk and return.

The common stock is most risky security. An investment in common stock of a company can not ensure the annual return and the return of the principal. Dividends are paid to stockholders only if there will be earning available to equity shareholders. In Nepal, there are not various types of securities but due to the development of banking industry and manufacturing industry, there is sufficient common stock for attracting Nepalese investors. Nepalese stock market is in emerging state. After restoration of democracy in 1990, it's developing is acceleration. After the Jana-andolan 2, the performance of stock market has been improved which is showed by the increasing trend of NEPSE. For this study five joint-ventures banks, listed in NEPSE, has been taken analysis of the risks and return in common stocks of these banks are mad in this study.

The relationship between risk and return is perception of the investors about risk and their demand for compensation. All the investors like to invest in non-risky assets. So, risk plays a vital role in the analysis of investment and to reach an investment decision. Higher the risk gives bigger premium and the
trade off between the two assumes a linear relationship between risk and risk premium.

The main objective of the study is to analyze the risk and return in common stock investment of Nepalese stock market. The study is focused on reference to analyze the risk and return in common stock investment. While analyzing the risk and return, brief review of related studies has been performed. Scientific methods are used in data analysis. Tables, graphs and diagrams are used to present the data and results more clearly. Both quantitative and qualitative analysis have performed by using statistical tools as well as performed by using statistical tools as well as personal judgment. Secondary data are collected from the NEPSE, NRB, SEBON and other related banks and their websites. Other subjective types of information are collected through the officials of NRB, SEBON and NEPSE. Findings of analysis are summarized and conclusion is drawn as follows.

### 5.2 Conclusion

The study made on risk and return analysis of common stocks investment of listed joint venture banks is based on secondary data from fiscal year 2002/03 to fiscal year 2008/09. In this study, expected rate of return of NABIL's stock is highest i.e. $77.41 \%$ in commercial banks. Like wise in terms of standard deviation, NABIL has the highest risk i.e 0.7218 in commercial bank and but, generally standard deviation is not used to determining risk, as there may be different expected return. Therefore, the coefficient of variance is considered as the best mechanism to measure the risk. On the basis of C.V. EBL stock seems to be the most risky with 1.2459 and SBC is low risky with 0.7445 . So, rational investor should invest on common stock of SCB. From the findings of the different banks beta coefficient of all the banks are very much volatile .On the other hand, it is found that the required rates of return of all the above-mentioned banks is lower than its expected rate or return. It means that all the sample banks stocks are under priced. Similarly, the study made to analyze the diversiable and undiversifiable risk reflects that all the
samples stock except have high systematic risk. And such risk cannot be diversified on minimized. This type of stock is known as aggressive stock. Thus, it is reflected format he above study that has the highest unsystematic risk, which can be minimized or eliminated. Such type of stock can be mentioned as defensive stock. Correlation between the stock in NABIL and SBI is highest i.e. 0.8879 . Thus, this portfolio can reduce risk. From the view point of return on portfolio investing in SBI and SCB is beneficial. While considering the risk portfolio consisting NABIL and HBL has the lowest risk.

### 5.3 Recommendations

The focus of the study is to assess risk associated with return on common stock considering individual and private investors. The following facts are recommended on the basis of data analysis and major findings of this research.

- Investor who wants high return should invest in SCB and NABIL common stock, irrespective of risk.
- Risk adverse investor (investors who don't want to take higher risk) should invest in HBL \& EBL common stock.
- It is recommended to shareholders that investment in SCB because its coefficient of variation is minimum by 0.7445 times.
- So, there is positive relationship between risk and return. Therefore the investor should select riskier bank to get higher return and less risky bank to get lower return.
- As per the study, common stock of SCB, NABIL, HBL, EBL and SBI is under price. So these stocks should be buying.
- The portfolio assets which has been made in the study, has the positive return therefore the investor can select these assets for portfolio.
- Risk adverse investor should make the portfolio of banks between NABIL and HBL and HBL and EBL common stock respectively.
- As risk and return are positively correlated they are requested to assess these factors as an important and recommended to analyze these factors with different financial tools and techniques.
- Nepalese investors are requested to develop an appropriate basis for their investment common stock as per the requirement. They are recommended to invest their fund by performing multiple analyses.


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## APPENDIX

Realized return, standard deviation, expected return and C.V. of different Sector.

AT-1A: Calculation of RRR, ERR, SD and C.V. of Commercial bank .

| Fiscal year | Commercial <br> Bank Index | $\mathrm{R}_{\mathrm{j}}=\frac{R_{t}-R_{t-1}}{R_{t-1}}$ | $\left(R_{j}-\bar{R}_{j}\right)$ | $\left(R_{j}-\bar{R}_{j}\right)^{2}$ |
| :---: | :---: | :---: | :---: | :---: |
| $2002 / 03$ | 199.90 | - | - | - |
| $2003 / 04$ | 231.97 | 0.1604 | -0.1321 | 0.0175 |
| $2004 / 05$ | 304.64 | 0.3133 | -0.0208 | 0.0004 |
| $2005 / 06$ | 437.49 | 0.4361 | 0.1436 | 0.0206 |
| $2006 / 07$ | 789.21 | 0.8039 | 0.5114 | 0.2615 |
| $2007 / 08$ | 985.70 | 0.2488 | -0.0437 | 0.0019 |
| $2008 / 09$ | 780.87 | -0.2078 | -0.5003 | 0.2503 |
| Total |  | $\Sigma R_{j}=1.7547$ |  | $\Sigma\left(R_{j}-\bar{R}_{j}\right)^{2}$ |
|  |  |  | $=0.5522$ |  |

We have,

Expected return $\mathrm{E}\left(\mathrm{R}_{\mathrm{j}}\right)=\frac{\Sigma R_{j}}{n} \quad=\frac{1.7547}{6}=0.2925$
Standard deviation $\left(\sigma_{\mathrm{j}}\right)=\sqrt{\frac{\sum(\mathrm{Rj}-\overline{\mathrm{R}} \mathrm{j})^{2}}{n-1}}=\sqrt{\frac{0.5522}{6-1}}=0.3323$

Coefficient Variation (C.V.) $=\frac{\sigma_{j}}{\overline{\mathrm{R}}_{\mathrm{j}}}=\frac{0.3323}{0.2925}=1.1361$

AT-1B: Calculation of RRR, ERR, SD and C.V. of Mfg. \& Proc. Company.

| Fiscal year | Mfg. \& Proc. <br> Index | $\mathrm{R}_{\mathrm{j}}=\frac{R_{t}-R_{t-1}}{R_{t-1}}$ | $\left(R_{j}-\bar{R}_{j}\right)$ | $\left(R_{j}-\bar{R}_{j}\right)^{2}$ |
| :---: | :---: | :---: | :---: | :---: |
| $2002 / 03$ | 250.13 | - | - | - |
| $2003 / 04$ | 255.58 | 0.0218 | -0.0762 | 0.0059 |
| $2004 / 05$ | 276.50 | 0.0819 | -0.0166 | 0.0003 |
| $2005 / 06$ | 301.11 | 0.0890 | 0.0095 | 0.00009 |
| $2006 / 07$ | 348.63 | 0.1578 | 0.0593 | 0.0035 |
| $2007 / 08$ | 423.70 | 0.2153 | 0.1168 | 0.0136 |
| $2008 / 09$ | 434.32 | 0.0251 | -0.0734 | 0.0059 |
| Total |  | $\Sigma R_{j}=0.5909$ |  | $\Sigma\left(R_{j}-\bar{R}_{j}\right)^{2}$ |
|  |  |  | $=0.02879$ |  |

We have,
Expected return $\mathrm{E}\left(\mathrm{R}_{\mathrm{j}}\right)=\frac{\Sigma R_{j}}{n} \quad=\frac{0.5909}{6}=0.0985$
Standard deviation $\left(\sigma_{\mathrm{j}}\right)=\sqrt{\frac{\sum(\mathrm{Rj}-\overline{\mathrm{R}} \mathrm{j})^{2}}{n-1}}=\sqrt{\frac{0.02879}{6-1}}=0.0762$

Coefficient Variation (C.V.) $=\frac{\sigma_{j}}{\bar{R}_{j}}=\frac{0.0762}{0.0983}=0.7736$

AT-1C: Calculation of RRR, ERR, SD and C.V. of Hotel.

| Fiscal year | Hotel Index | $\mathrm{R}_{\mathrm{j}}=\frac{R_{t}-R_{t-1}}{R_{t-1}}$ | $\left(R_{j}-\bar{R}_{j}\right)$ | $\left(R_{j}-\bar{R}_{j}\right)^{2}$ |
| :---: | :---: | :---: | :---: | :---: |
| $2002 / 03$ | 196.68 | - | - | - |
| $2003 / 04$ | 184.41 | 0.0624 | -0.0875 | 0.0077 |
| $2004 / 05$ | 178.00 | -0.0348 | -0.1847 | 0.0341 |
| $2005 / 06$ | 180.77 | 0.0156 | -0.1343 | 0.018 |
| $2006 / 07$ | 251.47 | 0.3911 | 0.2412 | 0.0582 |
| $2007 / 08$ | 370.90 | 0.4749 | 0.295 | 0.0870 |
| $2008 / 09$ | 367.42 | -0.0094 | -0.1405 | 0.0197 |
| Total |  | $\Sigma R_{j}=0.8998$ |  | $\Sigma\left(R_{j}-\bar{R}_{j}\right)^{2}$ |
|  |  |  | $=0.217$ |  |

We have,

Expected return $\mathrm{E}\left(\mathrm{R}_{\mathrm{j}}\right)=\frac{\Sigma R_{j}}{n}=\frac{0.8998}{6}=0.1499$
Standard deviation $\left(\sigma_{\mathrm{j}}\right)=\sqrt{\frac{\sum(\mathrm{Rj}-\overline{\mathrm{R}} \mathrm{j})^{2}}{n-1}}=\sqrt{\frac{0.217}{6-1}}=0.2083$

Coefficient Variation (C.V.) $=\frac{\sigma_{j}}{\overline{\mathrm{R}}_{\mathrm{j}}}=\frac{0.2083}{0.1499}=1.3896$

AT-1D: Calculation of RRR, ERR, SD and C.V. of Other.

| Fiscal year | Other Index | $\mathrm{R}_{\mathrm{j}}=\frac{R_{t}-R_{t-1}}{R_{t-1}}$ | $\left(R_{j}-\bar{R}_{j}\right)$ | $\left(R_{j}-\bar{R}_{j}\right)^{2}$ |
| :---: | :---: | :---: | :---: | :---: |
| $2002 / 03$ | 48.56 | - | - | - |
| $2003 / 04$ | 142.61 | 1.9368 | 1.1951 | 1.4283 |
| $2004 / 05$ | 347.65 | 1.4378 | 0.6961 | 0.4846 |
| $2005 / 06$ | 410.00 | 0.1793 | -0.5624 | 0.3163 |
| $2006 / 07$ | 818.12 | 0.9954 | 0.2537 | 0.0644 |
| $2007 / 08$ | 768.30 | -0.0609 | 0.8026 | 0.6442 |
| $2008 / 09$ | 738.99 | -0.0382 | -0.7794 | 0.6082 |
| Total |  | $\Sigma R_{j}=4.4502$ |  | $\Sigma\left(R_{j}-\bar{R}_{j}\right)^{2}$ |
|  |  |  | $=3.546$ |  |

We have,

Expected return $\mathrm{E}\left(\mathrm{R}_{\mathrm{j}}\right)=\frac{\Sigma R_{j}}{n} \quad=\frac{4.4502}{6}=0.7417$
Standard deviation $\left(\sigma_{\mathrm{j}}\right)=\sqrt{\frac{\sum(\mathrm{Rj}-\overline{\mathrm{R}} \mathrm{j})^{2}}{n-1}}=\sqrt{\frac{3.546}{6-1}}=0.8421$

Coefficient Variation (C.V.) $=\frac{\sigma_{j}}{\overline{\mathrm{R}}_{\mathrm{j}}}=\frac{0.8421}{0.7417}=1.1354$

AT-1E: Calculation of RRR, ERR, SD and C.V. of Hydro Power.

| Fiscal year | Hydro Power <br> Index | $\mathrm{R}_{\mathrm{j}}=\frac{R_{t}-R_{t-1}}{R_{t-1}}$ |
| :--- | :--- | :--- |$\quad\left(R_{j}-\bar{R}_{j}\right) \quad\left(R_{j}-\bar{R}_{j}\right)^{2}$


| $2002 / 03$ | - | - | - | - |
| :---: | :---: | :---: | :---: | :---: |
| $2003 / 04$ | - | - | - | - |
| $2004 / 05$ | - | - | - | - |
| $2005 / 06$ | - | - | - | - |
| $2006 / 07$ | 847.93 | - | - | - |
| $2007 / 08$ | 1324.00 | 0.5615 | 0.3862 | 0.1492 |
| $2008 / 09$ | 1044.81 | -0.2109 | 0.3862 | 0.1492 |
| Total |  | $\Sigma R_{j}=0.3506$ |  | $\Sigma\left(R_{j}-\bar{R}_{j}\right)^{2}$ |
|  |  |  |  | $=0.2984$ |

We have,

Expected return $\mathrm{E}\left(\mathrm{R}_{\mathrm{j}}\right)=\frac{\Sigma R_{j}}{n} \quad=\frac{0.3506}{2}=0.1753$

Standard deviation $\left(\sigma_{\mathrm{j}}\right)=\sqrt{\frac{\sum(\mathrm{Rj}-\overline{\mathrm{R}} \mathrm{j})^{2}}{n-1}}=\sqrt{\frac{0.2984}{2-1}}=0.5463$

Coefficient Variation (C.V.) $=\frac{\sigma_{j}}{\overline{\mathrm{R}}_{\mathrm{j}}}=\frac{0.5463}{0.1753}=3.1164$

AT-1F: Calculation of RRR, ERR, SD and C.V. of Trading.

| Fiscal year | Trading Index | $\mathrm{R}_{\mathrm{j}}=\frac{R_{t}-R_{t-1}}{R_{t-1}}$ | $\left(R_{j}-\bar{R}_{j}\right)$ | $\left(R_{j}-\bar{R}_{j}\right)^{2}$ |
| :---: | :---: | :---: | :---: | :---: |
| $2002 / 03$ | 94.56 | - | - | - |


| $2003 / 04$ | 95.01 | 0.0048 | -0.2145 | 0.046 |
| :---: | :---: | :---: | :---: | :---: |
| $2004 / 05$ | 123.20 | 0.2967 | 0.0774 | 0.0059 |
| $2005 / 06$ | 148.11 | 0.2029 | -0.0171 | 0.0003 |
| $2006 / 07$ | 155.37 | 0.0491 | -0.1702 | 0.0289 |
| $2007 / 08$ | 204.10 | 0.3136 | 0.0943 | 0.0089 |
| $2008 / 09$ | 295.83 | 0.4494 | 0.2301 | 0.0529 |
| Total |  | $\Sigma R_{j}=1.3159$ |  | $\Sigma\left(R_{j}-\bar{R}_{j}\right)^{2}$ <br> $=0.1429$ |

We have,

Expected return $\mathrm{E}\left(\mathrm{R}_{\mathrm{j}}\right)=\frac{\Sigma R_{j}}{n} \quad=\frac{1.3158}{6}=0.2193$

Standard deviation $\left(\sigma_{\mathrm{j}}\right)=\sqrt{\frac{\sum(\mathrm{Rj}-\overline{\mathrm{R}} \mathrm{j})^{2}}{n-1}}=\sqrt{\frac{0.1429}{6-1}}=0.1691$

Coefficient Variation (C.V.) $=\frac{\sigma_{\mathrm{j}}}{\overline{\mathrm{R}}_{\mathrm{j}}}=\frac{0.1691}{0.2193}=0.7711$

AT-1G: Calculation of RRR, ERR, SD and C.V. of Insurance.

| Fiscal year | Insurance <br> Index | $\mathrm{R}_{\mathrm{j}}=\frac{R_{t}-R_{t-1}}{R_{t-1}}$ | $\left(R_{j}-\bar{R}_{j}\right)$ | $\left(R_{j}-\bar{R}_{j}\right)^{2}$ |
| :---: | :---: | :---: | :---: | :---: |
| $2002 / 03$ | 240.64 | - | - | - |
| $2003 / 04$ | 237.62 | -0.0125 | -0.2241 | 0.0502 |


| $2004 / 05$ | 320.24 | 0.3477 | 0.1361 | 0.0185 |
| :---: | :---: | :---: | :---: | :---: |
| $2005 / 06$ | 381.25 | 0.1905 | -0.0211 | 0.0005 |
| $2006 / 07$ | 612.46 | 0.6065 | 0.3949 | 0.1559 |
| $2007 / 08$ | 817.3 | 0.3345 | 0.1229 | 0.0151 |
| $2008 / 09$ | 656.42 | -0.1969 | -0.4085 | 0.1669 |
| Total |  | $\Sigma R_{j}=1.2698$ |  | $\Sigma\left(R_{j}-\bar{R}_{j}\right)^{2}$ <br> $=0.4071$ |

We have,

Expected return $\mathrm{E}\left(\mathrm{R}_{\mathrm{j}}\right)=\frac{\Sigma R_{j}}{n} \quad=\frac{1.2698}{6}=0.2116$
Standard deviation $\left(\sigma_{\mathrm{j}}\right)=\sqrt{\frac{\sum(\mathrm{Rj}-\overline{\mathrm{R}} \mathrm{j})^{2}}{n-1}}=\sqrt{\frac{0.4071}{6-1}}=0.2853$

Coefficient Variation (C.V.) $=\frac{\sigma_{j}}{\bar{R}_{j}}=\frac{0.2853}{0.2116}=1.3483$

AT-1H: Calculation of RRR, ERR, SD and C.V. of Finance.

| Fiscal year | Finance Index | $\mathrm{R}_{\mathrm{j}}=\frac{R_{t}-R_{t-1}}{R_{t-1}}$ | $\left(R_{j}-\bar{R}_{j}\right)$ | $\left(R_{j}-\bar{R}_{j}\right)^{2}$ |
| :---: | :---: | :---: | :---: | :---: |
| $2002 / 03$ | 208.14 | - | - | - |
| $2003 / 04$ | 195.99 | -0.0584 | -0.4092 | 0.1675 |
| $2004 / 05$ | 228.39 | 0.1653 | 0.1855 | 0.0344 |


| $2005 / 06$ | 261.37 | 0.1444 | -0.2064 | 0.0426 |
| :---: | :---: | :---: | :---: | :---: |
| $2006 / 07$ | 471.82 | 0.8052 | 0.4544 | 0.2065 |
| $2007 / 08$ | 1152.70 | 1.4431 | 1.0923 | 0.1931 |
| $2008 / 09$ | 697.61 | -0.3948 | -0.7457 | 0.5561 |
| Total |  | $\Sigma R_{j}=2.1048$ |  | $\Sigma\left(R_{j}-\bar{R}_{j}\right)^{2}$ <br> $=2.2002$ |

We have,
Expected return $\mathrm{E}\left(\mathrm{R}_{\mathrm{j}}\right)=\frac{\Sigma R_{j}}{n} \quad=\frac{2.1048}{6}=0.3508$

Standard deviation $\left(\sigma_{\mathrm{j}}\right)=\sqrt{\frac{\sum(\mathrm{Rj}-\overline{\mathrm{R}} \mathrm{j})^{2}}{n-1}}=\sqrt{\frac{2.2002}{6-1}}=0.6634$

Coefficient Variation (C.V.) $=\frac{\sigma_{j}}{\overline{\mathrm{R}}_{\mathrm{j}}}=\frac{0.6635}{0.3508}=1.8911$

AT-1I: Calculation of RRR, ERR, SD and C.V. of Development Bank.

| Fiscal year | Development <br> Bank Index | $\mathrm{R}_{\mathrm{j}}=\frac{R_{t}-R_{t-1}}{R_{t-1}}$ | $\left(R_{j}-\bar{R}_{j}\right)$ | $\left(R_{j}-\bar{R}_{j}\right)^{2}$ |
| :---: | :---: | :---: | :---: | :---: |
| $2002 / 03$ | 246.72 | - | - | - |
| $2003 / 04$ | 190.03 | -0.2298 | -0.5122 | 0.2629 |
| $2004 / 05$ | 237.86 | 0.2517 | -0.0312 | 0.0009 |
| $2005 / 06$ | 294.40 | 0.2377 | -0.0452 | 0.0021 |


| $2006 / 07$ | 539.66 | 0.4545 | 0.1716 | 0.0295 |
| :---: | :---: | :---: | :---: | :---: |
| $2007 / 08$ | 1285.9 | 1.3828 | 1.0999 | 1.2098 |
| $2008 / 09$ | 772.56 | -0.3992 | -0.6821 | 0.4653 |
| Total |  | $\Sigma R_{j}=1.6977$ |  | $\Sigma\left(R_{j}-\bar{R}_{j}\right)^{2}$ <br> $=1.9705$ |

We have,

Expected return $\mathrm{E}\left(\mathrm{R}_{\mathrm{j}}\right)=\frac{\Sigma R_{j}}{n} \quad=\frac{1.6977}{6}=0.2829$
Standard deviation $\left(\sigma_{\mathrm{j}}\right)=\sqrt{\frac{\sum(\operatorname{Rj}-\overline{\mathrm{R}} \mathrm{j})^{2}}{n-1}}=\sqrt{\frac{1.9705}{6-1}}=0.3941$

Coefficient Variation (C.V.) $=\frac{\sigma_{j}}{\overline{\mathrm{R}}_{\mathrm{j}}}=\frac{0.6278}{0.2829}=2.2192$

AT-2A: Calculation Beta coefficient of the common stock of SCB.

| Fiscal Year | $\left(R_{i}-\overline{R_{i}}\right)$ | $\left(R_{m}-\overline{R_{m}}\right)$ | $\left(R_{i}-\overline{R_{i}}\right)\left(R_{m}-\overline{R_{m}}\right)$ |
| :---: | :---: | :---: | :---: |
| $2003 / 04$ | -0.5283 | -0.1959 | 0.1035 |
| $2004 / 05$ | -0.2468 | 0.0113 | -0.0028 |
| $2005 / 06$ | 0.2574 | 0.0696 | 0.0179 |
| $2006 / 07$ | 0.8293 | 0.4883 | 0.4049 |
| $2007 / 08$ | 0.0211 | 0.1288 | 0.0027 |
| $2008 / 09$ | 0.3322 | -0.5022 | -0.1668 |
| Total |  |  | $\sum\left[\left(R_{i}-\overline{R_{i}}\right)\left(R_{m}-\overline{R_{m}}\right)\right.$ <br> $=0.3594$ |

We have,

$$
\begin{aligned}
\operatorname{cov}\left(R_{i}, R_{m}\right)= & \frac{\sum\left[\left(R_{i}-\overline{R_{i}}\right)\left(R_{m}-\bar{R}_{m}\right)\right]}{n-1} \\
& =\frac{0.3594}{6-1}=0.0719
\end{aligned}
$$

and,

$$
\begin{aligned}
\beta i= & \frac{\operatorname{cov}\left(R_{i}, R_{m}\right)}{\sigma_{m}^{2}} \\
& =\frac{0.0719}{(0.3318)^{2}}=0.6530
\end{aligned}
$$

Where,
$\mathrm{n}=$ Number of observation $=6$
$\mathrm{R}_{\mathrm{i}}=$ Return on stock 'i' (i.e. SCB)
$B_{i}=$ Beta of SCB's common stock.
$\mathrm{R}_{\mathrm{m}}=$ Return of Market
$\sigma_{\mathrm{m}}{ }^{2}=$ Variance of market

AT-2B: Calculation Beta coefficient of the common stock of HBL.

| Fiscal Year | $\left(R_{i}-\overline{R_{i}}\right)$ | $\left(R_{m}-\overline{R_{m}}\right)$ | $\left(R_{i}-\overline{R_{i}}\right)\left(R_{m}-\overline{R_{m}}\right)$ |
| :---: | :---: | :---: | :---: |
| $2003 / 04$ | -0.1927 | -0.1959 | 0.0377 |
| $2004 / 05$ | -0.0467 | 0.0113 | -0.0005 |
| $2005 / 06$ | -0.00947 | 0.0696 | 0.0066 |
| $2006 / 07$ | 0.6279 | 0.4883 | 0.3066 |
| $2007 / 08$ | -0.0519 | 0.1288 | -0.0067 |
| $2008 / 09$ | -0.2421 | -0.5022 | 0.1216 |
| Total |  |  | $\sum\left[\left(R_{i}-\overline{R_{i}}\right)\left(R_{m}-\overline{R_{m}}\right)\right.$ <br> $=0.4521$ |

We have,

$$
\begin{aligned}
\operatorname{cov}\left(R_{i}, R_{m}\right)= & \frac{\sum\left[\left(R_{i}-\overline{R_{i}}\right)\left(R_{m}-\bar{R}_{m}\right)\right]}{n-1} \\
& =\frac{0.4521}{6-1}=0.0904
\end{aligned}
$$

and,

$$
\begin{aligned}
\beta i= & \frac{\operatorname{cov}\left(R_{i}, R_{m}\right)}{\sigma_{m}^{2}} \\
& =\frac{0.0904}{0.1101}=0.8211
\end{aligned}
$$

Where,
$\mathrm{n}=$ Number of observation $=6$
$\mathrm{R}_{\mathrm{i}}=$ Return on stock ' i ' (i.e. HBL)
$B_{i}=$ Beta of HBL's common stock.
$\mathrm{R}_{\mathrm{m}}=$ Return of Market
$\sigma_{\mathrm{m}}{ }^{2}=$ Variance of market

AT-2C: Calculation Beta coefficient of the common stock of EBL.

| Fiscal Year | $\left(R_{i}-\overline{R_{i}}\right)$ | $\left(R_{m}-\overline{R_{m}}\right)$ | $\left(R_{i}-\overline{R_{i}}\right)\left(R_{m}-\overline{R_{m}}\right)$ |
| :---: | :---: | :---: | :---: |
| $2003 / 04$ | 0.0247 | -0.1959 | -0.0048 |
| $2004 / 05$ | 0.1367 | 0.0113 | 0.0015 |
| $2005 / 06$ | 0.0655 | 0.0696 | 0.0046 |
| $2006 / 07$ | 0.6753 | 0.4883 | 0.3297 |
| $2007 / 08$ | -0.1502 | 0.1288 | -0.0193 |
| $2008 / 09$ | -0.7549 | -0.5022 | 0.3791 |
| Total |  |  | $\sum\left[\left(R_{i}-\overline{R_{i}}\right)\left(R_{m}-\overline{R_{m}}\right)\right.$ <br> $=0.6908$ |

We have,

$$
\begin{aligned}
\operatorname{cov}\left(R_{i}, R_{m}\right)= & \frac{\sum\left[\left(R_{i}-\overline{R_{i}}\right)\left(R_{m}-\bar{R}_{m}\right)\right]}{n-1} \\
& =\frac{0.6908}{6-1}=0.1382
\end{aligned}
$$

and,

$$
\begin{aligned}
\beta i= & \frac{\operatorname{cov}\left(R_{i}, R_{m}\right)}{\sigma_{m}^{2}} \\
& =\frac{0.1382}{0.1101}=1.2552
\end{aligned}
$$

Where,
$\mathrm{n}=$ Number of observation $=6$
$\mathrm{R}_{\mathrm{i}}=$ Return on stock 'i' (i.e. EBL)
$B_{i}=$ Beta of EBL's common stock.
$\mathrm{R}_{\mathrm{m}}=$ Return of Market
$\sigma_{\mathrm{m}}{ }^{2}=$ Variance of market

AT-2D: Calculation Beta coefficient of the common stock of SBI.

| Fiscal Year | $\left(R_{i}-\overline{R_{i}}\right)$ | $\left(R_{m}-\overline{R_{m}}\right)$ | $\left(R_{i}-\overline{R_{i}}\right)\left(R_{m}-\overline{R_{m}}\right)$ |
| :---: | :---: | :---: | :---: |
| $2003 / 04$ | -0.4412 | -0.1959 | 0.0864 |
| $2004 / 05$ | -0.5539 | 0.0113 | -0.0063 |
| $2005 / 06$ | 0.1967 | 0.0696 | 0.0137 |
| $2006 / 07$ | 1.1612 | 0.4883 | 0.5670 |
| $2007 / 08$ | -0.3602 | 0.1288 | -0.0464 |
| $2008 / 09$ | -0.0024 | -0.5022 | 0.0012 |
| Total |  |  | $\sum\left[\left(R_{i}-\overline{R_{i}}\right)\left(R_{m}-\overline{R_{m}}\right)\right.$ <br> $=0.6156$ |

We have,

$$
\begin{aligned}
\operatorname{cov}\left(R_{i}, R_{m}\right)= & \frac{\sum\left[\left(R_{i}-\overline{R_{i}}\right)\left(R_{m}-\bar{R}_{m}\right)\right]}{n-1} \\
& =\frac{0.6156}{6-1}=0.1231
\end{aligned}
$$

and,

$$
\begin{aligned}
\beta i= & \frac{\operatorname{cov}\left(R_{i}, R_{m}\right)}{\sigma_{m}^{2}} \\
& =\frac{0.1231}{0.1101}=1.1181
\end{aligned}
$$

Where,
$\mathrm{n}=$ Number of observation $=6$
$\mathrm{R}_{\mathrm{i}}=$ Return on stock ' i ' (i.e. SBI)
$B_{i}=$ Beta of SBI's common stock.
$\mathrm{R}_{\mathrm{m}}=$ Return of Market
$\sigma_{\mathrm{m}}{ }^{2}=$ Variance of market

## AT-3A: Calculation of correlation between the stock of $\operatorname{SCB}(A)$ and NABIL(B).

| Fiscal Year | $\left(R_{A}-\overline{R_{A}}\right)$ | $\left(R_{B}-\overline{R_{B}}\right)$ | $\left(R_{A}-\overline{R_{A}}\right)\left(R_{B}-\overline{R_{B}}\right)$ |
| :---: | :---: | :---: | :---: |
| $2003 / 04$ | -0.5283 | -0.3349 | 0.1769 |
| $2004 / 05$ | -0.2468 | -0.1991 | 0.0491 |
| $2005 / 06$ | 0.2574 | -0.2292 | -0.0589 |
| $2006 / 07$ | 0.8293 | 1.467 | 1.2166 |
| $2007 / 08$ | 0.0211 | -0.3296 | -0.0069 |
| $2008 / 09$ | 0.3322 | -0.3744 | -0.1244 |
| Total |  |  | $\sum\left[\left(R_{A}-\overline{R_{A}}\right)\left(R_{B}-\overline{R_{B}}\right)\right.$ <br> $=1.2524$ |

We have,

$$
\begin{aligned}
& \operatorname{cov}\left(R_{A}, R_{B}\right)=\frac{\sum\left[\left(R_{A}-\bar{R}_{A}\right)\left(R_{B}-\bar{R}_{B}\right)\right]}{n-1} \\
&=\frac{1.2524}{6-1} \\
&=0.2505 \\
& \text { and, } \\
& r_{A B}=\frac{\operatorname{cov}\left(R_{A}, R_{B}\right)}{\sigma_{A} \sigma_{B}} \\
&=\frac{0.2505}{0.4909 \times 0.7218} \\
&=0.7070
\end{aligned}
$$

Where,
$\mathrm{R}_{\mathrm{A}}=$ Return on common stock of SCB
$\sigma_{\mathrm{A}}=$ Standard deviation of return on C.S. of SCB
$\mathrm{R}_{\mathrm{B}}=$ Return on stock of NABIL
$\sigma_{B}=$ Standard deviation of return on C.S. of NABIL
$\mathrm{r}_{\mathrm{AB}}=$ Correlation between the rate of return on common stock of SCB and NABIL

## AT-3B: Calculation of correlation between the stock of $\operatorname{SCB}(A)$ and HBL(C).

| Fiscal Year | $\left(R_{A}-\overline{R_{A}}\right)$ | $\left(R_{C}-\overline{R_{C}}\right)$ | $\left(R_{A}-\overline{R_{A}}\right)\left(R_{C}-\overline{R_{C}}\right)$ |
| :---: | :---: | :---: | :---: |
| $2003 / 04$ | -0.5283 | -0.1927 | 0.1018 |
| $2004 / 05$ | -0.2468 | -0.0467 | -0.0115 |
| $2005 / 06$ | 0.2574 | -0.00947 | -0.0244 |
| $2006 / 07$ | 0.8293 | 0.6279 | 0.5207 |
| $2007 / 08$ | 0.0211 | -0.0519 | -0.0011 |
| $2008 / 09$ | 0.3322 | -0.2421 | -0.0804 |
| Total |  |  | $\sum\left[\left(R_{A}-\overline{R_{A}}\right)\left(R_{C}-\overline{R_{C}}\right)\right.$ <br> $=0.5051$ |

We have,

$$
\begin{aligned}
\operatorname{cov}\left(R_{A}, R_{C}\right) & =\frac{\sum\left[\left(R_{A}-\bar{R}_{A}\right)\left(R_{C}-\bar{R}_{C}\right)\right]}{n-1} \\
& =\frac{0.5051}{6-1} \\
& =0.10102
\end{aligned}
$$

and,

$$
\begin{aligned}
r_{A C} \quad & =\frac{\operatorname{cov}\left(R_{A}, R_{C}\right)}{\sigma_{A} \sigma_{C}} \\
& =\frac{0.10102}{0.4909 \times 0.3174} \\
& =0.6484
\end{aligned}
$$

Where,
$\mathrm{R}_{\mathrm{A}}=$ Return on common stock of SCB
$\sigma_{\mathrm{A}}=$ Standard deviation of return on C.S. of SCB
$\mathrm{R}_{\mathrm{C}}=$ Return on stock of HBL
$\sigma_{\mathrm{C}}=$ Standard deviation of return on C.S. of HBL
$\mathrm{r}_{\mathrm{AC}}=$ Correlation between the rate of return on common stock of SCB and HBL

AT-3C: Calculation of correlation between the stock of $\operatorname{SCB}(A)$ and EBL(D).

| Fiscal Year | $\left(R_{A}-\overline{R_{A}}\right)$ | $\left(R_{D}-\overline{R_{D}}\right)$ | $\left(R_{A}-\overline{R_{A}}\right)\left(R_{D}-\overline{R_{D}}\right)$ |
| :---: | :---: | :---: | :---: |
| $2003 / 04$ | -0.5283 | 0.0247 | -0.0131 |
| $2004 / 05$ | -0.2468 | 0.1367 | -0.0337 |
| $2005 / 06$ | 0.2574 | 0.0655 | 0.0169 |
| $2006 / 07$ | 0.8293 | 0.6753 | 0.5600 |
| $2007 / 08$ | 0.0211 | -0.1502 | -0.00032 |
| $2008 / 09$ | 0.3322 | -0.7549 | -0.2508 |
| Total |  |  | $\sum\left[\left(R_{A}-\overline{R_{A}}\right)\left(R_{D}-\overline{R_{D}}\right)\right.$ <br> $=0.2761$ |

We have,

$$
\begin{aligned}
\operatorname{cov}\left(R_{A}, R_{D}\right) & =\frac{\sum\left[\left(R_{A}-\bar{R}_{A}\right)\left(R_{D}-\bar{R}_{D}\right)\right]}{n-1} \\
& =\frac{0.2761}{6-1} \\
& =0.0552
\end{aligned}
$$

and,

$$
\begin{aligned}
r_{A D} \quad & =\frac{\operatorname{cov}\left(R_{A}, R_{D}\right)}{\sigma_{A} \sigma_{D}} \\
& =\frac{0.0552}{0.4909 \times 0.4631} \\
& =0.2428
\end{aligned}
$$

Where,
$\mathrm{R}_{\mathrm{A}}=$ Return on common stock of SCB
$\sigma_{D}=$ Standard deviation of return on C.S. of EBL
$R_{D}=$ Return on stock of HBL
$\sigma_{D}=$ Standard deviation of return on C.S. of EBL
$\mathrm{r}_{\mathrm{AD}}=$ Correlation between the rate of return on common stock of SCB and EBL

AT-3D: Calculation of correlation between the stock of $\operatorname{SCB}(A)$ and SBI(E).

| Fiscal Year | $\left(R_{A}-\overline{R_{A}}\right)$ | $\left(R_{E}-\overline{R_{E}}\right)$ | $\left(R_{A}-\overline{R_{A}}\right)\left(R_{E}-\overline{R_{E}}\right)$ |
| :---: | :---: | :---: | :---: |
| $2003 / 04$ | -0.5283 | 0.0247 | -0.0131 |
| $2004 / 05$ | -0.2468 | 0.1367 | -0.0337 |
| $2005 / 06$ | 0.2574 | 0.0655 | 0.0169 |
| $2006 / 07$ | 0.8293 | 0.6753 | 0.5600 |
| $2007 / 08$ | 0.0211 | -0.1502 | -0.00032 |
| $2008 / 09$ | 0.3322 | -0.7549 | -0.2508 |
| Total |  |  | $\sum\left[\left(R_{A}-\overline{R_{A}}\right)\left(R_{E}-\overline{R_{E}}\right)\right.$ <br> $=1.3749$ |

We have,

$$
\begin{aligned}
\operatorname{cov}\left(R_{A}, R_{E}\right) & =\frac{\sum\left[\left(R_{A}-\bar{R}_{A}\right)\left(R_{E}-\bar{R}_{E}\right)\right]}{n-1} \\
& =\frac{1.3749}{6-1} \\
& =0.2749
\end{aligned}
$$

and,

$$
\begin{aligned}
r_{A E} \quad & =\frac{\operatorname{cov}\left(R_{A}, R_{E}\right)}{\sigma_{A} \sigma_{E}} \\
& =\frac{0.2749}{0.4909 \times 0.6354} \\
& =0.8813
\end{aligned}
$$

Where,
$\mathrm{R}_{\mathrm{A}}=$ Return on common stock of SCB
$\sigma_{\mathrm{A}}=$ Standard deviation of return on C.S. of SCB
$\mathrm{R}_{\mathrm{E}}=$ Return on stock of SBI
$\sigma_{\mathrm{E}}=$ Standard deviation of return on C.S. of SBI
$\mathrm{R}_{\mathrm{AE}}=$ Correlation between the rate of return on common stock of SCB and SBI

AT-3E: Calculation of correlation between the stock of NABIL(B) and HBL(C).

| Fiscal Year | $\left(R_{B}-\overline{R_{B}}\right)$ | $\left(R_{C}-\overline{R_{C}}\right)$ | $\left(R_{B}-\overline{R_{B}}\right)\left(R_{C}-\overline{R_{C}}\right)$ |
| :---: | :---: | :---: | :---: |
| $2003 / 04$ | -0.3349 | -0.1927 | 0.0645 |
| $2004 / 05$ | -0.1991 | -0.0467 | 0.0093 |
| $2005 / 06$ | -0.2292 | -0.00947 | 0.0271 |
| $2006 / 07$ | 1.467 | 0.6279 | 0.9211 |
| $2007 / 08$ | -0.3296 | -0.0519 | 0.0171 |
| $2008 / 09$ | -0.3744 | -0.2421 | 0.0906 |
| Total |  |  | $\sum\left[\left(R_{B}-\overline{R_{B}}\right)\left(R_{C}-\overline{R_{C}}\right)\right.$ <br> $=1.1243$ |

We have,

$$
\begin{aligned}
& \operatorname{cov}\left(R_{B}, R_{C}\right)=\frac{\sum\left[\left(R_{B}-\bar{R}_{B}\right)\left(R_{C}-\bar{R}_{C}\right)\right]}{n-1} \\
&=\frac{1.1243}{6-1} \\
&=0.2249 \\
& \text { and, }
\end{aligned}
$$

$$
\begin{aligned}
r_{B C} \quad & =\frac{\operatorname{cov}\left(R_{B}, R_{C}\right)}{\sigma_{B} \sigma_{C}} \\
& =\frac{0.2249}{0.7218 \times 0.3174} \\
& =0.9817
\end{aligned}
$$

Where,
$\mathrm{R}_{\mathrm{B}}=$ Return on common stock of NABIL
$\sigma_{B}=$ Standard deviation of return on C.S. of NABIL
$\mathrm{R}_{\mathrm{C}}=$ Return on stock of HBL
$\sigma_{\mathrm{C}}=$ Standard deviation of return on C.S. of HBL
$\mathrm{R}_{\mathrm{BC}}=$ Correlation between the rate of return on common stock of NABIL and HBL

## AT-3F: Calculation of correlation between the stock of NABIL(B) and EBL(D).

| Fiscal Year | $\left(R_{B}-\overline{R_{B}}\right)$ | $\left(R_{D}-\overline{R_{D}}\right)$ | $\left(R_{B}-\overline{R_{B}}\right)\left(R_{D}-\overline{R_{D}}\right)$ |
| :---: | :---: | :---: | :---: |
| $2003 / 04$ | -0.3349 | 0.0247 | -0.0083 |
| $2004 / 05$ | -0.1991 | 0.1367 | -0.0272 |
| $2005 / 06$ | -0.2292 | 0.0655 | -0.015 |
| $2006 / 07$ | 1.467 | 0.6753 | 0.9907 |
| $2007 / 08$ | -0.3296 | -0.1502 | 0.0495 |
| $2008 / 09$ | -0.3744 | -0.7549 | 0.2826 |
| Total |  |  | $\sum\left[\left(R_{B}-\overline{R_{B}}\right)\left(R_{D}-\overline{R_{D}}\right)\right.$ <br> $=1.2723$ |

We have,

$$
\begin{aligned}
\operatorname{cov}\left(R_{B}, R_{D}\right) & =\frac{\sum\left[\left(R_{B}-\bar{R}_{B}\right)\left(R_{D}-\bar{R}_{D}\right)\right]}{n-1} \\
& =\frac{1.2723}{6-1} \\
& =0.2545
\end{aligned}
$$

and,

$$
\begin{aligned}
r_{B D} \quad & =\frac{\operatorname{cov}\left(R_{B}, R_{D}\right)}{\sigma_{B} \sigma_{D}} \\
& =\frac{0.2545}{0.7218 \times 0.4631} \\
& =0.7613
\end{aligned}
$$

Where,
$\mathrm{R}_{\mathrm{B}}=$ Return on common stock of NABIL
$\sigma_{B}=$ Standard deviation of return on C.S. of NABIL
$\mathrm{R}_{\mathrm{D}}=$ Return on stock of EBL
$\sigma_{D}=$ Standard deviation of return on C.S. of EBL
$\mathrm{R}_{\mathrm{BD}}=$ Correlation between the rate of return on common stock of NABIL and EBL

AT-3G: Calculation of correlation between the stock of NABIL(B) and SBI(E).

| Fiscal Year | $\left(R_{B}-\overline{R_{B}}\right)$ | $\left(R_{E}-\overline{R_{E}}\right)$ | $\left(R_{B}-\overline{R_{B}}\right)\left(R_{E}-\overline{R_{E}}\right)$ |
| :---: | :---: | :---: | :---: |
| $2003 / 04$ | -0.3349 | -0.4412 | 0.1478 |
| $2004 / 05$ | -0.1991 | -0.5539 | 0.1103 |
| $2005 / 06$ | -0.2292 | 0.1967 | -0.0451 |
| $2006 / 07$ | 1.467 | 1.1612 | 1.7035 |
| $2007 / 08$ | -0.3296 | -0.3602 | 0.1187 |
| $2008 / 09$ | -0.3744 | -0.0024 | 0.0009 |
| Total |  |  | $\sum\left[\left(R_{B}-\overline{R_{B}}\right)\left(R_{E}-\overline{R_{E}}\right)\right.$ <br> $=2.0361$ |

We have,

$$
\begin{aligned}
\operatorname{cov}\left(R_{B}, R_{E}\right) & =\frac{\sum\left[\left(R_{B}-\bar{R}_{B}\right)\left(R_{E}-\bar{R}_{E}\right)\right]}{n-1} \\
& =\frac{2.0361}{6-1} \\
& =0.4072
\end{aligned}
$$

and,

$$
\begin{aligned}
r_{B E} \quad & =\frac{\operatorname{cov}\left(R_{B}, R_{E}\right)}{\sigma_{B} \sigma_{E}} \\
& =\frac{0.4072}{0.7218 \times 0.6354} \\
& =0.8879
\end{aligned}
$$

Where,
$\mathrm{R}_{\mathrm{B}}=$ Return on common stock of NABIL
$\sigma_{B}=$ Standard deviation of return on C.S. of NABIL
$\mathrm{R}_{\mathrm{E}}=$ Return on stock of SBI
$\sigma_{\mathrm{E}}=$ Standard deviation of return on C.S. of SBI
$\mathrm{R}_{\mathrm{BE}}=$ Correlation between the rate of return on common stock of NABIL and SBI

AT-3H: Calculation of correlation between the stock of $\mathrm{HBL}(\mathrm{C})$ and EBL(D).

| Fiscal Year | $\left(R_{C}-\overline{R_{C}}\right)$ | $\left(R_{D}-\overline{R_{D}}\right)$ | $\left(R_{C}-\overline{R_{C}}\right)\left(R_{D}-\overline{R_{D}}\right)$ |
| :---: | :---: | :---: | :---: |
| $2003 / 04$ | -0.1927 | 0.0247 | -0.0048 |
| $2004 / 05$ | -0.0467 | 0.1367 | -0.00639 |
| $2005 / 06$ | -0.0947 | 0.0655 | -0.0062 |
| $2006 / 07$ | 0.6279 | 0.6753 | 0.4240 |
| $2007 / 08$ | -0.0519 | -0.1502 | 0.0078 |
| $2008 / 09$ | -0.2421 | -0.7549 | 0.1828 |
| Total |  |  | $\sum\left[\left(R_{C}-\overline{R_{C}}\right)\left(R_{D}-\overline{R_{D}}\right)\right.$ <br> $=0.5972$ |

We have,

$$
\begin{aligned}
\operatorname{cov}\left(R_{C}, R_{D}\right) & =\frac{\sum\left[\left(R_{C}-\bar{R}_{C}\right)\left(R_{D}-\bar{R}_{D}\right)\right]}{n-1} \\
& =\frac{0.5972}{6-1} \\
& =0.1194
\end{aligned}
$$

and,

$$
\begin{aligned}
r_{C D} \quad & =\frac{\operatorname{cov}\left(R_{C}, R_{D}\right)}{\sigma_{C} \sigma_{D}} \\
& =\frac{0.1194}{0.3174 \times 0.4631} \\
& =0.8128
\end{aligned}
$$

Where,
$\mathrm{R}_{\mathrm{C}}=$ Return on common stock of HBL
$\sigma_{\mathrm{C}}=$ Standard deviation of return on C.S. of HBL
$\mathrm{R}_{\mathrm{D}}=$ Return on stock of EBL
$\sigma_{D}=$ Standard deviation of return on C.S. of EBL
$\mathrm{R}_{\mathrm{CD}}=$ Correlation between the rate of return on common stock of HBL and EBL

AT-3I: Calculation of correlation between the stock of $\mathrm{HBL}(\mathrm{C})$ and SBI(E).

| Fiscal Year | $\left(R_{C}-\overline{R_{C}}\right)$ | $\left(R_{E}-\overline{R_{E}}\right)$ | $\left(R_{C}-\overline{R_{C}}\right)\left(R_{E}-\overline{R_{E}}\right)$ |
| :---: | :---: | :---: | :---: |
| $2003 / 04$ | -0.1927 | -0.4412 | 0.0850 |
| $2004 / 05$ | -0.0467 | -0.5539 | 0.0259 |
| $2005 / 06$ | -0.0947 | 0.1967 | -0.0186 |
| $2006 / 07$ | 0.6279 | 1.1612 | 0.7291 |
| $2007 / 08$ | -0.0519 | -0.3602 | 0.0187 |
| $2008 / 09$ | -0.2421 | -0.0024 | 0.0006 |
| Total |  |  | $\sum\left[\left(R_{C}-\overline{R_{C}}\right)\left(R_{E}-\overline{R_{E}}\right)\right.$ <br> $=0.8407$ |

We have,

$$
\begin{aligned}
\operatorname{cov}\left(R_{C}, R_{E}\right) & =\frac{\sum\left[\left(R_{C}-\bar{R}_{C}\right)\left(R_{E}-\bar{R}_{E}\right)\right]}{n-1} \\
& =\frac{0.8407}{6-1} \\
& =0.1681
\end{aligned}
$$

and,

$$
\begin{aligned}
r_{C E} \quad & =\frac{\operatorname{cov}\left(R_{C}, R_{E}\right)}{\sigma_{C} \sigma_{E}} \\
& =\frac{0.1681}{0.3174 \times 0.6354} \\
& =0.8341
\end{aligned}
$$

Where,
$\mathrm{R}_{\mathrm{C}}=$ Return on common stock of HBL
$\sigma_{\mathrm{C}}=$ Standard deviation of return on C.S. of HBL
$\mathrm{R}_{\mathrm{E}}=$ Return on stock of SBI
$\sigma_{\mathrm{E}}=$ Standard deviation of return on C.S. of SBI
$\mathrm{R}_{\mathrm{CE}}=$ Correlation between the rate of return on common stock of HBL and SBI

AT-3J: Calculation of correlation between the stock of EBL(D) and SBI(E).

| Fiscal Year | $\left(R_{D}-\overline{R_{D}}\right)$ | $\left(R_{E}-\overline{R_{E}}\right)$ | $\left(R_{C}-\overline{R_{C}}\right)\left(R_{E}-\overline{R_{E}}\right)$ |
| :---: | :---: | :---: | :---: |
| $2003 / 04$ | 0.0247 | -0.4412 | -0.0109 |
| $2004 / 05$ | 0.1367 | -0.5539 | -0.0752 |
| $2005 / 06$ | 0.0655 | 0.1967 | 0.0129 |
| $2006 / 07$ | 0.6753 | 1.1612 | 0.7842 |
| $2007 / 08$ | -0.1502 | -0.3602 | 0.0541 |
| $2008 / 09$ | -0.7549 | -0.0024 | 0.0018 |
| Total |  |  | $\sum\left[\left(R_{D}-\overline{R_{D}}\right)\left(R_{E}-\overline{R_{E}}\right)\right.$ <br> $=0.7664$ |

We have,

$$
\begin{aligned}
\operatorname{cov}\left(R_{D}, R_{E}\right) & =\frac{\sum\left[\left(R_{D}-\bar{R}_{D}\right)\left(R_{E}-\bar{R}_{E}\right)\right]}{n-1} \\
& =\frac{0.7664}{6-1} \\
& =0.1533
\end{aligned}
$$

and,

$$
\begin{aligned}
r_{D E} \quad & =\frac{\operatorname{cov}\left(R_{D}, R_{E}\right)}{\sigma_{D} \sigma_{E}} \\
& =\frac{0.1533}{0.4631 \times 0.6354} \\
& =0.5209
\end{aligned}
$$

Where,
$\mathrm{R}_{\mathrm{D}}=$ Return on common stock of EBL
$\sigma_{D}=$ Standard deviation of return on C.S. of EBL
$\mathrm{R}_{\mathrm{E}}=$ Return on stock of SBI
$\sigma_{\mathrm{E}}=$ Standard deviation of return on C.S. of SBI
$\mathrm{R}_{\mathrm{DE}}=$ Correlation between the rate of return on common stock of EBL and SBI

