IMPLICATION OF CAPITAL ASSET PRICING MODEL FOR MAKING INVESTMENT DECISION
(With Reference to EBL, NIBL, SCB and HBL)

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ABBREVIATIONS

ARR	:	Annual Rate of Return
C.V.	:	Coefficient of Variation
CAPM	:	Capital Asset Pricing Model
CPI	:	Consumer Price Index
EBL	:	Everest Bank Limited
GDP	:	Gross Domestic Product
HBL	:	Himalayan Bank Limited
IPO	:	Initial Public Offering
Ltd.	:	Limited
MBS	:	Master of Business Studies
NEPSE	:	Nepal Stock Exchange
NIBL	:	Nepal Investment Bank Limited
NRB	:	Nepal Rastra Bank
SCB	:	Standard Chartered Bank Nepal Limited
SEBON	:	Security Exchange Board Nepal
SML	:	Security Market Line
TU	:	Tribhuvan University

CHAPTER-I

INTRODUCTION

1.1 Background of the Study

Every company whether banking or non banking whenever it needs to increase its capital for any kind of expansions, they choose either of the two options: 1. Borrow the money, or 2. Raise it from investors by selling them a stake (issuing shares of stock) in the company. The second option-raising fund by issuing shares of stock takes place in the stock market. The individual and institutional investors need to make proper analysis of the stocks while making investment decision. They should know the stock market and should know the company's performances in which they want to make the investment.

Investors can make investment in the stock market where shares are issued and traded either through exchanges or over-the-counter markets. Investors have two options to make their investments or we can say that the stock market can be split into two main sections:

1. Initial Public Offering (IPO)

An initial public offering (IPO), or stock market launch, is a type of public offering where a company issues shares of stock to the general public for the first time. Through this process, a private company transforms into a public company. Here the money paid by the investing public for the newly issued shares goes directly to the company from the underwriting investment bank.Such market is considered as the primary market.

2. The Secondary Market

After the initial issuance any stocks traded will be on the secondary market, between investors themselves. Investors can purchase stock from other investors, rather than from issuing companies themselves through brokers, an agent that charges a fee or commission for executing buy and sell orders submitted by an investor.The national exchanges such as NASDAQ, Tokyo Stock Exchange, National Stock Exchange of India, Nepal Stock Exchange (NEPSE),etc are secondary markets.

In Nepal the history of securities market began with the floatation of shares by Biratnagar Jute Mills Ltd. and Nepal Bank Ltd. in 1937. Introduction of the Company Act in 1964, the first issuance of Government Bond in 1964 and the establishment of Securities Exchange

Center Ltd. in 1976 were other significant development relating to capital markets. Securities Exchange Center was established with an objective of facilitating and promoting the growth of capital markets. Before conversion into stock exchange it was the only capital markets institution undertaking the job of brokering, underwriting, managing public issue, market making for government bonds and other financial services. Nepal Government, under a program initiated to reform capital markets converted Securities Exchange Center into Nepal Stock Exchange in 1993. At present there are 59 brokers and 338 companies listed in the NEPSE. Among the listed companies only less than 100 are active and in trading.

Over the past decade, the investment in stock market is becoming very risky due to highly volatile in Nepalese economy, high inflation, government instability, and the major factor affecting to this is Maoist insurgency and political instability. Nepalese stock market shows a high level of fluctuation when we look at the overall picture of the stock market. People think twice before they invest in any stock market. This discourages the investors to pour money in the stock market due to which we can see now the market index is below 500 points and the number of transactions has also dropped down. The market index has reached its lowest point in the history of NEPSE in the year 2013. Investors are not confident to invest in the stock market.

Although investments in shares are risky in relation to the investments in other fixed income securities like treasury bills, saving certificates, etc. despite the risk element inherent to investment in shares, most investors desire to invest in shares in anticipation that the future price of the stock will increase. Some investment alternatives are preferred over others since the risk and return characteristics on such underlying investment alternatives satisfy the individual investor's expectations. Return expected on share investment can be partitioned into dividend and capital gain. Since market is unstable and affected by many kinds or diversifiable and un-diversifiable risks the return on share investment are not certain. It requires lots of information and analysis of information through interaction to make right decision for investment. Investors, in most cases, do not analyze published financial statement before they make the investment in shares of given company. Seeing this, the study is expected to provide at least some insight to the investors in making rational investment decision with the use of concept of embodied in the Capital Asset Pricing Model (CAPM). Investment decision is crucial, so CAPM becomes essential to make realistic investment decision, for productive and secured risk free stocks investment.

1.2 Focus of the Study

This study is focused on evaluating the selected individual stock of listed companies in NEPSE by using Capital Asset Pricing Model for making investment decision. Wrong investment decision will incur investment loss or negative return, loss of opportunity cost, loss of interest, etc. Here various statistical tools are used to carry out the research study. The study focuses on the following research:

- It helps to determine and compare the risk and return of the selected banks and their possible portfolios.
- It helps to access-realized rate of return of the selected banks and their possible portfolios.
- It helps to determine market valuation of the selected banks and their possible portfolios regarding under and over.
- It helps to find out the aggressiveness of the selected banks and their possible portfolios stock with the market.
- It helps to partition systematic risk and unsystematic risk associated with individual stock of the selected banks and their possible portfolios.

1.3 Statement of the Problem

Investors should make rational investment decision. For this purpose, knowledge for analysis of common stock is essential. Investor's attitude and perceptions are also considerable for rational investment decision. Investment is the sacrifice of current consumption for the future consumption whose objective is to increase wealth. The sacrifice of current consumption takes place at present with certainty and the investors expect desire level of returns at the end of their investment horizon. The decision to invest now is the most crucial decision as the future level of return is not certain. And while making investment decision time and risk are the two major factors to be considered. Every investment decision required lots of information and analysis of information through interaction. Not only general public but also the university graduates and postgraduates cannot analyze risk and return while making stock investment decision. As every investment is not free from risk the fundamental issue is how to select the best combination of risk and return to maximize the wealth of shareholders. So the study is conducted to give insight to all investors on how CAPM model can be used in investment decision making.

The present study, therefore, attempts to address the following issues relevant to investment decisions in the Nepalese Stock Market:

- How can risk and return be determined of the selected stock of banks and their possible portfolios? Do the stocks of companies with higher mean expected returns have higher risks?
- How expected and required rates of return are computed and compared?
- Which stocks are underpriced and overpriced in the Nepalese Security Market?
- Which stocks are aggressive, defensive or are average in the Nepalese Security Market?
- What is the systematic risk position in relation to total risk of the selected companies?
- How to create and select the optimal portfolio or minimum variance portfolio among the selected banks?
- What are the required rates of return based on CAPM for selected stocks of banks and their portfolios? How can CAPM equation be estimated of the selected banks and their portfolios for investment decision?

1.4 Objective of the Study

The research study is based on the following objectives:

- To calculate the risk and expected return of the selected banks and their possible portfolios listed in NEPSE.
- To identify the highly aggressive, aggressive, average and defensive stocks among the selected banks and their possible portfolios securities.
- To partition the total risk of individual stock into diversifiable and un-diversifiable risk of bank and their possible portfolios.
- To compute and analyze beta and CAPM equations for the selected banks and their portfolios.
- To compare expected rates of return with the required rate of return of individual stocks.
- To identify if the selected banks and their possible portfolios are under priced or over priced with required rate of return and expected return.

1.5 Significance of the Study

Since market of Nepal is still at its developing stage, there are many spaces where system of the market (stock market) needs to be upgraded. Likewise there are many people who want to make investments in share market but due to lack of knowledge and information they are not able to enter in the market and even if they enter they are not able to make rational decisions.

There was a time in Nepal when even sages visited brokers' office to buy share knowing nothing about share, as they are drained in their mind investing in share market you can make lots of money. This study is conducted to illuminate all those prospective investors and investors to make better investment decisions, gaining maximum return for a given level of risk or for a given level of return taking the lowest risk. Apart from investors the study is helpful for academicians, students, teachers and those who are acquainted with stock market.

1.6 Limitations of the Study

- This study is based on secondary data published by NEPSE (Nepal Stock Exchange and Security Board of Nepal).
- The calculation of dependent and independent variables are based on accounting data of the enterprises published by NEPSE.
- The closing price of previous years are taken as market price of the stock while calculating value of the company where the actual market price of stock is not available and the calculations to fit the analytical mode are made by computer.
- In this study, yearly stock returns for 4 firms listed on NEPSE are used. The data ranges from fiscal year 2005/06- 2012/13, a period of 8 years.
- Through secondary data NEPSE it is constrained to use one base price (i.e. closing price of previous year) and return for whole one year period, this base price and return might reflect the overall performance of the enterprise, where as in S&P 500 and others we can get each month base price and return.

1.7 Organization of the Study

Chapter- I: Introduction

This chapter comprises background of the study, focus of the study, statement of the problem, significance, objectives and limitations of the study.

Chapter II: Review of Literature

This chapter includes review of previous writings and studies on the relevant problem being explored by accredited scholars and researchers.

Chapter- III: Methodology

This chapter explains the research methodology used for the report. It includes research design, sources and procedure of data collection, population and sample chosen for the study and method of data analysis.

Chapter- IV: Data Presentation and Analysis

This chapter elaborates the presentation and analysis of data, here the collected raw data are analyzed using statistical tolls and presented in the form of tables and graphs.

Chapter -V: Summary, Conclusions and Recommendations

This chapter summarizes the research with its findings and thus made conclusions on the basis of empirical evidences.

CHAPTER -II
REVIEW OF LITERATURE

This chapter has been divided into three broad parts as below:

2.1 Conceptual Review

Investment is the sacrifice of current consumption for the future consumption whose objective is to increase wealth. The sacrifice of current consumption takes place at present with certainty and the investor expects desire level of return at the end of his investment horizon. Return is the primary motive of the investment. The decision to invest now is the most crucial decision as the future level of return is not certain.

According to Warren Edward Buffett investing is often described as the process of laying out money now in the expectation of receiving more money in the future and investors should be looking to companies that will have good value in ten years. Investment decision is made to create value; it is the allocation of capital to different securities or diversified portfolio of securities whose benefits are to be realized in the future. Because the future benefits are not known with certainty, investment necessarily involves risk. Consequently, they should be evaluated in relation to their expected return and risks, for these are the factors that affect the firm's valuation in the marketplace. Thus we can say investment is the present commitment for the future benefits that is shrouded in uncertainty. This uncertainty is the risk associated with the future return of the investment.

And while making investment decision time and risk are the two major factors to be considered. Making investment is sometimes profitable and less risky sometimes less profitable and high risky job. Choosing the best alternative, when there are a number of investment alternatives, is even more difficult job. Every investment is not safe and has certain level of risk.

2.1.1 The Investment Process

The investment process involves the steps followed by an investor for making investment decisions. According to Sharpe, Alexander and Bowley, investment decision can be categorized under following five basic processes:

a. Set Investment Policy

It involves determining the investor's objectives and the amount of his or her investable wealth. Due to positive relationship between risk and return for sensible investment strategies, it is not appropriate for an investor to say that his/ her objective is to "make a lot of money". So investment objective should be stated in terms of both risk and return. This step concludes with the identification of potential categories of financial assets for consideration in the ultimate portfolio.

b. Perform Security Analysis

It involves examining several individual securities or group of securities within the broad categories of financial assets previously identified. There are many approaches to security analysis. However, most of these approaches can be classified into two classifications; technical analysis and fundamental analysis. Technical analysis involves study of stock market prices in an attempt to predict future price movements for the common stock of particular firm which is possible only by examining the past prices and patterns of price movements. Whereas; fundamental analysis involves computation of the real present value of an asset, for this expected cash flows, time factor, discount rate, etc plays an important role.

c. Construct a Portfolio

The third step in the investment process is the portfolio construction that involves identifying those specific assets in which to invest, as well as determining the proportions for the investor's wealth to put into each one. Here the issues of selectivity, timing and diversification need to be addressed by the investor.

d. Revise the Portfolio

Portfolio revision concerns the periodic repetition of the previous three steps. That is, overtime investor may change his or her investment objectives as per the market opportunity and other circumstances, which will cause the currently held portfolio to be less than optional.

e. Evaluate the Performance of the Portfolio

It involves determining periodically how the portfolio performed, in terms not only the return earned but also the risk experienced by the investor. Thus appropriate measures of risk and returns are required.

2.1.2 Risk

Risk can be defined as the variability of possible returns around the expected return of an investment. Every investor has his or her own attitude about risk and how much he or she can tolerate. Since investment alternatives have different types of risks associated with them, the investor must determine which combination of alternates matches his or her particular risk tolerances.

Sources of Investment Risk

Various factors play roles to make the actual return differ from expected return. Such factors are known as sources of risk. These factors are (Clark, 1997:308).

a. 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 rises, 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 as well

b. Purchasing Power Risk

Purchasing power risk is the variability of return an investor suffers because of inflation. Inflation erodes the purchasing power of the rupees and increases investment risk. The rate of inflation is measured by percentage change in the Consumer Price Index (CPI) over the period. The consumer price index is calculated by collecting the prices of consumer goods. Nepal Rastra Bank (NRB) calculates this index in Nepal.

c. Bull-Bear Market Risk

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

d. 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.

e. Default Risk

Default risk is that portion of investment's 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.

f. 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.

g. Call-Ability Risk

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

h. 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 investors bet interests.

i. Political Risk

Political risk is the portion of asset's 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.

j. Industry Risk

An industry risk 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 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 and 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.

k. Other Risks

Besides these above-mentioned risks, there are other risks like Off Balance Sheet Risk, Technological and Operational Risks, Country and Sovereign Risk, Insolvency Risk, etc. *(Bhattarai; 2008:109)*

The Range

The range is one of the traditional methods of measuring risk. It shows difference between the best possible return and the worst possible return, whereas it does not provide any information about the distribution of the rates of return between the extremes. It is computes as;

The Range= Best possible rate of returns – Worst possible rate of returns
The degree of risk of an underlying security is reflected in the magnitude of the difference. The smaller is the difference the lower will be the degree of risk.

The Standard Deviation

The standard deviation (σ) is the other measure of investment risk. Higher standard deviation represents larger dispersion of return and so higher is the risk and vice versa.

Standard deviation (σ_i) = $\sqrt{\frac{\Sigma(R_i - Er_i)^2}{n}}$

Unsystematic Risk

Unsystematic risk is also known as diversifiable risk. This type of risk is unique to an organization and can be largely eliminated by holding a diversified portfolio of investment. Unsystematic risk occurs through the events like labor strikes, management errors, inventions, advertising campaigns, availability of raw materials, etc.

More precisely, the unsystematic risk is unique to each firm; an efficiently diversified portfolio of securities can successfully eliminate most of the unsystematic risk inherent in individual securities.

Systematic Risk

Systematic risk is also known as undiversifiable risk. This risk is that portion of total variability in return caused by market factors (also called market risk) that simultaneously affect the prices of all securities. Undiversifiable risk occurs due to the changes in the macro-economic factors like, interest rate, inflation, investors' expectations, and gross domestic product (GDP), etc. Moreover, it is the causes of external environment (political, economic, sociological and technological) of the firm.

Systematic risk is that part of the total risk that cannot be eliminated by allocating capital to a diversified portfolio of investments. The systematic risk as measured by beta.

Coefficient of Variation

The coefficient of variation (C.V.) is the other useful measure of risk. It is the standard deviation divided by the expected return, which measures risk per unit of return. It provides a more meaningful basis for comparison when the expected returns on two alternatives are not the same. If investors believe that the rate of return should increase as the risk increase, then the coefficient of variation provides a quick summary of the relative trade-off between expected return and risk.

Coefficient of Variation (C.V.) = $\frac{\sigma_i}{Er_i}$

Beta Coefficient

The beta is simply the slope of the characteristic line. It depicts the sensitivity of the security's excess return to that of the market portfolio. The beta represents the systematic risk of a stock due to underlying movements in security prices. This risk cannot be diversified

away by investing in more stocks because it depends on such things as changes in the economy and in the political atmosphere, which affect all stocks. In summary, the beta of a stock represents is contrition to the risk of a highly diversified portfolio of stocks.

Empirical work on the stability of historical beta information over time suggests that past betas are useful in predicting future betas; however, the ability to predict seems to vary with the size of the portfolio. The larger the number the number of securities in a portfolio, the greater the stability of the beta for that portfolio over time even for the individual stock, however, past beta information has been found to have reasonable predictive value. In addition to portfolio size, betas tend to show greater ability as longer time intervals as studied.

Beta Coefficient (β_i) = $\frac{Cov(r_i - r_m)}{\sigma^2 m}$

2.1.3 Return

Return is any extra money gained over invested amount at the end of the investment period. For investors, return is considered the main attraction to invest in a risky security as a stock accepting a varying degree of risk tolerance. Return is the income received on an investment plus any change in market price. The total return is calculated by adding capital gain and the dividend yield of a security. Capital gain is calculated by dividing the difference between the NEPSE index of current year and the previous year by the previous year's NEPSE index as below:

Capital gain = $(t_n - t_{n-1})/t_{n-1}$

Where,

t_n= NEPSE index of current year

t_{n-1}= NEPSE index of previous year

Dividend yield is the ratio between dividend paid and market price.

Hence, Total Return (R_i)= Capital gain + Dividend yield

2.1.2.1 The Expected Rate of Return

The expected rate of return is the expected after-tax increase in the value of the initial investment over the holding period. The overall rate of return can be decomposed into capital appreciation and dividend components. Capital appreciation is the difference between

investor's end-of-the period and beginning-of-the period stocks' value. Expected return is the most likely return on an asset (in our case the stock), which has been calculated here by dividing the total sum of individual stock's annual return over the study period by the number of years in the study period.

Expected Return, $(Er_i) = \frac{\Sigma R_i}{n} = \frac{(r_1+r_2+r_3\ldots.r_n)}{n}$

2.1.2.2 Single Period Return

The investment return is defined as the after tax increase in the value of the initial investment. The increase in value can come from two sources: a direct cash payment to the investor or an increase in the market value of the investment relative to the original purchase price. The rate of return over the holding period, or holding period return (HPR), is computed as:

HPR= [(Ending Price – beginning Price) + Cash Receipts]/Beginning Price

2.1.2.3 Annualized Holding Period Returns

Annualized holding periods returns can be calculated in two ways. First one possibility is to take the simple arithmetic average of the annual HPRs computed by:

$\bar{r} = \sum_{t=1}^{n} \frac{r_t}{n} = \frac{(r_1+r_2+r_3\ldots.r_n)}{n}$

Where,

$\bar{r}$ = arithmetic mean return

r_t = single period return at time t

n = number of observations or returns

The simple arithmetic average, however, ignores the compounding effect that results in the first period's return is reinvested. In addition, the result of an arithmetic average return can be distorted if there are large differences in the rates of return across time periods. Large differences in the periodic rates of return over longer investment horizons will cause the arithmetic rate of return to be misleading.

The second one geometric mean rate of return does not suffer from this flaw. The geometric mean rate of return, HPR_s, is defined as the rate of return that would make the initial investment equal to the ending investment value. The formula for the geometric mean rate of return is,

$G_m = [\prod_{t=1}^{n}(1+r_t)]^{\frac{1}{n}} - 1 = [(1+r_1)(1+r_2)(1+r_3).....]^{1/n} - 1$

Where,

G_m = geometric mean return

r_t = single period return at time

n = number of observations or returns

2.1.2.4 Required Rate of Return

"When setting the required rate of return on an investment, an investor must consider the real rate of return, expected inflation and risk. Because consumption is forgone today, the investor is entitled to a rate of return that compensates for this deferred consumption. Since the investor expects to receive an increase in the real goods purchased later and assuming for the moment, zero expected inflation and risk, the required rate could equal the real rate of return, in which case it would represent the pure time value of money. The capital markets determine this rate based upon the supply of money to be invested relative to the demand for borrowed money." (Johnson, M. Cheney & Edward A. Morses, Fundamental of Investments, 1995, p. 33)

The required rate of return is the minimum rate of return that an investor expects from his/her investment in risky assets. It is the function of real rate of return and risk. The required rate of return is the return on risk free assets i.e. government securities plus risk premium. It is determined by CAPM/SML.

The required rate of return using CAPM/SML is:

Required Rate of Return $E(R_i) = R_f + [E(R_m) - R_f]\beta_i$

2.1.2.4 Trade-Off between Risk and Return

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

2.1.3 Portfolio Analysis

For any investor who wants to minimize the risk and maximize the return of investment, it is not possible through investment in a single asset. S/he needs to invest in two or more than two securities, and this collection of securities is called portfolio. To gain maximum return for a given level of risk or to bear minimum level of risk for a given level of return is the basic assumption of portfolio. While making investment decision it is very important for investor to create portfolios and choose the optimal portfolio that has maximum return at whatever level of risk the investor deems appropriate. Different diversification techniques of portfolio can be used to reduce portfolio's risk, such as:

- Simple Diversification

  Simple diversification is the diversification that selects 10-15 assets randomly and make portfolio to minimize the risk of portfolio.
- Diversification Across Industries

  Under this diversification assets are selected from different industries rather than from one industry. For instance; securities of Hotel sector, Banking sector, Manufacturing sector, etc are combined to create a portfolio.
- Superfluous Diversification

  Superfluous diversification is like simple diversification but here the number of selected assets in the portfolio has to be more than simple diversification. Such diversification is difficult to manage, has higher research and transaction costs so it is better to avoid such kinds of portfolio diversification.
- Markowitz Diversification

  Markowitz diversification is based on correlation. Under this diversification, portfolio is created by combining those assets which are less than perfectly positively correlated (+1) (negatively correlated assets) to reduce the portfolio risk (to gain the riskless portfolio).

2.1.4 CAPM

The Capital Asset Pricing Model often expressed as CAPM was developed by William Sharpe (1964) followed by John Litner (1965), Treynor (1965) and Mossin (1966) as a logic extension to basic portfolio theory using the geometry of the Security Market Line (SML) that determines the market risk premium (beta). It describes the relationship between risk and expected return and is used in the pricing of risky securities. The CAPM is still widely used

in evaluating the performance of managed portfolio and estimating the cost of capital for firms even though it is about four and a half decades old.

The Capital Asset Pricing Model CAPM emphasizes that to calculate the expected return of a security; two important things need to be known by the investors:

- The risk premium of the overall equity/ portfolio (assuming that the security is only risky asset)
- The security's beta versus the market.

The security's premium is determined by the component of its return that is perfectly correlated with the market, meaning the extent to which the security is a substitute for investing in the market. In other word, the component of the security's return that is uncorrelated with the market can be diversified away and does not demand a risk premium. The CAPM model states that the return to investors has to be equal to:

- The risk free rate.
- Plus a premium for the stocks as a whole that is higher than the risk free rate.
- Multiplied by the risk factor for the individual company.

This can be expressed mathematically as:

$E(R_i)= R_f+[E(R_m) – R_f]\beta_i$

Assumptions of the CAPM:

- Investors are rational and risk averse. They pursue the only interest of maximizing the expected utility of their end of period wealth. Implication: The model includes the single time horizon for all investors.
- The markets are perfect, thus taxes, inflation, transaction costs, and short selling restrictions are not taken into account.
- Investors can borrow and lend unlimited amounts at the risk-free rate (R_f).
- All assets are infinitely divisible and perfectly liquid.
- Investors have homogenous expectations about asset returns. In other words, all investors agree about mean and variance as the only system of market assessment, thus

everyone perceives identical opportunity. The information is costless, and all investors receive the same information simultaneously.

- Asset returns conform to the normal distribution.
- The markets are in equilibrium, and no individual can affect the price of a security frame.
- The total number of assets on the market and their quantities are fixed within the defined time.

Capital Asset Pricing Model (CAPM), an important tool used to analyze the relationship between risk and rates of return. The primary conclusion of the CAPM is this: The relevant riskiness of an individual stock is its contribution to the riskiness of a well-diversified portfolio.

The risk that remains after diversifying is market risk, or the risk that is in the market, and it can be measured by the degree to which a given stock tends to move up or down with the market *(Brigham, et al.; 1999: 178-180).*

The Security Market Line

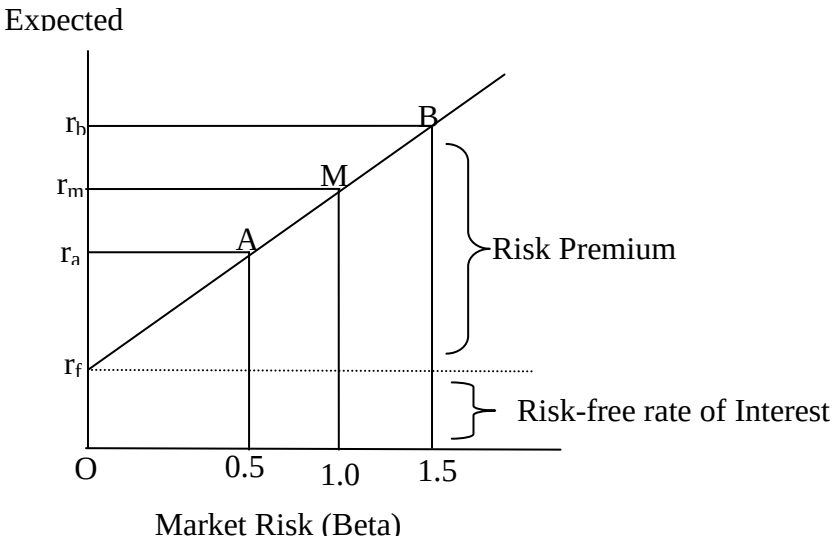
The security market line (SML) provides a universal measure of risk that still adheres to Markowitz efficiency and his criteria for portfolio selection, namely:

- Maximize return for a given level or risk
- Minimize risk for a given level of return

The SML confirms that the optimum portfolio is the market portfolio. Because the return on a portfolio (or security) depends on whether it follows market prices as a whole, the closer the correlation between a portfolio (security) and the market index, then the greater will be its expected return. Finally, the SML predicts that both portfolios and securities with higher beta values will have higher returns and vice versa.

Figure 2.1

The Security Market Line



As figure 2.1 illustrates, the expected risk-rate return of r_m from a balanced market portfolio (M) will correspond to a beta value of one, since the portfolio cannot be more or less risky than the market as a whole. The expected return on risk-free investment (r_f) obviously exhibits a beta value of zero.

Portfolio A (or anywhere on the line r_f– M) represents a lending portfolio with a mixture of risk and risk-free securities. Portfolio B is a borrowing or leveraged portfolio, because beyond (M) additional securities are purchased by borrowing at the risk-free rate of interest.

2.2 Review of Related Studies

2.2.1 Review of Journals/ Articles

Cohen (2005), published an article on "*Aristotle on Investment Decision Making"* where she has concluded that in this age of inexpensive and abundant data, investors must remain mindful of the limitations of the data they are suing for their investment decisions. Despite widespread problems with the quality, timeliness, and relevance of financial and economic data, many investors accept and react to these data at face value. Often, further analysis of the data and an understanding of the factors that drive the data will lead to increased uncertainty and may change the analyst's conclusions. If investors are not using the right model at the right time, they will get an answer that makes little sense. In addition, investors must take

care that they are using reliable data and must formally recognize the inherent lack of precision in many of their observations and measurements.

A well-known saying of Aristotle, "Our discussion will be adequate if it has much clearness as the subject matter allows. Equal precision cannot be found in all discussions. Political science (and economics) investigates many things with much variety and volatility. It is the mark of an educated person to look for precision only as far as the nature of the subject allows" wisdom found in this quote is applied in this article to some elements of investment decision-making.

In this article, Cohen clarified the lessons from Aristotle that can (and should) be applied to investment decision-making and then looked at these lessons in the specific context of economic data. Cohen has expressed lessons from Aristotle's wisdom for investment decision as:

- Define the market or asset clearly
- Consider not only returns but also standard deviations
- Define earnings and other metrics of company performance carefully
- Even assumed constants can vary
- The long-term average is the arithmetic mean, not necessarily equilibrium
- Economic data (Trade, Employment & labor costs, Federal budget deficit and Global flows of capital)

The message that Ms. Cohen inferred through this article is twofold. First, there are many numbers available to investors, but many of them are not well understood. Many of them are misinterpreted, not just those related to corporate performance but also those related to the economy. Second, models work when they are appropriate for the particular circumstance, but some of the best investment judgments over time have come when people recognized that models derived in other periods were broken or not directly relevant.

Rouwenhorst (1999), an article on "*Local Return Factors and Turnover in Emerging Markets*" This article examines the sources of return variation in emerging stock markets. Compared to the developed markets the correlation between most emerging market and stock

market has been historically low and until recently many emerging country restricted investment by foreign investor.

He attempts two set of question to answer. The first set of three questions concern the existence of expected return premiums;

- Do the factors that explain expected return difference in developed equity markets also describe the cross section or expected returns of emerging market firms?
- Are the returns factors in emerging markets primarily local or they having global components as well?
- How does the emerging market evidence contribute to the international evidence form developed markets that similar return factors are present in markets around the world?
- Is there a cross sectional relation between liquidity and average return in emerging markets? Are the return factors in emerging markets cross sectional correlated with liquidity?

According to Rouwenhorst, total returns are calculated in the sum of the dividend return and price appreciation using prices scaled by a capital adjustment factor, which are corrected to price effects associated with stock split, stock dividends and rights issues. Main emerging markets have firms with multiple share assets are treated as a single value weighted portfolio of the outstanding equity securities. With detail analysis of data and interpretation of results he has concluded his findings as the first conclusion is that the return factors in emerging markets are qualitatively similar to those in developed markets; small stocks outperform growth stocks and emerging market stocks exhibit momentums. There is no evidence that local market betas are associated with average returns. The low correlation between the country return factors suggests that the premium have a strong local character. Furthermore, global exposure cannot explain the average factor returns of emerging market. This is little evidence that the correlation between the local factors portfolios have increase, which suggests that the factors responsible for the increase of emerging market country correlation are separated from those drives the difference between expected return within these markets. A Bayesian analysis of premiums in developed and emerging market shows that unless one has strong prior belief to the contrary. The empirical evidence favors the hypothesis that size, momentum and values strategies are compensated for in expected returns around the share turnover and examines the turnover characteristic of the local factors portfolios. There is no

evidence of relation between expected returns and turnover, in emerging markets. However, beta, size momentum and value are positively cross sectional correlated with turnover in emerging markets, this suggests that return premium do not simply reflect a compensation for liquidity."

The study by Rouwenhorst does not consider the analysis of single security. It has been analyzed the return factors in worldwide stock markets. However, it concentrates in the various emerging stock markets. Hence this article contributes in the area of risk and return analysis in common stock investment *(Rouwenhorst; 1999: 1439-1462)*

Ghimire (2001), in his article "*Nepal Share Market and Investors Prospect*", he has pointed out some important trends of the Nepalese capital market. In the article Ghimire stated the Nepalese share price is decreasing because of many unbalanced factors. The major reason behind the movement in the index is the domination of the banking sector script in the Nepalese stock market transactions. Mismanagement practices cannot help the growth of share market. The general public has invested recklessly. They just believe what one broker or the other investor says about script. One of the prime motives for the investment is to earn return on it. He has concluded that the general investors should be alert and aware of the situation. They must receive the financial information before they make investment and act rationally.

Bhattarai (2005), in his article "*Matching and Cheating"*, has explained technique of selling and buying of share in NEPSE. "Many investors in the Nepali stock market don't know that brokers who use a relatively unknown technique called "Matching" are cheating them. The investors cheated by this method are normally those who occasionally buy or sell shares, not the regular ones who are active almost every day in the market.

Matching and splitting are the most prevalent mode of securities transaction in Nepal. According to the SEBON, the regulator of the Country's stock market, about 65% of the total transactions in the NEPSE are executed through matching.

Matching is helping market manipulators to increase the price of their selected stock by matching small quantities of shares at a higher price and thus misleading the naïve investors

who would be tempted to buy large quantity of shares at the artificially increased price from the same manipulators.

If matching is totally banned, the government may lose some revenue as the total transaction in stocks may be reduced and its impact will not only be on capital gain tax but also on the tax earning form the commission earned by the brokers. But the question is whether the cheating of the general investors' would be allowed to continue. Thus it calls for a proper regulatory framework so that the investors are not cheated while brokers also get a fair commission for their service even by pursuing their profession honestly."

Bhattarai (2005), in his article of "*Define Your Objective Before Buying Stocks"*, has explained how and why investors should set their objectives before buying stocks. "Stock market is perhaps poorly understood among Nepalese investors. Its development remains almost impossible unless the people accept it as a way of their life. For this, first of all they have to know what stock market is, and how it functions. If it s not understood, it cannot attract the interests of investors. Thus investors' awareness about stock market and their rights are also essential.

People invest in the share market for different purposes. If someone is not clear about his/her purpose, the strategy followed can be wrong and the benefits not satisfactory, or there s/he may even incur loss. So, it is necessary to define our objectives first and then start playing with the market. Some possible objectives would be to maximize divined income, to maximize capital gain in short run, to maximize total gain and to minimize risk. A proper setting of objectives helps in identify the category of shares that help to accomplish the set objectives. If we observe stocks market regularly, we find various patterns of movement in different stocks. Thus, setting clearly defined objectives help to gain from such movement.

Investors who want to maximize their dividend income would do better by investing in the shares in which more shares at a less amount of commission can be purchased. But those investors who want to maximize their return by capital gain in the short run, it is better to avoid investing in shares of finance and insurance companies because their share price is found to fluctuate less as compared to the banks. In case of stocks that do not fluctuate much, it will be difficult to cover the transaction costs.

Capturing a capital gain in a short run requires a selection of highly fluctuating companies or newly listed companies such as Bank of Kathmandu (BOK), Lumbini Bank Ltd. (LBL), Macchapuchhre Bank Ltd. (MBL), Nepal Bangladesh Bank Ltd. (NBBL), and Nepal Credit and Commerce Bank Limited (NCCBL). These price changes can provide a handsome capital gain to the investors but it further requires a regular collection of information and regular contact with brokers. Similarly, the shares of newly listed banks are found to fluctuate more compared to old banks, for example NCCBL.

The next fundamental objective of buying securities is for the purpose of borrowing. Investors can borrow money by using the shares as collateral. Banks and finance companies provide loans up to 50% of the market price of the shares. To borrow in this way, one should have those securities that promise more certain return as well as growth. Such stocks are those of SCB, NABIL, Bishal Bazaar Company Ltd., Unilever Nepal Ltd. and NIB. Therefore, it's better to buy these high priced stocks if investors intend to borrow by pledging them. Such borrowing can be used to buy more stocks and the selection of such stock will again depend on the purpose for which you want to buy them.

If the objective is to minimize the risk, investors require selecting stocks that remain less fluctuating in the market. For example, Bishal Bazaar Company Ltd., HBL, Bottlers Nepal Ltd., RastriyaBeemaSansthan and Unilever Nepal Ltd., are found to be such stocks."
Regmi (2012), in his article entitled "*Stock Market Development and Economic Growth: Empirical Evidence from Nepal*", has examined causal relationship between stock market development and economic growth in Nepal for the period 1994-2011. The finding suggests that stock market development has significantly contributed to the economic growth in Nepal. In this perspective, a refined policy measures should be adopted to strengthen and improve the role of stock market in order to expedite and maintain the strong growth of the economy.

In the article Dr. Regmi has concluded "Stock market in Nepal promoted economic growth of the Nepalese economy. Since stock market is a vehicle for economic growth in our context, the stock market should be integrated into the whole economic system of the country while designing economic policies. The key policy implication is that the country requires a well built and enabling stock market in order to accelerate and maintain strong growth of the economy. Hence, meaningful efforts are required on the part of the government to ensure

well-organized and competent operation of stock market because the more efficient the market, the more possibility it will attract investors. The government should remove impediments to stock market development in the form of tax, legal and regulatory barriers because they are sometimes disincentives to investment, should invest more and develop the nation's infrastructure in order to create an enabling efficiency, and the rate of returns of firms, should employ appropriate trade policies that promote the inflow of international capital and foreign investment so as to enhance the production capacity of the nation, and should strengthen the capacity of the Nepal Stock Exchange so as to check and prevent sharp practices by market operators in order to safeguard the interest of shareholders. Moreover, the Nepal Stock Exchange should improve the trading system in order to increase the ease with which investors can purchase and sell shares, thus guaranteeing liquidity on the stock market. Besides, stock market reformation policies may give a further support to the economy and may act as a key enabler and catalyst of economic growth."

Kaidarya (2012) has published an article on, "*Investor Awareness and Investment on Equity in Nepalese Capital Market*". He has explained that Nepalese financial sector has been growing rapidly so does the growth of capital market, which is dominated by the financial sector. The rapid growth of capital market has raised the question of sustainable development of this sector. For the long term growth, it has some preconditions: the stakeholder's literacy and awareness level, the access to information, and ability to analyze them for the financial decision making. The study find that the equity investors are aware and their level of awareness is high compare to needed level, aware equity investor have more chance of holding high volume of equity investment and there is problem on access to information for equity investors in secondary market.

In this study, investor awareness and its relationship with investment decision in equity and investors access to market information were examined. Investor awareness is crucial for the investment decision making and sustainable growth of capital market. In other word there is positive correlation between awareness and level of investment. Investors are keen to get market information timely and sufficiently to make a profitable investment. Nepalese capital market is characterized with limited sources of information which is the rational fact is but the study shows that there is problem on access to information for equity investors in secondary market. The investor awareness level is found to be affected by the related work

experience understanding of investment environment, learning expectation and access to market information. Equity investors in secondary market are not satisfied with the available source of information and efforts of information dissemination mechanism.

2.2.2 Review of Thesis

Bhatta (1995) has conducted a study on "*Assessment of the Performance of Listed Companies in Nepal*" with the objective to analyze the performance of listed companies in terms of risk and return; company specific risk, systematic risk, unsystematic risk, expected rate of return, required rate of return and internal rate of return through portfolio context. Bhatta has collected data of ten listed companies from 1990 to 1995 for the analysis.

Bhatta has made following findings in risk return behavior from the analysis of different stocks. "A highly significant positive correlation has been addressed between risk and return character of the company. Investors expect higher returns from those stocks that associate higher risk. Nepalese capital market is not efficient one. So the stock price does not contain all the information relating to market and company itself. Neither investors analyze the overall relevant information of the stocks nor does the member of stock exchange try to disseminate the information. So the market return and risk both may not represent reality. However, the analysis based in the available information shows high priced stocks such as BBC, NIB, NIC has beta risk than others. These companies thus require higher returns to satisfy the investors for their risk premium. Investors in Nepal have not yet practiced to invest in portfolio of securities an analysis of the two securities portfolio shows that the risk can be totally minimized if the correlation is perfectly negative. In this situation, the risk can totally be diversified, but when there is perfectly positive relationship between the returns of the two securities, the risk is undiversifiable. The analysis shows some has negative correlation and some has positive one. Negative correlation between securities returns is preferred for diversification of risk."

Thus on the basis of findings Bhatta concluded, "An analysis of risk and return shows that many companies have higher unsystematic or specific risk. There is a need of expert institution that will provide consultancy services to the investors to maximize their wealth through rational investors to maximize their wealth through rational investment decision.

Hence Bhatta recommended the following points to improve the market efficiently:

- Developed institutions to consult investors for risk minimization.
- Establish an information channel in Nepal stock exchange.
- Market proper amendment on trading rules.

Pokharel (2004), has conducted a study on "*Portfolio Selection and CAPM: The Nepalese Evidence"* with the objective to determine and compare the risk and return across the nature of busniess and to compute and analyze beta and CAPM equations for the selected enterprises. Pokharel has founded the following major results from the study of role and impact of axiological variables on dividend yield, capital gain yield and total yield;

- Among the fifteen selected enterprises the expected return of Nepal Lever Limited is highest i.e. 79.90% and lowest is of BBCL.
- The standard deviation showed that most of the companies are quite risky. The return seems fluctuating very year resulting higher variation. STCL has the highest risk and NIDC capital market has the lowest standard deviation.
- The lowest coefficient of variation is of NIBL and highest in NICL and STCL.
- The NEPSE index showed negative movement till 1997/98 but improved there after increasing till 1999/2001 and again falls thereafter. The index of banking and manufacturing are moving in the same direction, and increased till 1999/2000 but decreased thereafter. The index of trading is regularly decreasing throughout the review of period while that of Hotel, Trading and other is fluctuating each year and is decreasing continuously form 1992/2001.
- The required future returns on stock of the companies have a linear relationship with market index. Among the fifteen enterprises Nepal Lever Limited has the highest future return and lowest is of BBCL. Among the fifteen sampled companies ten have future return greater than market return.
- NIDC and NABIL has the highest beta and lowest risk containing companies are BBCL, STCL, NAL and BNL.
- Under the CAPM the relevant measure of risk of determining a security's expected return is its covariance with the market portfolio.

- Under the CAPM, the total risk of a security can be separated into market risk and non market risk. Each security's non market risk is unique to that security and hence is also termed its unique risk.

In his study Pokharel has recommended that there should be a system of publishing beta of the Nepalese companies regularly that facilitates decision making process of all the concerned. And to the investors he has recommended that investors have to focus their mind on both risk and return. Before thinking about higher return they also have to think about the risk associated with the return, besides investing the fund in single stock, it is better to invest making portfolio of more than single asset. Further he has recommended to welcome foreign investment portfolio, companies should try to increase stability in dividend yields, and the companies should attempt to reduce diversifiable risk with proper and efficient management. Whereas with the government due to increased violence and unstable political situations there is a decrease in investment. Many of the industries are closed and those that are some way sustaining are facing heavy recession due to which investors are not willing to invest in any sector; so government has to play a vital role to improve the security as well as political condition and to promote investors.

Shrestha (2009) has conducted a study on "*Risk and Return Analysis and Asset Allocation Decision of Selected Nepalese Investment Alternatives"* with the objective to identify the risk and return characteristics of selected investment alternatives in Nepal, and recommend a suitable asset allocation for different class of investors. Shresta has figured that in Nepal, growth of financial market is slow and unsatisfactory because of ignorance of potential investor. People have been investing in gold coin, bullions or jewelry since ancient times. They do not have adequate knowledge about investment alternatives and their traits. Investors group consist large proportion of high-class people and those who have academic background related to finance or economics and general investor have neither any idea in investment portfolio or asset allocation nor any information or research about it is available. And on the basis of her data analysis she concluded CIT Mutual Fund, NCM Mutual Fund and Gold were found appropriate alternative to construct an optimum portfolio using Sharpe's Model of portfolio optimization.

Sapkota (2010) has conducted a study on "*Risk and Return Analysis and Optimal Portfolio Creation of Common Stock Investment*" with the objective to find out the condition of risk and return analysis of common stock investment and suggesting how to create an optimal portfolio among the commercial banks. Besides this, his other objectives were to analyze risk and return of investment in common stock of commercial bank, to determine relation of each bank with the industry index, to explain portion of systematic and unsystematic risk from the total risk, to evaluate common stock's price under CAPM method, to analyze how to create optimal portfolio combination using selected commercial banks and to show the current market movement, banking index movement and selected sample banks price movement in trend line.

The major findings of his study are as follows.
BOK's common stock has highest expected return of 87.42% whereas lowest is of EBL i.e. 57.40%. NABIL's common stock has highest risk i.e. 81.82% whereas EBL's stock has least risk of 37.17%. Coefficient of variation analysis has resulted that there is the highest risk borne by investor of NABIL for per unit return and lowest coefficient of variation is of EBL. All the banks' relation with banking index shows positive. EBL has maximum positive relation and SBI has the lowest positive relation with industry index. SBI has the highest unsystematic risk i.e. 99.87% whereas the lowest unsystematic risk is of EBL i.e. 42.10%. EBL's systematic risk is highest i.e. 57.90% and lowest systematic risk is of SBI i.e. 0.125%. BOK's stock is aggressive i.e. market sensitive, to the market changes as evaluated by the highest beta coefficient of 1.25, whereas it is the lowest of SBI i.e. 0.0582. Under CAPM analysis, all banks' common stocks are showing under priced. The portfolio return between SCBL and NAIBL has 80.13% and 81.82% risk respectively. In his study he has suggested to create optimal portfolio using two assets i.e. NABIL and SCBL as this portfolio is the optimal portfolio combination with lowest standard deviation and optimal portfolio return.

Bhattarai (2010), in his thesis report "*Risk, Return and Portfolio Analysis of Common Stock of Insurance Companies*" with the major objectives as follows:

- To focus on analysis of price movement of individual insurance companies
- To analyze and evaluate the insurance companies in terms of their risk and return.

- It will also focus on the analysis of portfolio that can be constructed by bringing together the risk and return of all insurance companies included in this study.

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

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

Chhetri (2011) has conducted a study on "*Risk and Return Analysis and Optimal Portfolio Creation of Sample Commercial Banks with reference to NIB, EBL and SCB*" with the objective to analyze risk and return for maximization of investor's wealth through optimal portfolio creation. In his study Chhetri has concluded that the ultimate investment objective is to systematically maximize the investor's wealth. Wealth can be defined as the positive difference between assets and liabilities. The risks and returns on investment are positively related to each other i.e. an investor seeking higher returns must be willing to face higher level of risks and vice-versa. An investor has different objective depending upon age, income, planned activities and attitudes about risk; so, investing wisely is the function of every investor's specific needs and goals. It is not appropriate for an investor's objective in making a lot of money recognizing the possibility of losses as well. Many times, investors blindly invest their money with the hope of getting good returns from their investable funds but due to many reasons like change in the investor's objective, age, occupation, income tax, time horizon, tolerance in risk and many other special circumstances, they lose their hard earning while investment made without analyzing the risk and return involved in the stocks. On the other hand, increase in financial market, concept and principles; a lot of other financial

alternatives have mushroomed. At present, unhealthy competition environment has also been seen. It is not only difficult but very difficult to determine which financial institution is good or bad. So to get the maximum return from a minimum level of risk, the investor should wisely diversify its investment by means of portfolio creation with systematically analysis of risk and return.

Chhetri has made following findings on the basis of his analysis:

- SCB has the highest rate of return with 56.26%, EBL has 46.70% and NIB has 40.36%.
- NIB has highest standard deviation 81.80%, SCB has 72.70% and EBL has 67.78%.
- Co-efficient of Variation Analysis has resulted highest risk 2.0268 is borne by NIB, lowest is SCB and EBL has 1.4493 risk.
- All three sampled banks are positively related with banking index. NIB has the highest correlation of co-efficient 85.95% and EBL has the minimum positive relation 76.78% with the industry/ business index.
- The highest unsystematic risk is 41.06% of EBL and lowest 6.48% of NIB.
- The highest beta co-efficient of 1.3323.of NIB followed by 1.0867 of SCB and 0.9847 of EBL shows their market sensitiveness or aggressiveness respectively.
- Thus, for optimal portfolio, 56.75% should be invested in SCB and rest 43.25% should be invested in NIB for optimal portfolio return 67.31% with standard deviation 57.80%.

Chhetri has recommended the following points to overcome the weaknesses and inefficiencies as well as to improve present stock performance on the basis of the analysis and major findings of his study:

- All investors are recommended to make two analyses: technical and fundamental analysis. Technical analysis gives result from market trend and price movement of common stock and fundamental analysis gives result from companies internal and external, all information and also recommends about rules and regulations of countries which impact directly and indirectly the market price of common stock where investors going to invest.
- Expected return recommends that banking sectors' common stocks are the best options for the investment as they are providing attractive rate of return.
- Risk and return play vital role in banking sector. Therefore, it is suggested to analyze risk and return with sincerity before investing in this sector. According to the analysis of

individual asset of bank, investors should invest their money in the asset of SCB due to the lowest C.V. (i.e. 1.2922), maximum expected return (i.e. 56.26%) and medium risk.

- Investors must concern with the portion of systematic risk, which arises from external factors, which cannot be diversifiable, but unsystematic risk cab be diversified. This type of risk arises from internal factor. Asset of NIB has the highest 93.52% systematic risk from the total risk. So NIB is recommended and EBL has the lowest systematic risk but the highest unsystematic risk that shows weakness in management to deal with internal factors which have created unsystematic risk.
- Analysis of personal risk, attitude, needs and requirements will be helpful before making an investment in stock market. Investors should make several discussions with stockholders before reaching in the decision. Investors should make their decision on the basis of reliable information rather than the imagination and rumors.
- Broker firms are good way to exchange and share investment ideas. Mutual fund is worthwhile for people with little interest in investment. Investors are recommended to share experiences, ideas and take view of expert before investing in stocks of individual banks.
- Investors need to diversify their fund to reduce the risk. Proper construction of portfolio will reduce considerable potential loss, which can be defined in terms of the risk but portfolio construction is dynamic and difficult job. Thus, investors should select the stock that have higher return and negative correlation or near to zero correlation between different banks and sectors. The portfolio revision is also necessary at certain interval time to get best return at lower risk. According to the study, created portfolio gives investor lower risk and considerable return. In this study, an optimum portfolio using two assets between SCB and NIB is created. Investors should apply creating optimum portfolio before making investment strategy. Optimal portfolio gives minimum risk and considerable return.
- Government should amend the rules and regulations regarding the stock market in time-to-time that ensures the protection of an individual investor's right. Such amendment is essential to make the act effectiveness with the pace of tome and need to follow the implementation and supervision of rules and regulation to make sure the objective is achieved.
- Before making an investment decision it is recommended to visit and discuss with investment companies, with individual expert and researchers. Investors should make

their investment decision because of reliable information or financial parameters of the related bank rather than imagination rumor.

- The financial institutions and companies should provide the real financial statements. The data provided by NEPSE and the companies itself are different in some cases. The other thing, there is also a great difference between the audited and unaudited financial reports of the financial institutions. It creates confusion to the potential investors about the actual financial condition of the company. So, they should only publish their audited annual statements.
- It is recommended that for future researches, they can prepare new thesis based on this study and they can increase sample size and study period for advance result.
- It is recommended not to follow the general trend of buying and selling of the securities when it is going up and down because it is a risky strategy. The decision should be based on fact and figures rather use intuition and go blindly.
- Government's rules and regulation directly impact the market. So, every investor is suggested that they should make analysis about the rules and regulation of government, which affect the market movement.
- Other investment alternatives availability also affects the market. Commodity market, real estate and gold are the investment alternatives. So all the investors are recommended to make analyses about all alternative investment, which affect the market return.
- It is further recommended not to completely base on this very study as it only provides inferences based on five years data of selected 3 commercial banks and only represents the small proportion of the market. But it does only provide the basis for logical judgment.
- The financial institutions are recommended to invest the sum in productive sectors rather than housing and building apartment. In order to gauge the satisfaction level of the customers and to continuously improve the way they work, regular feedback and surveys, which provide valuable insights about their product and services, should be undertaken. I do hope that this will of course enable them to improvise and introduce various policies, procedures, products and value added services that help to meet their customers' needs.
- Last but not the least, it is recommended to all the investors not to run after the financial institutions, which provide maximum interest rate f return only. Some of them might be

running at bad times. So, all the investors are recommended to invest in those institutions, which guarantee the investors' investment though provided with low return. It is really a high time to focus on "Lower the risk, lower the return rather than higher the risk, higher the return.

Lama (2012), has conducted a study on "*Risk and Return of Common Stock of Everest Bank limited, Kumari Bank Limited and Nepal Investment Bank Limited"* with the objective to explore risk associated with common stock investment and other variable that helps to decide about the stock and investment in commercial banks. From his study Lama has concluded that 'Risk and Return' of common stock of commercial banks is not in good condition meaning there is no good return according to risk of investment in common stock of commercial banks. While comparing risk and return of selected commercial banks, EBL has the highest risk and return. While comparing risk and return of different industries, the development banking sector is best as per highest expected return with higher degree of risk and from the view point of coefficient of variation trading sector is the best as it has least coefficient of variation where as manufacturing and processing sector has minimum return and risk.

Aryal (2012), in his thesis report of "*Investment Decision in NEPSE with Reference to Capital Asset Pricing Model"* focuses on the evaluation of individual stock of listed companies in NEPSE. In his study 43 listed companies has been selected for the purpose of evaluation of stock for taking the decision of various purposes by using the Capital Asset Pricing Model. Aryal has concluded in his study that investment in stock market was the major portion of this study, which involves trade-off between risk and return. The study is focused upon the application of CAPM in stock evaluation. Economically Nepal is backward and its economic performance is not in the satisfactory level. Generally public people are least understood about the stock market and face conceptual thoughts about its risk. Risk is the uncertainty, which relates to the degree of ups and down in return. Investing like many other activities involves risk in order to achieve return. Because of its higher expected return most of the investors are attracted to common stocks. Many people consider stock market investment as a game where they expect to win. Stock market investment can be boos up investor's fund as well and crash down like boulders from the mountains. As we know higher the risk higher will be return, so standard deviation is not only a single measure of risk.

Coefficient of variance also measures risk. Market sensitivity or the systematic risk is measured by beta coefficient, which cannot be reduced by diversification. Beta is used to determine the required return of as assets using CAPM. With this help investor's can make decision tat which security has to buy and which security has to sell. If the required rate of return is lower than expected rate of return a stock is underpriced. It means this stock has the chance to increase in the price in future so long positioning is suggested. If the required rate of return is higher than expected rate of return the stock is overpriced. It means this stock has the chance to decrease in the price in future so short positioning is suggested"

Aryal in his study has made following recommendations based on his findings, conclusions and other information as;

- Investors have to focus their mind also on risk not only the return. Before thinking about higher return they also have to think about risk associated with return. If there is higher return there will be higher risk definitely. So risk averse investor can invest on moderate type of stock having average risk and return.
- Investors need to diversify fund o reduce risk. Besides investing the funds in a single stock, it is better to invest making portfolio or more than a single asset. Portfolio investment gives maximum return at very minimum risk or increases the return keeping the risk in a constant way. For a higher portfolio effect stock returns with negative correlation and higher expected return should be best.
- Investment in capital market is a new phenomenon in Nepal. Most of he investors are purchasing shares in primary market only and they are not considering the risk involves in the initial public offering.
- Investor should purchase or sell securities on the basis of past trend earning dividend, market value or shares. Stock trading in secondary market is less risky than the initial public offering.
- The companies themselves are responsible for increasing or decreasing the unsystematic risk, which badly hit the business and profit. So proper ad efficient management is essential for the process of any organization.
- Stock investment is very risky job so investor should know his need, desire, risk taking capabilities, tackling with ever changing market to win the stock market. Self-knowledge, superior forecasting ability and sound understanding on the information of stock market can live winning chance in investment of stock.

- Investor should analyze the similar companies' i.e. industry before investing in a common stock of a particular company because the industry factors have a significant influence in the performance of an individual company.
- Traditionally, the purchase of land, construction of building and saving on the bank had been the major area of investment for the people but their attitudes changing towards shares, debenture and other securities. But the government policies and programs are not directed toward the development of domestic stock market (over the counter market) for mobilizing saving and providing equitable investment opportunities for the people of all regions.
- People of older time were interested on long-term investment. But now a days people needs return immediately and want to invest for short period only. The attitude of people towards investment has change due to many situations and circumstances. Because of risk factor nobody wants to invest in long period. Due to the increasing violence and unstable political situation there is decrease in investment most of the liason office and breach office and industry are closed and those who are survived one acing heavy recession. So government has to play a vital role to improve conditions of investing environment as well as to promote investments.
- NEPSE need to modernize the trading system and effective information channel. Different program should be developed to increase rationally as well as market efficiency support to summarize in the risk-return statistics describing the investment candidates.

Research Gap

A number of available unpublished Master's thesis reports have been reviewed in this study. The past researcher works were limited to creating optimal portfolio and making investment on basis of expected return portfolios and standard deviations of portfolios. In this report 4 different banks EBL, NIBL, SCB and HBL are taken as sample for the study. The study is made on latest data from 2005/06 to 2012/13 of eight years period and ending close price of 2005 and 2014 is also referred in many calculations where required. This study focuses on use of CAPM for evaluating each sampled individual bank's performances. The study infers how to implement CAPM on each individual investment asset as well as portfolios thus created and make investment decision on the basis of its findings. All possible two assets

portfolios are created from the four sampled banks and for all available portfolios detail analysis are made by finding each portfolio's expected return, standard deviation, covariance, correlation, coefficient of variation and required rate of return of CAPM. Further it also evaluates pricing of all possible six portfolios.

CHAPTER-III
RESEARCH METHODOLOGY

Research is a logical and systematic search for new and useful information or in depth study of a particular topic. It is an investigation of finding solutions to scientific and social problems through objective and systematic analysis. Research methodology is systematic way to solve a problem. It is a technique used for conducting research. It provides various methods for collection, presentation, interpretation and analysis of data. For this, various financial and statistical tools are used to analyze the data and conclude to the finding.

It gives the theoretical foundation of data collection and analysis for the research study. Its aim is to give the work plan of research. It represents the highlight of research design, population, sample size, data collection techniques, sources of data and data analysis tools.

3.1 Research Design

A research design is a detailed outline of how an investigation will take place. It is a blue print for the study that presents a series of guidepost to enable the researcher to progress in the right direction in order to achieve the goal. Research design is the plan, structure and strategy of investigation so as to obtain answers to research questions and to control the variance *(Kerlinger; 1986, 275).* It is the main part of any research work.

In this study descriptive research design cum analytical approach has been adopted for conceptualizing the problem by collecting large amount of data and to analyze the related data and the relationship among variables.

3.2 Sources and Procedure of Data Collection

The study is based on the secondary data relating to sample chosen companies' year end closing price per share, dividend distribution, market capitalization, risk free rate etc. Major sources of data are listed as follows:

- Annual reports of Security Exchange Board Nepal (SEBON)
- Annual trading reports of NEPSE
- Annual audited reports of the listed companies
- Nepal Rastra Bank Quarterly Economic Bulletins

- Nepal Rastra Bank website URL [http://www.nrb.org.np/]
- Articles and journals from different newspaper and magazines
- Reports, bulletins and newsletters published from NEGOSIDA

3.3 Population and Sample

In Nepal's financial market there are various investment tools such as stock investment, government bonds, corporate bonds and debentures, mutual funds, treasury bills, etc. Among these investment alternatives some of specific in a class are selected for the study.

For instance, there are 338 companies listed in NEPSE. All the listed companies do not provide the scope for their study as some old listed companies do not publish their financial statement to NEPSE and some are new that have just begun their operation.

The study is concentrated to 4 listed companies of onlyBanking sector. These 4 listed companies (Everest Bank Ltd., Nepal Investment Bank Ltd, Standard Chartered Bank Ltd. and Himalayan Bank Ltd.) are the chosen sample for the study of this research and all 338 listed companies are taken as the total population.

3.4 Financial and Statistical Tools

The study employs various financial and statistical tools to analyze and interpret the collected data. Before analysis, data is categorized and presented in the tabular format, charts and graphs. Following are the tools that are used for the analysis of data in this report:

3.4.1 Required Rate of Return

This is the minimum acceptable rate of return for investing in any security. Risk free rate, beta coefficient and expected return are used to derive required rate of return in CAPM to justify the level of risk inherent in the investment alternative.

Required Rate of Return $E(R_i)= R_f+[E(R_m) – R_f]\beta_i$

Where,

$E(R_i)$= Required rate of return for asset i

R_f= Risk free rate of return

$[E(R_m)-R_f]$= Risk premium for stock i

β_i = Beta of stock i

3.4.2 Expected Rate of Return

The expected rate of return is the rate of return one would anticipate receiving on an investment usually based on historical data and is not guaranteed. The expected return is a tool used to determine whether or not an investment has a positive or negative average net outcome.

Expected Return, $(Er_i) = \frac{\Sigma R_t}{n} = \frac{(r_1 + r_2 + r_3)}{n}$

Where,

Er_i= Expected rate of return

R_i = single period return at time t

n = number of observations or returns

3.4.3 Standard Deviation

Standard deviation is used to the annual rate of return of an investment to measure the investment's volatility. It is a weighted average of the deviations from the expected value and it provides an idea of how far above or below the expected value and the actual value is likely to be.

Standard deviation $(\sigma_i) = \frac{\sqrt{\Sigma(R_i - Er_i)^2}}{n}$

Where,

Er_i= expected rate of return

R_i = single period return at time t

n = number of observations or returns

3.4.4 Variance

The variance of an asset's rate of return equals the sum of the products of the squared deviations of each possible rate of return from the expected rate of return multiplied by the probability that the rate of return occurs, i.e.:

Variance, Var $(R_i) = \sigma^2_i$

The total risk or total variability of returns of an investment (the standard deviation of its returns) within a diversified portfolio can be divided into systematic risk and unsystematic risk.

3.4.5 Coefficient of Variation

The coefficient of variation represents the ratio of the standard deviation to the expected return. It is useful statistic for comparing the degree of variation from one data series to another, even if the expected returns are drastically different from each other.

Coefficient of Variation (C.V.) = $\frac{\sigma_i}{Er_i}$

Where,

C.V. = Coefficient of Variation

σ_i= standard deviation of asset i

Er_i= expected return of asset i

In general the CAPM indicates that an asset's required return should be related to the risk free rate of return plus a risk-free return based on the beta of the asset.

3.4.6 Beta Coefficient

Beta coefficient measures the part of the investment's statistical variance that cannot be removed by the portfolio diversification. It shows the volatility, or systematic risk, of a security in comparison to the market return as a whole.

Beta Coefficient (β_i) = Cov (r_i,r_m) / σ^2_m

Where,

β_i = beta coefficient of i^{th} asset,

σ^2_m = variance of market return,

Cov (r_i,r_m) = covariance between the returns of security and market

Beta coefficient =1 (Average stock, it means that excess returns or the stock vary proportionally with excess returns for the market portfolio. In other words, the stock has the same unavoidable or systematic risk as the market as a whole.)

Beta coefficient >1 (Aggressive stock, the stock's excess return varies more than proportionally with the excess return of the market portfolio. Or we can say it has more systematic risk than the market as a whole. This type of stock is often called "aggressive" investment.)

Beta coefficient <1 (Defensive stock, the stock has less unavoidable or systematic risk than does the market as a whole. This type of stock is often called “defensive” investment.)

3.4.7 Correlation

Correlation measures the degree of relationship of movement of return of securities. The correlation coefficient always lies between +1 and -1. The value of +1 represents perfectly correlated meaning the two securities have direct relationship to each other and -1 represents a perfectly negative correlation meaning the two securities have inverse linear relationship. Combining securities having zero correlation will reduce portfolio risk, perfect negative correlation could eliminate risk whereas, perfect correlation will not reduce any portfolio risk. Correlation is measured by using the following equation;

$(\rho_{ij}) = \frac{Cov\,(r_i - r_i)}{\sigma_i\ \sigma_j}$

3.5 Data Processing Procedure

For data processing procedure aforementioned various statistical tools are used to analyze the data. At first the raw data market price per share, dividend yield and market capitalization of listed companies are collected from NEPSE; and quarterly risk free rate from economic bulletin of Nepal Rastra Bank. Then the collected data is categorized and presented in the tabular format, charts and graphs using statistical tools to process these data for the analysis of CAPM.

CHAPTER-IV

DATA PRESENTATION AND ANALYSIS

This chapter is the core focus of the study. It is an analytical chapter where analysis and evaluation of financial items are made with the help of different financial and statistical tools. This chapter focuses on data presentation and analysis of sampled banks with the market. In this chapter the effort has been made to analyze "Implication of Capital Asset Pricing Model for Making Investment Decision". Historical or secondary data is used for data presentation and analysis of investment risk and returns of sampled commercial banks using CAPM considering the fiscal year market closing price, dividend yield and risk free rate of return.

4.1 Analysis of Individual Commercial Banks

4.1.1 Analysis of Total Dividend of Everest Bank Ltd. (EBL)

The following table shows the cash dividend, share dividend and total dividend of EBL from FY 2005/06 to FY 2012/13.

Table 4.1

Cash Dividend, Stock Dividend and Total Dividend of EBL

Fiscal Year	Stock Dividend (%)	Cash Dividend (%)	Total Dividend (%)
2005/06	0	25	25
2006/07	30	10	40
2007/08	30	20	50
2008/09	30	30	60
2009/10	30	30	60
2010/11	10	50	60
2011/12	30	1.58	31.58
2012/13	10	50.53	60.53
Average	**21.25**	**27.139**	**48.389**

Source: AGM Reports of EBL

Table 4.1 shows the gradual increase in the rate of dividend provided by EBL over the period of three years from FY 2005/06 to FY 2008/09 and remained at the same rate for three consecutive years. The total dividend dropped in FY 2011/12 to 31.58% and increased again in FY 2012/13. Highest total dividend is paid in the year 2012/13 and has issued stock dividend of 30% five times in the eight years period to increase the capital fund. Average

total dividend of EBL during eight years is 48.389%, average total stock and cash dividend is 21.25% and 27.139% respectively.

Figure 4.1

Cash Dividend, Stock Dividend and Total Dividend of EBL

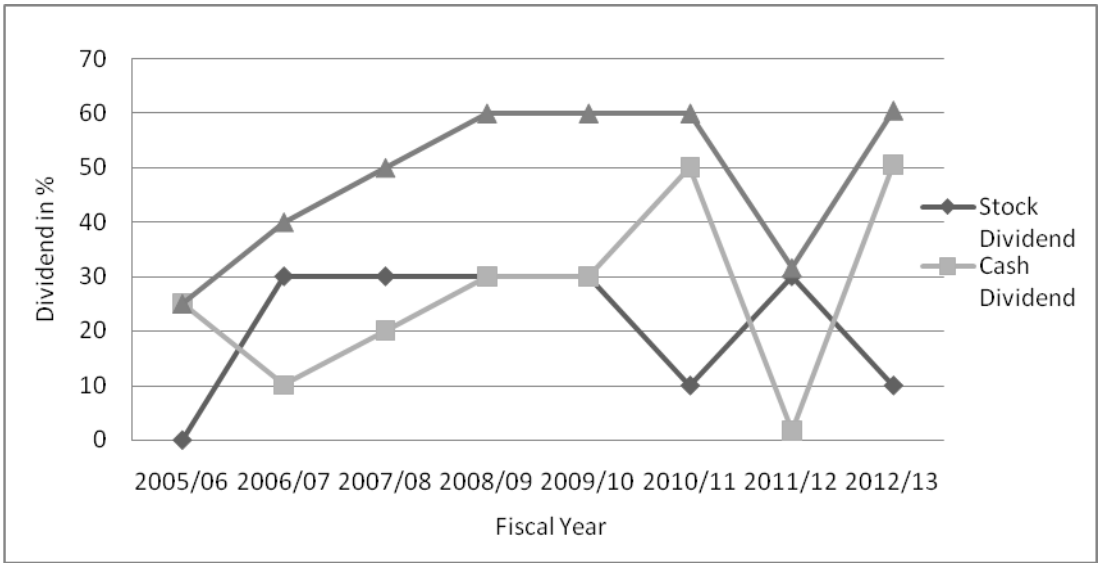


Figure 4.1 shows the trend line of stock dividend, cash dividend and total dividend of EBL over the period of eight years, during the period the bank has raised its capital fund by issuing higher stock dividend than cash dividend except for the two FY 2010/11 and 2012/13.

4.1.2 Analysis of Market Stock Price of EBL

The following table shows the closing market price of EBL.

Table 4.2

Closing Market Price of EBL

Fiscal Year	Closing MPS
2005/06	1379
2006/07	2430
2007/08	3132
2008/09	2455
2009/10	1630
2010/11	1094
2011/12	1033
2012/13	1599
Average	1844

Source: AGM Reports of EBL

Table 4.2 shows that the market price of EBL was increasing from the year 2005/06 and reached at its highest price in the year 2007/08 at Rs 3132 and decreased thereafter at the

lowest price during the period in year 2011/12 at Rs 1033. The average market price of EBL during the period of eight years is Rs 1844.

Figure 4.2

Price Movement of Common Stock of EBL

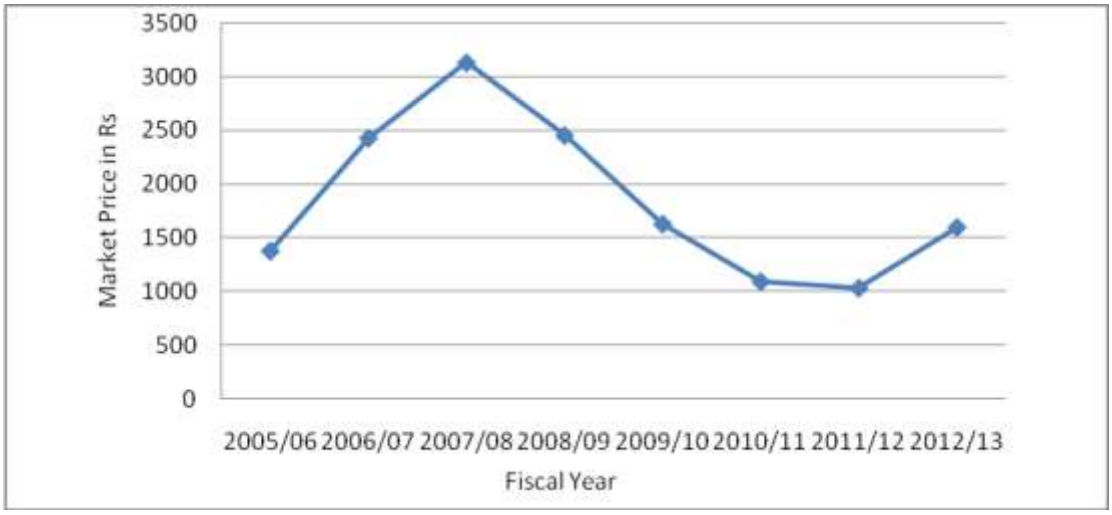


Figure 4.2 reveals the trend line of market price of EBL over the eight years period. It is clear from the figure that the market price of EBL is fluctuating over the period, and the trend line shows the highest peak over the period in year 2007/08 and lowest in the year 2011/12.

4.1.3 Analysis of Risk and Return of EBL

Table 4.3

Annual Rate of Return per Share of EBL

Fiscal Year	Closing MPS	Stock Dividend	Cash Dividend	Total Dividend (Rs)	ARR (%)
2005/06	1379	0	25	25	61.40
2006/07	2430	30	10	949.6	145.1
2007/08	3132	30	20	756.5	600
2008/09	2455	30	30	519	-5.00
2009/10	1630	30	30	358.2	-19.0
2010/11	1094	10	50	153.3	-23.5
2011/12	1033	30	1.58	481.28	38.4
2012/13	1599	10	50.53	313.63	85.2

Source: Appendix 1, 2 and Annual Reports of EBL

Table 4.3 shows the annual rate of return of EBL in sampled eight years period. The rate of return is highest in the FY 2006/07 i.e. 145.10% while negative in three consecutive FYs from 2008/09 to 2010/11.

Figure 4.3

Annual Rate of Return per Share of EBL

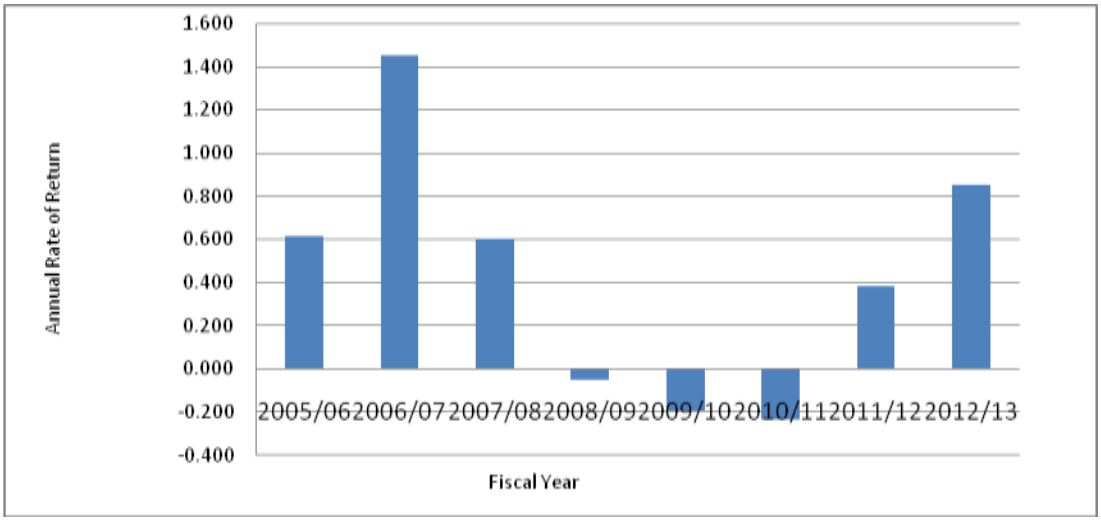


Figure 4.3 clearly shows that required rate of return of highest at 1.451 in year 2006/07 and the minimum at -0.235 in year 2010/11, which means the investors of EBL earned the highest profit in year 2006/07.

Table 4.4

Tabulation of calculated Expected Return, Standard Deviation and Co-efficient of Variation of EBL

Expected Return (Er_i)	0.489
Standard Deviation (σ_i)	0.582
Co-efficient of Variation (C.V.)	1.190

Source: Appendix 2, 3 and 4

According to table 4.4 the expected rate of return of EBL is 0.489 and its standard deviation for the return is 0.582. Investors investing in EBL stocks should bear 1.190 risk for one unit of return.

4.1.4 Analysis of Total Dividend of Nepal Investment Bank Limited (NIBL)

The following table shows the cash dividend, share dividend and total dividend of NIBL from FY 2005/06 to FY 2012/13.

Table 4.5

Cash Dividend, Stock Dividend and Total Dividend of NIBL

Fiscal Year	Stock Dividend	Cash Dividend	Total Dividend (%)
2005/06	35.46	20	55.46
2006/07	25	5	30
2007/08	33.33	7.5	40.83
2008/09	0	20	20
2009/10	0	25	25
2010/11	25	25	50
2011/12	25	5	30
2012/13	10	25	35
Average	19.224	16.563	35.786

Source: AGM Reports of NIBL

Table 4.5 shows that the highest dividend rate provided by NIBL during the eight FYs is in the beginning year i.e. 55.46% and the lowest dividend issued was in 2008/09 i.e. 20%. The bank has issued dividend consistently throughout the years. The average total dividend of NIBL is 35.786% whereas its average stock and cash dividends are 19.224% and 16.563 respectively.

Figure 4.4

Cash Dividend, Stock Dividend and Total Dividend of NIBL

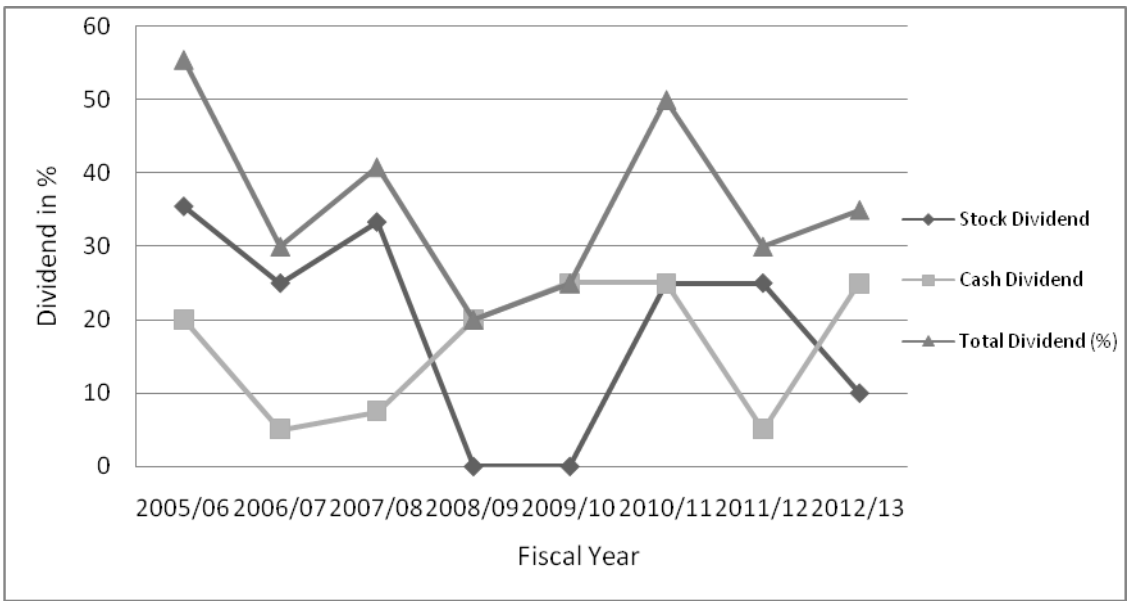


Figure 4.4 shows the trend line of stock dividend, cash dividend and total dividend of NIBL over the period of eight years, during the period the bank has raised its capital fund by issuing

higher stock dividend in the year 2005/06 to 2007/08 and then for two consecutive years 2008/09 and 2009/10 no stock dividends were issued whereas the rate of cash dividend increased in these two years, and in subsequent years the rate of stock dividend again increased.

4.1.5 Analysis of Market Stock Price of NIBL

The following table shows the closing market price of NIBL.

Table 4.6

Closing Market Price of NIBL

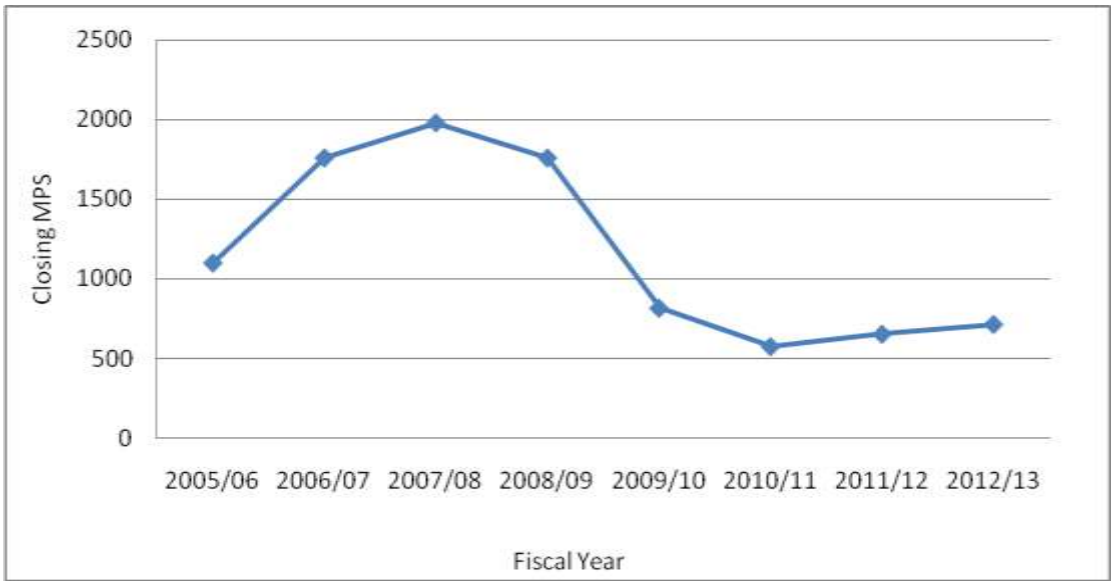
Fiscal Year	Closing Price
2005/06	1260
2006/07	1729
2007/08	2450
2008/09	1388
2009/10	705
2010/11	515
2011/12	511
2012/13	781
Average	**990**

Source: AGM Reports of NIBL

Table 4.6 indicates that the price of NIBL has been increasing from the year 2005/06 at Rs 1260 and reached the highest in year 2007/08 at Rs 2450 then again it decreased in an increasing rate and reached down to Rs 511 in year 2011/12. The closing price of 2012/13 is Rs 781.

Figure 4.5

Price Movement of Common Stock of NIBL



From figure 4.5 it is clear that the movement of price of NIBL is very fluctuating and is bell shape, increased and decreased in increasing rate till the year 2009/10 then sustained increasing in decreasing rate. The highest peak of price of NIBL in sampled eight years is in 2007/08.

4.1.6 Analysis of Risk and Return of NIBL

Table 4.7

Annual Rate of Return per Share of NIBL

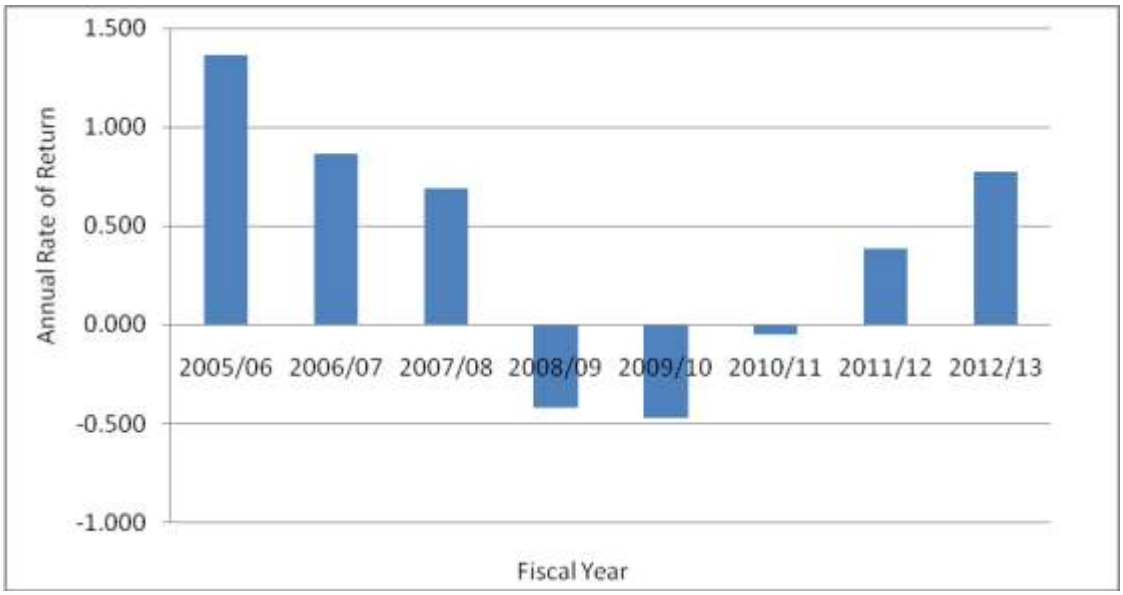
Fiscal Year	Closing MPS	Stock Dividend	Cash Dividend	Total Dividend (Rs)	ARR (%)
2005/06	1260	35.46	20	633.1034	136.60
2006/07	1729	25	5	617.5	86.20
2007/08	2450	33.33	7.5	470.1204	68.90
2008/09	1388	0	20	20	-42.50
2009/10	705	0	25	25	-47.40
2010/11	515	25	25	152.75	-5.30
2011/12	511	25	5	200.25	3.8.10
2012/13	781	10	25	124	77.10

Source: Appendix 1, 2 and Annual Reports of NIBL

In the table 4.7, it indicates that the annual rate of return has been decreasing continuously and became negative in the years 2008/09, 2009/10 and 2010/11 where rate of return lied at -42.50, -47.4 and -5.30 respectively. The highest annual rate of return is 136.60 at the beginning of the year in 2005/06 and lowest is -47.4 in year 2009/10.

Figure 4.6

Annual Rate of Return Per Share of NIBL



From above figure 4.6 it clearly states the annual rate of return has been decreasing continuously and is below x-axis meaning negative for three years 2008/09 to 2010/11 and then the return picked up gradually. From the figure we can easily see and state that highest return is in 2005/06 and lowest is in 2009/10.

Table 4.8

Tabulation of Calculated Expected Return, Standard Deviation and Co-efficient of Variation of NIBL

Expected Return (Er_i)	0.445
Standard Deviation (σ_i)	0.659
Co-efficient of Variation (C.V.)	1.476

Source: Appendix 2, 3 and 4

Table 4.8 shows risk and return and risk per unit o return of NIBL. The expected rate of return for investing in stocks of NIBL is 0.445 with standard deviation of 0.659. And to

invest in NIBL the investors needed to bear risk 1.476 per unit return, so it is highly aggressive investment.

4.1.7 Analysis of Total Dividend of Standard Chartered Bank Nepal Limited (SCB)

The following table shows the cash dividend, share dividend and total dividend of SCB from FY 2005/06 to FY 2012/13.

Table 4.9

Cash Dividend, Stock Dividend and Total Dividend of SCB

Fiscal Year	Cash Dividend	Stock Dividend	Total Dividend (%)
2005/06	130	10	140
2006/07	80	50	130
2007/08	80	50	130
2008/09	80	50	130
2009/10	55	15	70
2010/11	50	0	50
2011/12	45	15	60
2012/13	40	10	50
Average	**70**	**25**	**95**

Source: AGM reports of Standard Chartered Bank Nepal Ltd.

According to table 4.9 we can know how much cash and stock dividend has been issued by SCB in past eight years. The record shows that SCB has been giving high dividend in all eight years. The highest dividend is in the beginning 2005/06 i.e. 140% but during the year stock dividend is only 10%. After that year, in years 2006/07 to 2008/09, the three consecutive years SCB has given 130% dividend by providing 50% bonus shares to its investors by increasing its capital. Then the dividend rate decreased to 70%, 50%, 60% and 50% in years 2009/10 to 2012/13 respectively.

Figure 4.7
Cash Dividend, Stock Dividend and Total Dividend of SCB

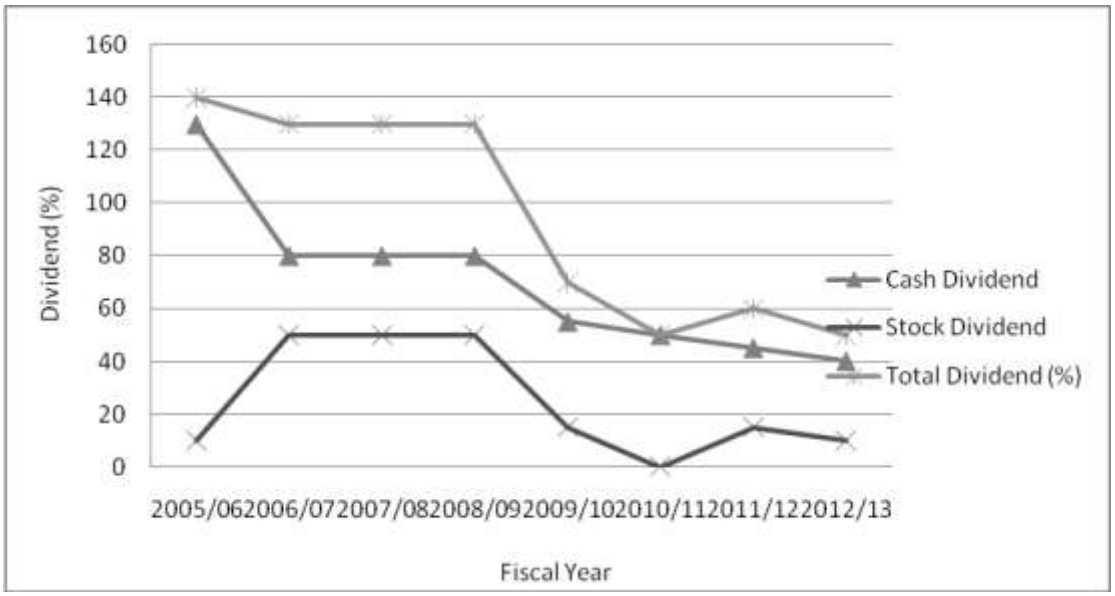


Figure 4.7 gives better view of the trend line of dividend movement of SCB, the total dividend has decreased drastically from the beginning of the sampled year to the end 8th sampled year. 2010/11 is the year when SCB has not provided any stock dividend and in years 2005/06, 2011/12 and 2012/13 the issued stock dividends are comparatively less than the other years.

4.1.8 Analysis of Market Stock Price of SCB

The following table shows the closing market price of SCB:

Table 4.10

Closing Market Price of SCB

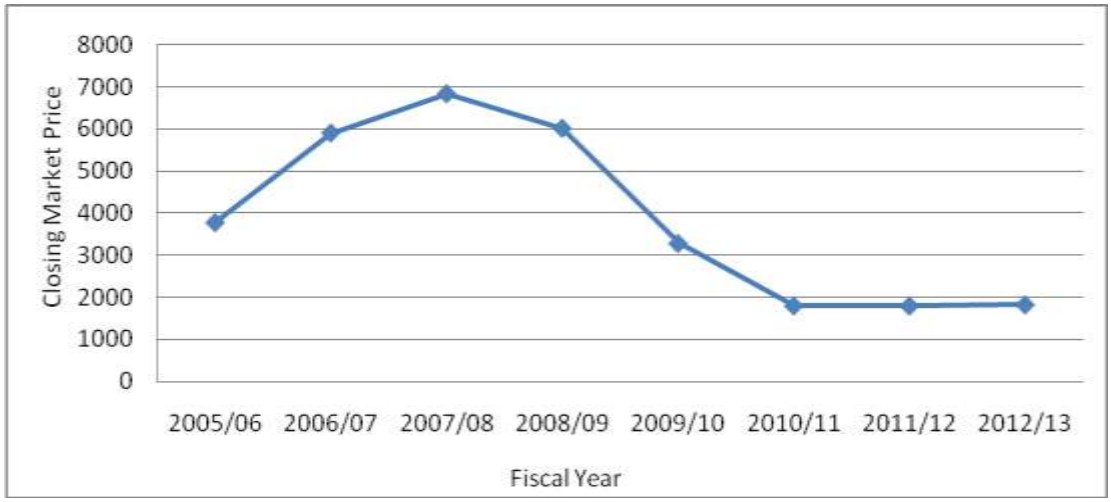
Fiscal Year	Closing Price
2005/06	3775
2006/07	5900
2007/08	6830
2008/09	6010
2009/10	3279
2010/11	1800
2011/12	1799
2012/13	1825
Average	**2799**

Source: AGM reports of Standard Chartered Bank Nepal Ltd.

Table 4.10 shows the fiscal year closing price of SCB. In the table the stock price of SCB is highest at Rs 6830 in 2007/08 and lowest in last three consecutive years 2010/11, 2011/12 and 2012/13 at Rs 1800, Rs 1799 and Rs 1825. The price of stock of SCB has been increasing and decreasing throughout the years, which showed the stock of SCB is very volatile.

Figure 4.8

Price Movement of Common Stock of SCB



Above figure 4.8 helps us better view of price movement of common stock of SCB. The trend line shows the stock price of SCB increased at first and reached highest in 2007/08 and falls drastically and reached towards lowest in 2010/11 and could not pick up thereafter.

4.1.9 Analysis of Risk and Return of SCB

Table 4.11

Annual Rate of Return per Share of SCB

Fiscal Year	Closing MPS	Cash Dividend	Stock Dividend	Total Dividend (Rs)	ARR (%)
2005/06	3775	130	10	720	91.68
2006/07	5900	80	50	3495	148.87
2007/08	6830	80	50	3085	68.05
2008/09	6010	80	50	1719.5	13.17
2009/10	3279	55	15	325	-40.03
2010/11	1800	50	0	50	-43.58
2011/12	1799	45	15	318.75	17.65
2012/13	1825	40	10	319.9	255.82

Source: Appendix 1, 2 and Annual Reports of SCB

From the above table it can be seen that the annual rate of return of SCB is highest in year 2012/13 at 255.82% and lowest in 2010/11 at -43.58%. The stock price has been decreasing from year 2006/07 and reached negative to -40.03 in year 2009/10. The above annual rate of return can be better viewed and explained in the graph as;

Figure 4.9

Annual Rate of Return Per Share of SCB

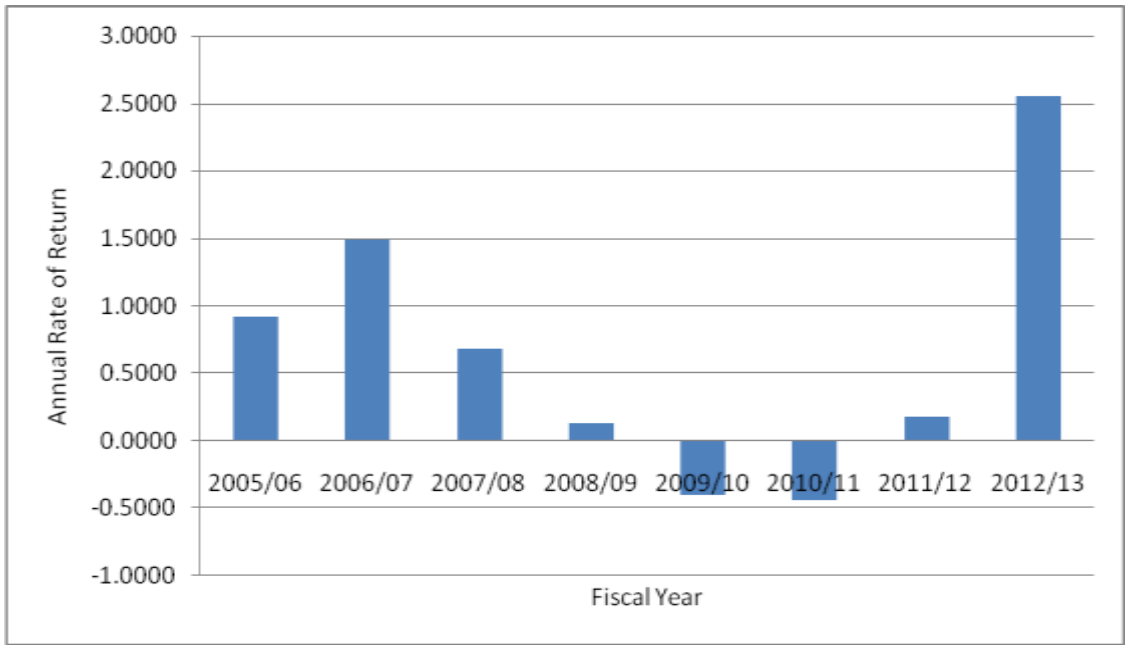


Figure 4.9 clearly shows the annual return fluctuations in the sampled eight years. The annual return of the company has never remained smooth and there is high volatility in the return of the stock of SCB. The highest return is at the end period of the year in 2012/13 and very low in 2008/09 and 2011/12 and are negative below x-axis in year 2009/10 and 2010/11.

Table 4.12

Tabulation of Calculated Expected Return, Standard Deviation and Co-efficient of Variation of SCB

Expected Return (Er_i)	0.731
Standard Deviation (σ_i)	1.018
Co-efficient of Variation (C.V.)	1.424

Source: Appendix 2, 3 and 4

According to table 4.12 the common stocks of SCB has expected return of 0.731 with 1.018 risk or standard deviation. And the coefficient of variation is 1.424 meaning investors of SCB

needs to bear risk of 1.424 for per unit return which tells that the stock of SCB is aggressive investment.

4.1.10 Analysis of Total Dividend of Himalayan Bank Limited (HBL)

The following table shows the cash dividend, share dividend and total dividend of HBL from FY 2005/06 to FY 2012/13.

Table 4.13

Cash Dividend, Stock Dividend and Total Dividend of HBL

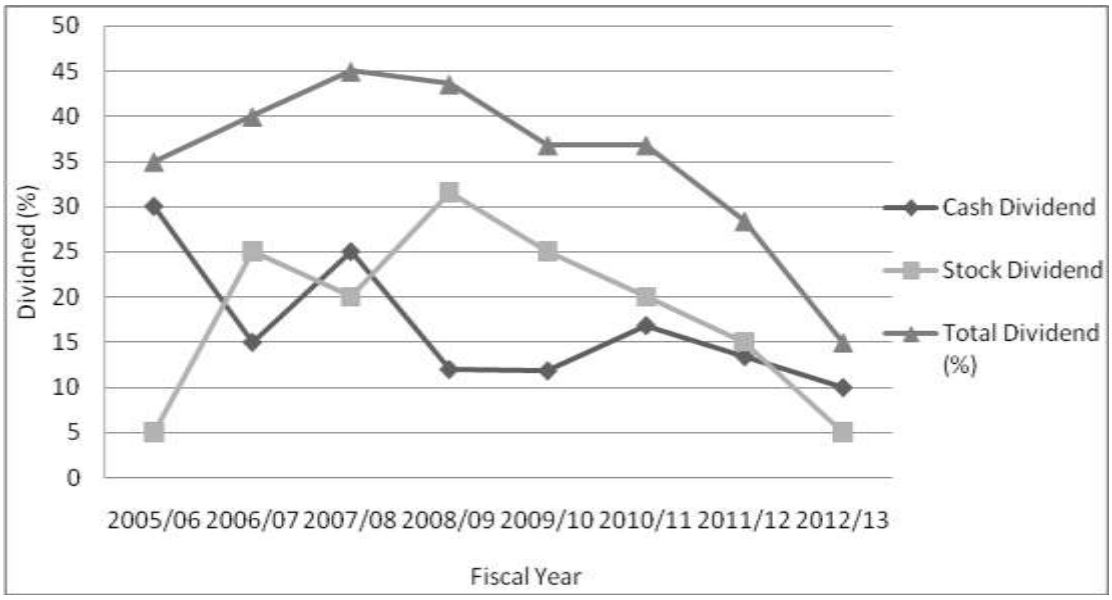
Fiscal Year	Cash Dividend	Stock Dividend	Total Dividend (%)
2005/06	30	5	35
2006/07	15	25	40
2007/08	25	20	45
2008/09	12	31.56	43.56
2009/10	11.84	25	36.84
2010/11	16.842	20	36.842
2011/12	13.421	15	28.421
2012/13	10	5	15
Average	**16.763**	**18.32**	**35.0829**

Source: AGM Reports of Himalayan Bank Limited

According to table 4.13 average cash dividend of HBL is 16.763%, average stock dividend is 18.32% and average total dividend is 35.0829%. The highest dividend provided by HBL is during the year 2008/09 i.e. 43.56% and lowest is 15% during the year 2012/13. During year 2008/09, HBL has raised its capital highest by providing 31.56% bonus share to its shareholders. From the record we can see that HBL has been continuously providing bonus shares and increasing its capitalization.

Figure 4.10

Cash Dividend, Stock Dividend and Total Dividend of HBL



From figure 4.10 we can see that HBL had been giving dividend to its shareholders consistently in eight sampled years but the rate of dividend has fallen drastically from starting of the year 2005/06 to the end year period taken as sample i.e. 2012/13. Most of the years HBL has increased its capitalization by giving stock dividend higher than the cash dividend. At the beginning and end year the stock dividend is provided least at 5%.

4.1.11 Analysis of Market Stock Price of HBL

The following table shows the closing market price of HBL.

Table 4.14

Closing Market Price of HBL

Fiscal Year	Closing Price
2005/06	1100
2006/07	1760
2007/08	1980
2008/09	1760
2009/10	816
2010/11	575
2011/12	653
2012/13	714
Average	**1169.75**

Source: AGM Reports of Himalayan Bank Limited

Table 4.14 shows the closing market price of HBL. From the figure we can see that closing price of stock price of HBL has been increasing and reached highest at Rs 1980 in year 2007/08 and then started to fall down at increasing rate at Rs 1760, Rs 816, Rs 575, Rs 653 and Rs 714 in the following consecutive years 2008/09, 2009/10, 2010/11, 2011/12 and 2012/13 respectively. The average closing price of HBL is Rs 1169.75 for the eight sampled years.

Figure 4.11

Price Movement of Common Stock of HBL

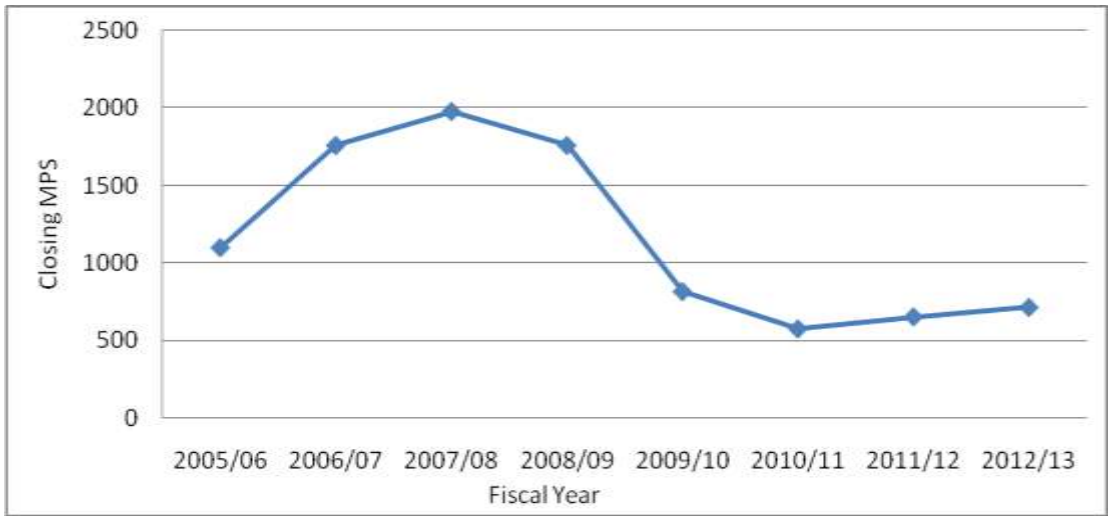


Figure 4.11 helps us view the price movement of common stock of HBL at one glance. We can see the variation in the price movement of HBL, in given eight sampled years the price has moved as bell, the rate of decreasing price movement is higher than the increasing price movement. The price started to increase at the beginning of the year and reached highest in 2007/08 and falls back to lowest in 2010/11 and could not pick up the price there after.

4.1.12 Analysis of Risk and Return of HBL

Table 4.15

Annual Rate of Return per Share of HBL

Fiscal Year	Closing Price	Cash Dividend	Stock Dividend	Total Dividend (Rs)	ARR (%)
2005/06	1100	30	5	118	32.4
2006/07	1760	15	25	510	106.4
2007/08	1980	25	20	377	33.9
2008/09	1760	12	31.56	269.5296	2.5
2009/10	816	11.84	25	155.59	-44.8
2010/11	575	16.8421	20	147.4421	-11.5
2011/12	653	13.4211	15	120.5211	34.5
2012/13	714	10	5	57.05	18.1

Source: Appendix 1, 2 and Annual Reports of HBL

According to table 4.15, the annual rate of return of HBL is highest in year 2006/07 at 106.4 and after 2006/07 the return rate decreased and reached to negatives in 2009/10 and 2010/11 at -44.8% and -11.5%. Then annual return picked up at 34.5 in 2011/12 and again fell back at 18.10% in 2012/13 year. The variation in the return of HBL can be better viewed in the graph shown below.

Figure 4.12

Annual Rate of Return per Share of HBL

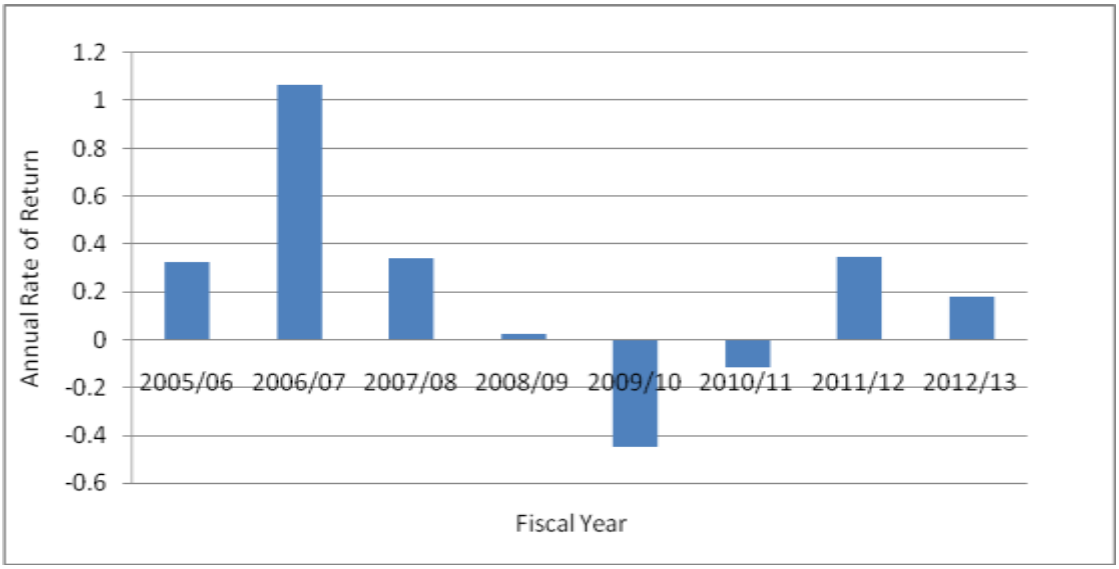


Figure 4.12 gives better picture of annual rate of return of HBL, at one glance we can say that in 2009/10 the annual rate of return of HBL is lowest and negative followed by year 2010/11 and the annual return is highest in year 2006/07. During the period of 2007 to 2011 the

performance of HBL is not so well and so their annual rate of return is least in these three years.

Table 4.16

Tabulation of Calculated Expected Return, Standard Deviation and Co-efficient of Variation of HBL

Expected Return (Er_i)	0.245
Standard Deviation (σ_i)	0.440
Co-efficient of Variation (C.V.)	1.792

Source: Appendix 2, 3 and 4

In table 4.16 we can see the expected rate of return of HBL for eight sampled years is 0.245 with risk or standard deviation of 0.440. And the coefficient of variation is 1.792 which tells that investors of HBL has to bear risk 1.792 per unit of return from stocks of HBL. With its high coefficient of variation we can conclude that stocks of HBL is very aggressive stock.

4.2 Inter Bank Comparison

Standard deviation is the relative measure of risk associated with any investment alternative. it is a weighted average of the deviations from the expected value and it provides an idea of how far above or below the expected value and the actual value is likely to be. the higher the variability of actual return from the expected value, the higher will be the standard deviation.

Coefficient of Variation (C.V.)

According to the findings of expected return, standard deviation and co-efficient of variation of sampled banks during the eight sampled FYs in preceding section, a comparative analysis of return, risk and risk per units is performed in the following table;

Table 4.17

Comparative Analysis of Expected Return, Standard Deviation and Coefficient of Variation of EBL, NIBL, SCB and HBL

Bank	Expected Return (Er_i)	Standard Deviation (σ_i)	Coefficient of Variation	Remarks		
				Return	Risk	C.V.
EBL	0.489	0.582	1.190	2nd Highest	Medium	Lowest
NIBL	0.445	0.659	1.476	Medium	2nd Highest	2nd Highest
SCB	0.731	1.018	1.424	Highest	Highest	Medium
HBL	0.245	0.440	1.792	Lowest	Lowest	Highest

According to table 4.17 it is founded which company has highest and lowest expected return, standard deviation and coefficient of variation.

Here expected return is the likely return to realize in the forthcoming year calculated from historic realized rates of returns. From above table 4.17 the highest expected rate of return over the eight sampled years period are Standard Charted Bank Nepal Ltd. and Everest Bank Ltd. with 0.731 and 0.489 whereas lowest expected return is of HBL i.e. 0.245.

Standard deviation is the relative measure of risk associated with any investment alternative. It is a weighted average of the deviations from the expected value and it provides an idea of how far above or below the expected value and the actual value is likely to be. The higher the variability of actual return from the expected value, the higher will be the standard deviation meaning higher is the risk. In the above table Standard Chartered Bank Nepal Ltd. has the highest standard deviation i.e. 1.018 followed by Nepal Investment Bank Ltd. i.e. 0.659 and lowest 0.440 of HBL.

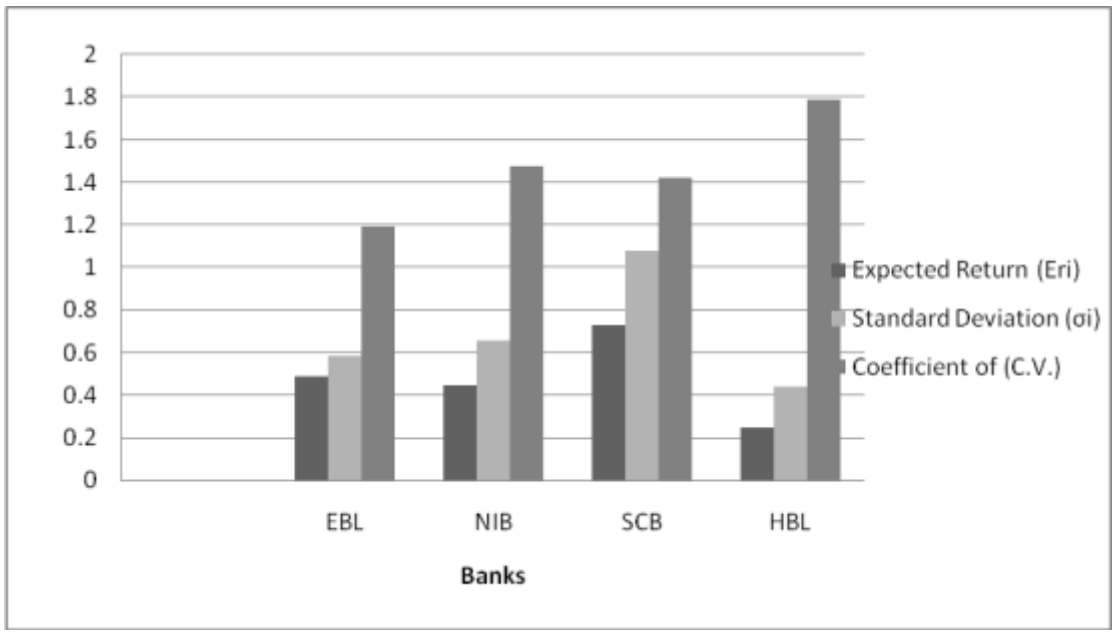
Every investor want to make investment in the asset where return is higher and lower is the risk. Higher the risk higher is the return generally. Aggressive investors tend to take higher risk so as to gain higher return whereas risk averse investors invest in lower risk investment with lower return. How to make investment decision when one asset or investment has higher expected return and other has lower standard deviation? In such case we can use another measure of risk, the coefficient of variation to make the investment choice as it shows the risk per unit of return. According to table 4.17 the coefficient of variation is highest of HBL i.e.

1.792 followed by Nepal Investment Bank Ltd. i.e. 1.476 and lowest of EBL i.e. 1.190. This indicates that common stock of HBL is more risky than other banks whereas it provides lowest return. Aggressive investors can invest in SCB as it gives highest return with medium risk per unit of return. Investment in EBL is desirable among 4 because for one unit of return, investors should bear only 1.190 unit of risk.

The comparison of risk and return among the sampled banks is better shown in the following figure;

Figure 4.13

Expected Return, Standard Deviation and Coefficient of Variation of Each Sampled Commercial Banks



From the above figure the comparison of each sampled bank's risk and return and their positioning can be easily done at one glance. HBL has lowest expected return with highest coefficient of variation. SCB has highest expected return with highest standard deviation and EBL and NIBL stands in quite similar position but the expected return of EBL is greater than NIBL whereas, NIBL's coefficient of variation and standard deviation are higher than EBL. So, stocks of EBL are more dominant than NIBL and between the two investors would choose stocks of EBL.

4.3 Comparison with the Market

4.3.1 Market Risk and Return Analysis

Stock market index is one of the most important indicators of secondary market which is also considered as the barometer of country's economy. Market index is directly correlated with the country's economic trend. Nepal Stock Exchange Ltd. (NEPSE) is the only stock market in Nepal. Overall market movement is represented by market index i.e. NEPSE index. NEPSE index group consists of various indices and they are calculated on the basis of market capitalization, whereas NEPSE index itself is calculated by considering all listed shares including that of promoter shares of all listed companies in NEPSE.

The NEPSE index from 2005/06 to 2012/13 is presented in the following table:

Table 4.18

NEPSE Index from 2005/06 to 2012/13

Fiscal Year	NEPSE Index
2005/06	386.83
2006/07	683.95
2007/08	963.36
2008/09	749.10
2009/10	477.73
2010/11	362.84
2011/12	389.74
2012/13	518.33

Source: www.nepse.com.np

NEPSE Index highest point during the last eight years period was 963.36 in FY 2007/08 and the lowest is recorded in FY 2010/11 of 362.84 points. NEPSE Index was in increasing trend during the period from FY 2005/06 to FY 2007/08 then the index went on drooping and reached at its lowest 362.84 points in FY 2010/11 and slowly picked up there after. This shows the market is very sensitive and volatile.

The trend of overall market index can be viewed better from following figure:

Figure 4.14

NEPSE Index Movement from 2005/06 to 2012/13

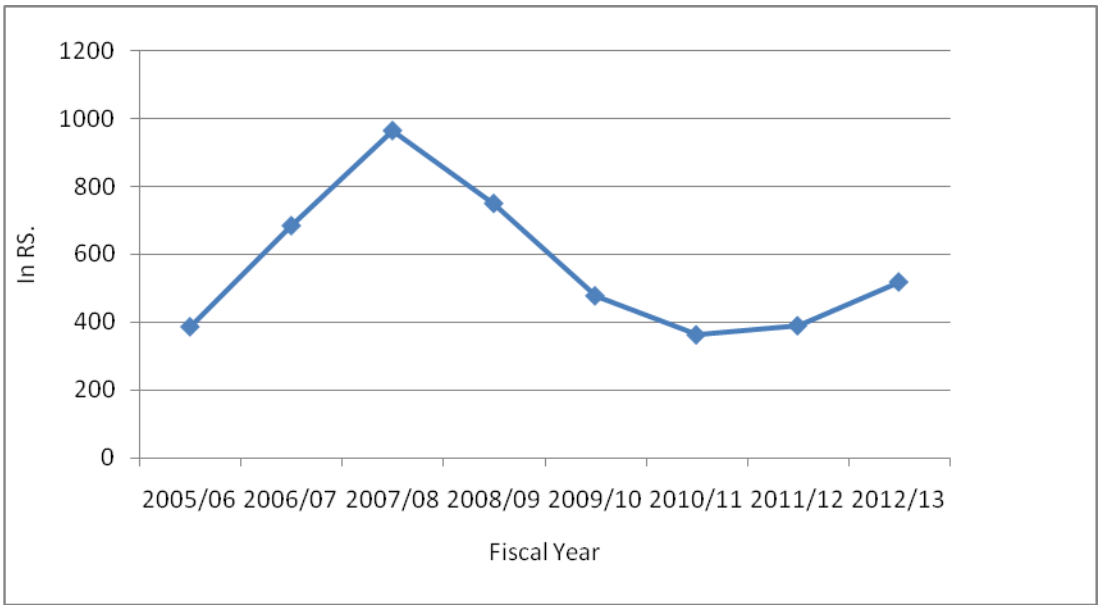


Figure 4.1 shows the trend of NEPSE index movement from FY 2005/06 to FY 2012/13, rising in first few years and reached the highest level in FY 2007/08 with the increase by 576.53 points considering FY 2005/06 points as base and then falls back to the lowest in FY 2010/11 with decrease of 600.52 points. After FY 2010/11 the NEPSE Index is increasing in a decreasing rate.

Market return is calculated by using the following equation.

$R_m = (NI_t - NI_{t-1}) / NI_{t-1}$

Where;

R_m = Return on Market

NI = NEPSE Index

T = Time or the year

Table 4.19

Annual Market Return

Fiscal Year	Market Index	$R_m = (NI_t - NI_{t-1}) / NI_{t-1}$
2005/06	386.83	0.349
2006/07	683.95	0.768
2007/08	963.36	0.409
2008/09	749.1	-0.222
2009/10	477.73	-0.362
2010/11	362.85	-0.240
2011/12	389.74	0.074
2012/13	518.33	0.330
Average	566.486	0.138

Source: www.nepse.com.np

Note: Market Index of 2004/05 is 286.67 points.

From table 4.19 we can see annual market return or NEPSE return of past eight years. The table indicates that the market return has increased from 0.349 to the highest return of the sampled years i.e. 0.768 from year 2005/06 to 2006/07 and then it started to fall. The annual market return was negative during three consecutive years from 2008/09 to 2010/11 and the annual market return slowly picked up reaching 0.33 rate of return at the end period. We can have better view of the market return movement in the graph below;

Figure 4.15

Annual Realized Rate of Return of Market Index

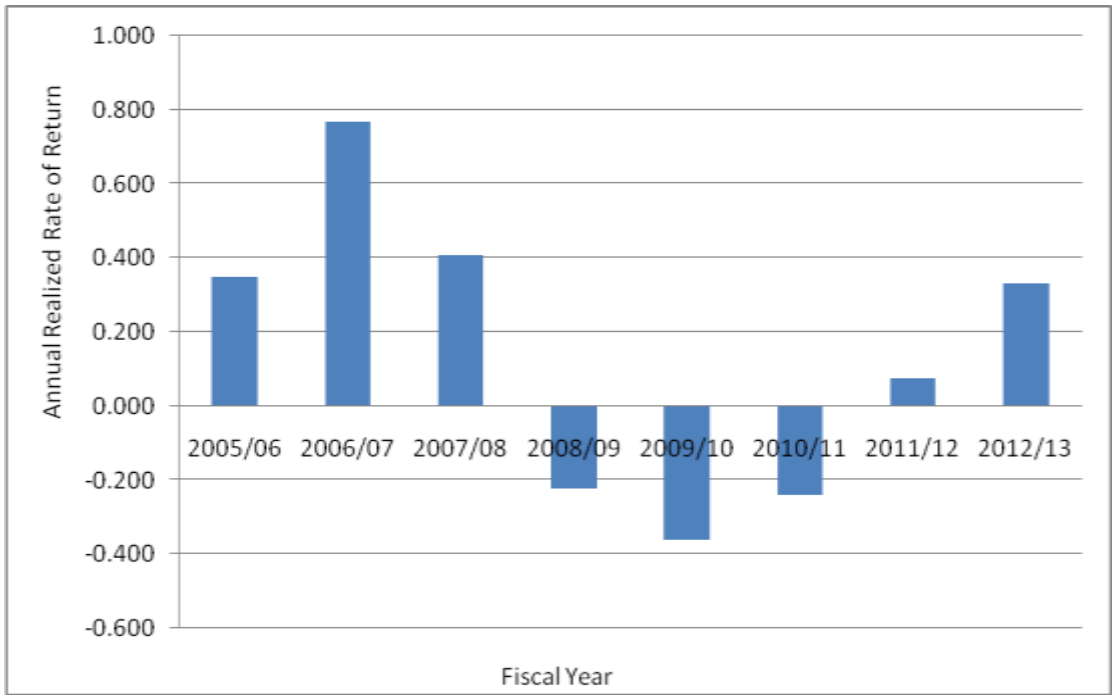


Figure 4.15 shows that the annual rate of return of market / NEPSE Index is fluctuating a lot and the return is towards down trend from 2006/07. The highest return is in the year 2006/07 and the lowest return is in the year 2009/10 as in the year 2009/10 the annual market return is below x-axis which indicates negative return.

Table 4.20

Tabulation of calculated Expected Return, Standard Deviation and Co-efficient of Variation of NEPSE Index

Expected Return (Er_m)	0.138
Standard Deviation (σ_m)	0.392
Co-efficient of Variation (C.V.)	2.843

Source: Appendix 2, 3 and 4

According to table 4.20 we can conclude that expected return of the eight sampled years from 2005/06 to 2012/13 of market index is 0.138 for which the standard deviation is 0.392. And the coefficient of variation of market return is 2.843 meaning, for per unit return of market 2.843 risk has to be taken.

4.3.2 Market Sensitivity Analysis

The total risk of returns of an asset can be divided into two part; diversifiable risk and undiversifiable risk. It is shown as;

Total risk = Undiversifiable Risk + Diversifiable Risk

Systematic Risk + Unsystematic Risk

Market Risk + Unique Risk

Factor Risk + Non Factor Risk

Related to Macro Economic Factors + Related to Micro Economic Factors

Diversifiable Risk

Diversifiable risk is also known as unsystematic risk or unique risk or non factor risk or risk that is related to micro economic factors. Since this kind of risk is unique to each organization it can be eliminated by holding diversified portfolio of investment. Such risk occurs due to inefficient management of the organization, advertisement campaigns, inventions, raw materials, labor strikes, etc

Undiversifiable Risk

Undiversifiable risk also known as systematic risk or market risk or factor risk or risk that is related to macro economic factors. This is that portion of total risk of any organization caused by market factors, the risk that cannot be minimized or eliminated and the risk that affects stock prices of all the organizations simultaneously as this kind of risk is occurred due to change in macro economic factors such as GDP, inflation, interest rate, etc. This kind of risk in not the risk of internal factors of the individual organization but the risk caused by external environment factors such as political, technological, sociological and technological.

The statistical measure of undiversifiable risk i.e. beta coefficient is calculated by;

Beta Coefficient (b_i) = $Cov(r_i,r_m)/ \sigma^2 m$

Where;

b_i = beta coefficient of asset i

$\sigma^2 m$ = variance of market return

$Cov(r_i,r_m)$ = covariance between the returns of security and market

Beta of market return is always 1 and beta coefficient as an index of systematic risk is used to rank the assets. In other words market sensitivity of stock is explained by beta coefficient with respect to market beta. Higher beta shows higher sensitivity and higher the reaction to the market movement and vice versa. contends that shares of assets co-move with the market. if the market moves by 1% and a share has a beta of two, the return on the share would move by 2%. The beta indicates the sensitivity of the return on shares with the return on the market. Depending on the nature of the companies' product or activities, their market sensitivity differs. For instance; luxury products manufacturers have higher beta than that of food manufacturer or daily basic needs goods manufacturers.

The stock of any company is classified as aggressive or defensive or average depending on the value of its beta coefficient as shown in the table below:

Table 4.21

Beta and Stocks Classification

Beta Coefficient (b_i)	Stocks classification and degree of risk
Beta Coefficient > 1	Aggressive stock, i.e. more risky than the market
Beta Coefficient < 1	Defensive stock, i.e. less risky than the market
Beta Coefficient = 1	Average stock, i.e. equally risky as the market

The following table shows the beta coefficient of sampled banks over the period of eight years; 2005/06 to 2012/13.

Table 4.22

Beta Coefficient of EBL, NIBL, SCB and HBL

Banks	Beta Coefficient	Comparison with Market	Remarks
EBL	1.435	>1	Medium Aggressive
NIBL	1.442	>1	Medium Aggressive
SCB	1.961	>1	Most Aggressive
HBL	1.019	>1	Least Aggressive

Source: Appendix-6

The realized return of stock with beta greater than 1 fluctuates more than the return of the market, the beta of stock less than 1 fluctuates less than the return of the market and the beta

of stock that is equal to 1 fluctuates with the market in same direction, hence they are named Aggressive, Defensive and Average stock respectively.

From the above table 4.22 all the sampled banks stocks are aggressive stocks as the beta of all 4 sampled banks over the eight years period is greater than 1. Among the four banks, the most aggressive stock is of SCB with highest beta of 1.961, the second most aggressive stock is of NIBL with beta of 1.442 and followed by EBL and HBL with their betas as 1.435 and 1.019 respectively.

By using beta coefficient and variance of the market we can partition total risk (variance) into systematic and unsystematic risk as;

Total Risk = Systematic Risk + Unsystematic Risk

Following table shows the underlying proportion of systematic and unsystematic risk of the four sampled banks.

Table 4.23

Proportion of Systematic Risk and Unsystematic Risk

Banks	Total Risk	Systematic Risk	Unsystematic Risk	Proportion of Systematic Risk	Proportion of Unsystematic Risk
EBL	0.339	0.317	0.022	93.510	6.490
NIB	0.434	0.32	0.114	73.733	26.267
SCB	1.037	0.592	0.445	57.088	42.912
HBL	0.194	0.16	0.034	82.474	17.526

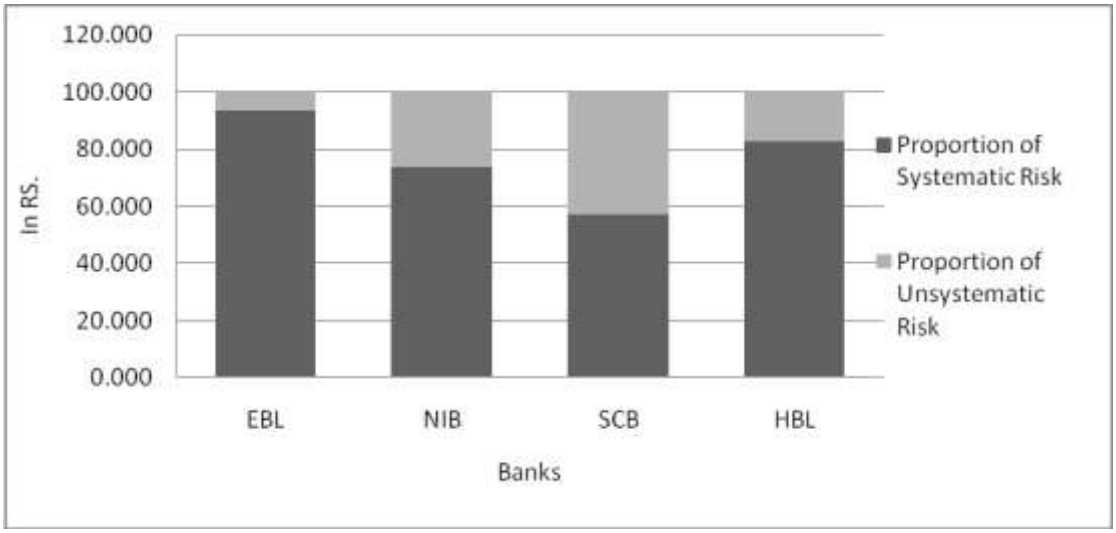
Source: Appendix-7

The above table shows the systematic and unsystematic risk and its proportion of different commercial bank's common stock. The proportion of systematic risk of EBL is higher than other sampled banks i.e. 93.510%.This indicates that out of total risk of stocks of EBL, 93.510% is undiversifiable risk created from systematic factors or market factors and cannot be diversified or controlled by the company and the remaining 6.490% is unsystematic risk created due to company related factors and can be diversified with optimal portfolio management. Likewise HBL and NIBL has second and third highest systematic or undiversifiable risk caused by market factors, they are 82.474 % and 73.733% respectively. SCB has lowest proportion of systematic risk i.e. 57.088% which indicates that the proportion of systematic risk and unsystematic risk is almost same and the controllable risk is 42.912%.

This proportion of risk can be easily partitioned at once glance with the help of following figure.

Figure 4.16

Proportion of Systematic Risk and Unsystematic Risk



From the above figure we can view that the proportion of systematic risk is highest of EBL and lowest of SCB.

Coefficient of Determination

The coefficient of determination and the proportion of systematic risk are the same. The coefficient of determination is the proportion of systematic risk in total risk. The higher the systematic risk the higher will the coefficient of determination and vice versa. The following equation justifies that the coefficient of determination and the proportion of systematic risk are the same.

Coefficient of Determination (ρ^2_{im})

$$= \text{Systematic Risk / Total Risk}$$

$$= b^2_i \sigma^2_m / \sigma^2_i$$

$$= [(\rho_{im}\, \sigma_i\, \sigma_m / \sigma^2_m)^2 * \sigma^2_m] / \sigma^2_i$$

$$= [\{(\rho^2_{im}\, \sigma^2_i\, \sigma^2_m) / \sigma^2_i\} * \sigma^2_m] / \sigma^2_i$$

$$= \rho^2_{im}$$

Therefore proportion of systematic risk = ρ^2_{im} and proportion of unsystematic risk = 1- ρ^2_{im}.

The value of coefficient of determination can also be calculated using following formula:

Coefficient of Determination (ρ^2_{im})

Correlation between asset and the market, $(\rho_{im}) = Cov(r_i, r_m) / \sigma_i \sigma_m$

$= x$ ..... (supposedly)

Therefore the Coefficient of Determination, $(\rho^2_{im}) = x^2$

Let us calculate the coefficient of determination of each sampled bank using the above correlation's formula and explain the result.

i. EBL Coefficient of Determination (ρ^2_{im})

Correlation between EBL and market, $(\rho_{im}) = Cov(r_i, r_m) / \sigma_i \sigma_m$

$= 0.221/ (0.582*0.392)$

$= 0.969$

Therefore Coefficient of Determination of EBL $(\rho^2_{im}) = 0.969^2 = 0.939$

The coefficient of determination measures the proportion of systematic risk in total risk. Here, the determination of 0.939 indicates that, out of the total variability of return, 93.90% variability is due to market movement or macroeconomic factors and the remaining 6.10% is due to the unique causes of the company itself. Thus, the stock of EBL is market sensitive.

ii. NIBL Coefficient of Determination (ρ^2_{im})

Correlation between NIBL and market, $(\rho_{im}) = Cov(r_i, r_m) / \sigma_i \sigma_m$

$= 0.222/ (0.659*0.392)$

$= 0.859$

Therefore Coefficient of Determination of NIBL $(\rho^2_{im}) = 0.861^2 = 0.739$

Here the coefficient of determination of 0.739 indicates that, out of the total variability of return, 73.90% variability is due to market movement or macroeconomic factors and the remaining 26.10% is due to the unique causes of the company itself. Thus, the stock of NIBL is market sensitive but its sensitivity towards market is less than that or EBL.

iii. SCB Coefficient of Determination (ρ^2_{im})

Correlation between SCB and market, $(\rho_{im}) = Cov(r_i, r_m) / \sigma_i \sigma_m$

$= 0.302/ (1.018*0.392)$

$= 0.757$

Therefore Coefficient of Determination of SCB (ρ^2_{im}) = 0.759^2 = 0.573

Here the coefficient of determination of 0.573 indicates that, out of the total variability of return, 57.30% variability is due to market movement or macroeconomic factors and the remaining 42.70% is due to the unique causes of the company itself. The market sensitivity of SCB is not so high. Among the four sampled banks SCB has lowest market sensitivity.

iv. HBL Coefficient of Determination (ρ^2_{im})

Correlation between HBL and market, (ρ_{im}) = $Cov(r_i, r_m) / \sigma_i \sigma_m$

= 0.157/ (0.440*0.392)

= 0.910

Therefore Coefficient of Determination of HBL (ρ^2_{im}) = 0.915^2 = 0.828

Here the coefficient of determination of 0.837 indicates that, out of the total variability of return, 82.80% variability is due to market movement or macroeconomic factors and the remaining 17.20% is due to the unique causes of the company itself. Thus, the stock of HBL is market sensitive.

From the above calculation of Correlation of EBL, NIBL, SCB and HBL with the Market is shown in the table below.

Table 4.24

Correlation of EBL, NIBL, SCB and HBL with the Market

Banks	Correlation with Market	Remarks	Ranking (on basis of +ve movement with market)
EBL	0.969	Perfectly +vely Correlated	1
NIBL	0.859	+vely Correlated	3
SCB	0.757	+vely Correlated	4
HBL	0.910	Perfectly +vely Correlated	2

Table 4.25

Coefficient of Determination of EBL, NIBL, SCB and HBL

Banks	Coefficient of Determination	Remarks	Ranking (on basis of high market sensitivity)
EBL	0.939	Highly Market Sensitive	1
NIBL	0.739	Market Sensitive	3
SCB	0.573	Market Sensitive	4
HBL	0.828	High Market Sensitive	2

4.3.3 Investment Decision with Implication of CAPM in Single Assets

Today CAPM is regarded by many as a superior model of security price behavior to others based on wealth maximization. Unlike the dividend and earnings share valuation models of Gordon (1962) and Modigliani and Miller (1961), the CAPM explicitly identifies the risk associated with an ordinary share (common stock) as well as the future returns it is expected to generate. The CAPM can be used by investors who desire to eliminate unsystematic risk through efficient diversification and assess the required return for a given level of non-diversifiable risk or systematic (market) risk.

Moreover, the CAPM can also express investment returns in two forms

For individual securities

$E(R_i) = r_f + (Er_m - r_f)b_i$

And because systematic betas apply to a portfolio

$E(R_p) = r_f + (r_m - r_f)b_p$

where;

$E(R_i)$ = Required rate of return for asset i

b_i = beta of stock i

Er_m = expected return on market

r_f = risk free rate of return

$E(R_p)$ = Required rate of return for portfolio

b_p = beta of portfolio

Risk Free Rate of Return (R_f)

Risk free rate of return is the return on the investment which has no any risk associated with it. The average realized rate of return of 91-day treasury bill provided by Nepal Rastra Bank for the period of 2005/06 to 2012/13 has been taken as the proxy for the risk free rate of return in this study. In the following table we can see the average risk free rate of return of the eight sampled years is 5.041 i.e. is used in this study;

Table 4.26

Risk Free Rate of Return

Fiscal Year	91-Day Treasury Bill Rate
2005/06	3.75
2006/07	4.54
2007/08	5.39
2008/09	8.71
2009/10	8.515
2010/11	8.721
2011/12	0.399
2012/13	0.3
Total	40.325
Avg. Return (R_f)	**5.041**

Source: www.nepse.com.np

Table 4.26 shows the average risk free rate of return used in this study is 5.041 which is calculated by adding up all the past eight sampled years risk free rate and divide the total amount by eight years.

The following table shows the calculation of required rate of return of sampled banks;

Table 4.27

Required Rate of Return of EBL, NIBL, SCB and HBL

Banks	Rf	Erm	bi	E(Ri) = rf + (Erm-rf)bi
EBL	0.054	0.138	1.435	= 0.050+(0.138-0.050)*1.435= 0.176
NIBL	0.054	0.138	1.442	= 0.050+(0.138-0.050)*1.442= 0.177
SCB	0.054	0.138	1.961	= 0.050+(0.138-0.050)*1.961= 0.223
HBL	0.054	0.138	1.019	= 0.050+(0.138-0.050)*1.019= 0.140

From the above table we can see the required rate of return of each sampled banks highest is of SCB 0.223 and followed by NIBL, EBL and HBL at returns of 0.177, 0.176 and 0.140 respectively. By comparing this required rate of return of each bank with its expected rate of return pricing of the stock price of the company can be done as shown in the following table;

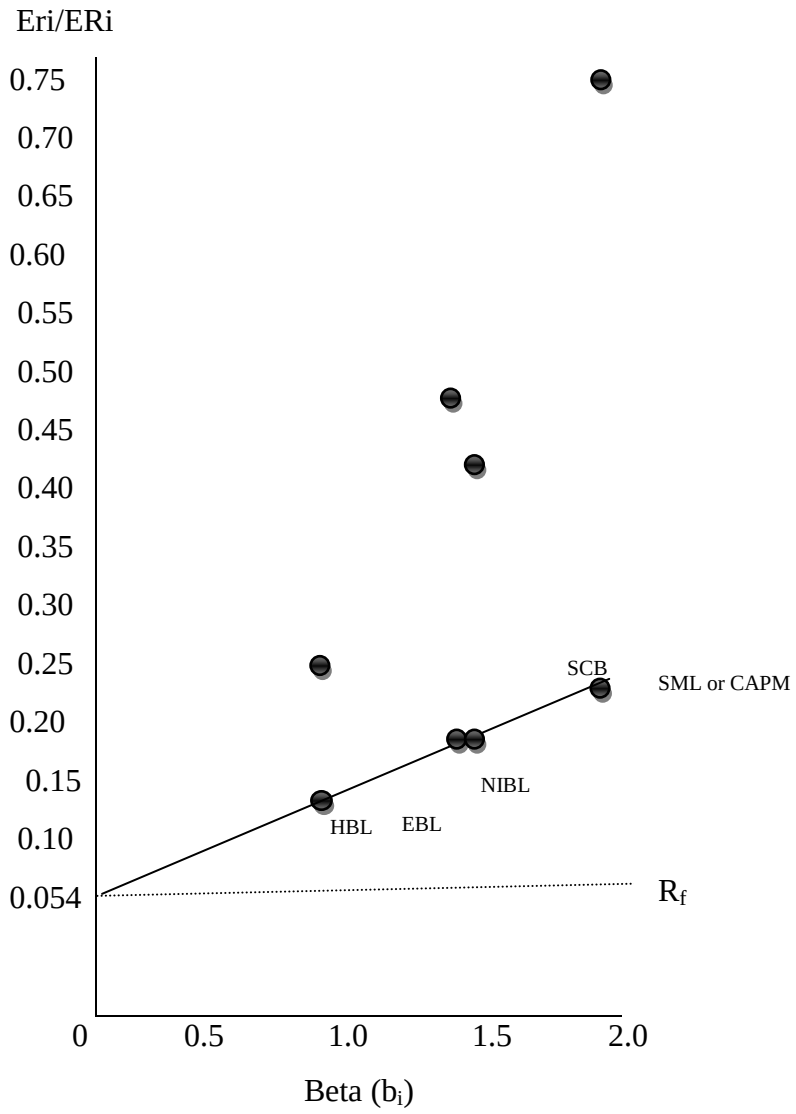
Table 4.28

Market Price Evaluation of EBL, NIBL, SCB and HBL

Banks	$E(R_i)$		$\bar{R}_i$ or Er_i	Price Evaluation
EBL	0.176	<	0.489	Under priced
NIBL	0.177	<	0.445	Under priced
SCB	0.223	<	0.731	Under priced
HBL	0.140	<	0.245	Under priced

In the table 4.28 we can see that the expected rate of returns of all sampled banks are greater than their required rate of returns, so it is recommended to buy stocks of all these banks as they are underpriced and they have good investment opportunity providing the investors higher return in the near future.

Figure 4.17
Expected Return and Required Rate of Return on Graph



In the figure 4.17 x-axis shows the betas of the sampled banks and y-axis shows the expected and required rate of return. From the figure, we get all expected rate of returns far above the SML or CAPM which shows that the stocks are undervalued and higher the gap between the SML line and expected return rates greater is beneficial for the investors to invest in that stock. The gap of SCB is highest from its expected rate of return and SML or required rate of return, it is recommendable to buy the stocks of SCB. second highest gap is of EBL followed by NIBL and HBL. Since all the stocks are underpriced, investors can gain profit by buying these stocks. So, from the data and findings it is recommended to buy the stocks.

4.4 Analysis of Portfolios with Markowitz Diversification

Markowitz Diversification, developed by Harry Markowitz in1952, is an analytical technique to diversify a portfolio. This diversification is also known as modern theory of portfolio management. Markowitz diversification is based on correlation. Lower the correlation between assets, the more the Markowitz Diversification will be able to reduce the portfolio's risk.

Six possible portfolios are created from four sampled banks. They are:

- EBL & NIBL
- EBL & SCB
- EBL & HBL
- NIBL & SCB
- NIBL & HBL
- SCB & HBL

Calculation of Correlation of Portfolios

Table 4.29

Correlation of Portfolios

Portfolio	Correlation of Coefficient	Remark	Ranking (as per degree of +ve relationship of movement of bank's return)
EBL & NIBL	0.791	Positively correlated	3
EBL & SCB	0.821	Positively correlated	2
EBL & HBL	0.906	Positively correlated	1
NIBL & SCB	0.692	Positively correlated	5
NIBL & HBL	0.698	Positively correlated	4
SCB & HBL	0.572	Positively correlated	6

Source: Appendix 8

From table 4.28 the correlation of coefficient between the combination of SCB and HBL is least perfectly positively correlated whereas all other combinations of banks have higher correlation of coefficient, thus, according to Markowitz Diversification among the six portfolios (EBL & NIBL, EBL & SCB, EBL & HBL, NIBL & SCB, NIBL & HBL and SCB & HBL); portfolio combination of SCB and HBL is selected.

4.5 Analysis of Portfolios with Expected Return, Standard Deviation and Coefficient of Variation

Calculation of Proportion of Investment in two Different Assets that gives Minimum Variance is calculated as;

Note: In the following portfolios prior asset is considered as "i" asset and later asset as "j".

For portfolio EBL and NIBL

$W_i = (\sigma^2_j - Cov_{ij}) / (\sigma^2_i + \sigma^2_j - 2Cov_{ij})$

= (0.434-0.303)/(0.339+0.434-2*0.303)

= 0.784

Wj = 1- Wi = 1- 0.784 = 0.216

For portfolio EBL and SCB

$W_i = (\sigma^2_j - Cov_{ij}) / (\sigma^2_i + \sigma^2_j - 2Cov_{ij})$

= (1.037-0.486)/(0.339+1.037-2*0.486)

= 1.364

Wj = 1- Wi = 1- 1.364 = -0.364

For portfolio EBL and HBL

$W_i = (\sigma^2_j - Cov_{ij}) / (\sigma^2_i + \sigma^2_j - 2Cov_{ij})$

= (0.194-0.232)/(0.339+0.194-2*0.232)

= -.550

Wj = 1- Wi = 1- (-0.550) = 1.55

For portfolio NIBL and SCB

$W_i = (\sigma^2_j - Cov_{ij}) / (\sigma^2_i + \sigma^2_j - 2Cov_{ij})$

= (1.037-0.464)/(0.434+1.037-2*0.464)

= 1.055

Wj = 1- Wi = 1- 1.055 = -0.055

For portfolio NIBL and HBL

$W_i = (\sigma^2_j - Cov_{ij}) / (\sigma^2_i + \sigma^2_j - 2Cov_{ij})$

= (0.194-0.202)/(0.434+0.194-2*0.202)

= -0.036

Wj = 1- Wi = 1- (-0.036) = 1.036

For portfolio SCB and HBL

$W_i = (\sigma^2_j - Cov_{ij}) / (\sigma^2_i + \sigma^2_j - 2Cov_{ij})$

= (0.194-0.256)/(1.037+0.194-2*0.256)

= -0.100

Wj = 1- Wi = 1- (-0.100) = 1.10

Following table shows the expected returns of all possible portfolios of sampled banks.

Table 4.30

Expected Returns of Portfolios

Portfolios	Erp	Ranking (from high to low)
EBL & NIBL	0.479	1
EBL & SCB	0.401	3
EBL & HBL	0.111	6
NIBL & SCB	0.429	2
NIBL & HBL	0.238	4
SCB & HBL	0.196	5

Source: Appendix 9

In Table 4.30 we can see that the highest expected return is of portfolio EBL & NIBL i.e. 47.90% and is followed by other portfolios NIBL & SCB, EBL & SCB, NIBL & HBL, SCB & HBL and lowest expected return is of EBL & HBL with expected returns of 42.90%, 40.10%, 23.80%, 19.60% and 11.10% respectively.

Following table shows the standard deviations of all possible portfolios of sampled banks.

Table 4.31

Standard Deviations of Portfolios

Portfolios	σ_p	Ranking (from low to high)
EBL & NIBL	0.680	6
EBL & SCB	0.631	5
EBL & HBL	0.511	3
NIBL & SCB	0.589	4
NIBL & HBL	0.413	2
SCB & HBL	0.231	1

Source: Appendix 10

From above Table 4.31 we can conclude that in terms of standard deviation of portfolio SCB & HBL has least risk as this portfolio has lowest standard deviation 0.231 whereas, portfolio EBL & NIBL has the highest standard deviation of 0.680. EBL & NIBL portfolio has the highest variability of actual return from the expected value, thus it has the highest risk. Following table shows the coefficient of variations of all possible portfolios of sampled banks.

Table 4.32

Coefficient of Variations of Portfolios

Portfolios	C.V.p	Ranking (from low to high)
EBL & NIBL	1.418	3
EBL & SCB	1.574	4
EBL & HBL	4.612	6
NIBL & SCB	1.372	2
NIBL & HBL	1.737	5
SCB & HBL	1.176	1

Source: Appendix 11

According to Table 4.32, EBL & HBL portfolio has highest coefficient of variation of 4.612. To invest in such portfolio investors can loss their investment as it has very high risk, to gain one unit of return investors need to bear 4.612 unit risk in this portfolio. So, such portfolio should be avoided. It is recommended and advisable to invest in portfolio of SCB & HBL as it has lowest coefficient of variation i.e. 1.176, investment in such portfolio investors need to bear 1.176 risk per unit of return.

Following table shows the beta coefficients of all possible portfolios of sampled banks.

Table 4.33

Betas of Portfolios

Portfolios	Bp	Remarks
EBL & NIBL	1.437	Aggressive
EBL & SCB	1.244	Aggressive
EBL & HBL	0.902	Defensive
NIBL & SCB	1.413	Aggressive
NIBL & HBL	1.078	Average
SCB & HBL	1.004	Average

Source: Appendix 12

From Table 4.33we can conclude that EBL & NIBL portfolio is the most aggressive portfolio with highest beta of 1.437, followed by portfolios NIBL & SCB and EBL & SCB with betas higher than one i.e. 1.413 and 1.244 respectively. Portfolios NIBL & HBL and SCB & HBL are average stocks portfolios as their betas are 1.078 and 1.004 respectively. Portfolio EBL & HBL has beta less than 1 i.e. 0.902 so it is defensive stocks portfolio.

Analysis of Portfolios with CAPM

CAPM equation for required rate of return of portfolio is calculated as;

Required Rate of Return of Portfolio $E(R_p) = r_f + (Er_m - r_f)\, b_p$

Following table shows calculation of required rate of returns of portfolios.

Table 4.34

Required Rate of Returns of Portfolios

Portfolios	rf	Erm	Bp	$E(R_p) = r_f + (Er_m - r_f)\, b_p$
EBL & NIBL	0.050	0.138	1.437	=0.05+(0.138-0.05)*1.437=0.176
EBL & SCB	0.050	0.138	1.244	=0.05+(0.138-0.05)*1.244=0.159
EBL & HBL	0.050	0.138	0.902	=0.05+(0.138-0.05)*0.902=0.129
NIBL & SCB	0.050	0.138	1.413	=0.05+(0.138-0.05)*1.413=0.174
NIBL & HBL	0.050	0.138	1.078	=0.05+(0.138-0.05)*1.078=0.145
SCB & HBL	0.050	0.138	1.004	=0.05+(0.138-0.05)*1.004=0.138

Table 4.35

Market Price Evaluation of Portfolios

Portfolios	$E(R_p)$		$\bar{R}_i$ or Er_p	Price Evaluation
EBL & NIBL	0.176	<	0.479	Under priced
EBL & SCB	0.159	<	0.401	Under priced
EBL & HBL	0.129	<	0.111	Under priced
NIBL & SCB	0.174	<	0.429	Under priced
NIBL & HBL	0.145	<	0.238	Under priced
SCB & HBL	0.138	<	0.196	Under priced

Table 4.35 indicates that all portfolios are underpriced as required rate of returns are less than expected rate of returns. So, investors should hold long position of these portfolios, hold or buy the stocks of portfolios, considering other risk and return factors too.

4.5 Major Findings of the Study

The major findings of the study are as follows:

1) EBL has provided stock and cash dividend to its investors from fiscal year 2006/07 to 2012/13 with the consistency of 30% stock dividend in fiscal year 2006/07, 2007/08, 2008/09, 2009/10 and 2011/12. NIBL also has provided stock dividend 25% and above for five years except for year 2008/09 and 2009/10, in these two years no stock dividend was paid out and in year 2012/13 only 10% stock dividend was issued and throughout the year cash dividend is provided consistently. The dividend of SCB for three consecutive years from 2006/07 to 2008/09 was very impressive with 50% of bonus share and 80% of cash dividend i.e. total of 130%. Rest of the years the % of stock dividend issued is very low and is 0 in the year 2010/11. Likewise HBL has also provided cash and stock dividend but with high variation throughout the eight sampled years from least 5% to greatest 31.56% stock dividend. (Table No. 4.1, 4.5, 4.9 and 4.13)
2) The market price of all sampled banks have reached highest level in year 2007/08 and then dropped to lowest and could not pick up much. The figure shows there is marginal growth in the market price of all sampled banks from year 2011/12. (Table No. 4.2, 4.6, 4.10 and 4.14)

3) SCB is paying highest expected return among the four sampled banks, followed by EBL, NIBL and HBL as the expected return of SCB is 73.10%, EBL is 48.90%, NIBL is 44.50% and HBL is 24.50%. (Table No. 4.4, 4.8, 4.12 and 4.16)
4) On the basis of standard deviation, common stock of SCB has highest standard deviation of 1.018; followed by NIBL and EBL at 0.659 and 0.582 standard deviation respectively. And common stock of HBL has lowest standard deviation of 0.440. (Table No. 4.4, 4.8, 4.12 and 4.16)
5) On the basis of coefficient of variation, common stock of EBL has lowest coefficient of variation i.e. 1.190 unit of risk per unit of return and HBL has highest coefficient of variation i.e. 1.792 unit of risk per unit of return whereas SCB has 1.424 and NIBL has 1.476 unit of risk per unit of return. (Table No. 4.4, 4.8, 4.12 and 4.16)
6) Stock of SCB is most aggressive as it has highest beta i.e. 1.961 and HBL is least aggressive as it has lowest beta i.e. 1.019 whereas, NIBL and EBL has 1.442 and 1.435 betas respectively. (Table No. 4.22)
7) On the basis of coefficient of determination or the proportion of systematic risk, EBL has highest systematic risk proportion i.e. 93.90%, followed by HBL, NIBL and SCB with coefficient of determination of 82.80%, 73.90% and 57.30% respectively. (Table No. 4.25)
8) According to CAPM required rate of returns of EBL, NIBL, SCB and HBL are 0.176, 0.177, 0.223 and 0.140 respectively. (Table No. 4.27 and 4.28)
9) Among six possible portfolios correlation coefficient of portfolio EBL & HBL is highest i.e. 0.906, followed by portfolios EBL & SCB, EBL & NIBL, NIBL & HBL, NIBL & SCB and SCB & HBL with 0.821, 0.791, 0.698, 0.692 and 0.572 respectively. (Table No. 4.29)
10) Portfolio EBL & NIBL has highest expected return i.e. 47.90% and portfolio EBL & HBL has lowest expected return i.e. 11.10%. Other portfolios' expected returns are; NIBL & SCB has 42.90%, EBL & SCB has 40.10%, NIBL & HBL has 23.80% and SCB & HBL has 19.60% expected returns. (Table No. 4.30)
11) Among six portfolio standard deviation portfolio of EBL & NIBL portfolio is highest, followed by EBL & NIBL, NIBL & SCB, EBL & HBL, NIBL & HBL and lowest standard deviation of SCB & HBL. Their standard deviations are 0.631, 0.589, 0.511, 0.413and 0.231 respectively. (Table No. 4.31)

12) According to coefficient of variation of portfolio, lowest risk per unit return of portfolio is SCB & HBL i.e. 1.176 and highest is of EBL & HBL i.e. 4.612. NIBL & SCB has 1.372 second lowest coefficient of variation followed by EBL & NIBL, EBL & SCB and NIBL &HBL with 1.418, 1.574 and 1.737 coefficient of variations respectively. (Table No. 4.32)
13) Beta portfolio of SCB & HBL and NIBL & HBL shows they are average stocks as their betas are 1.004 and 1.078. Portfolio EBL & HBL with the given weights indicates it is defensive stock as it has beta lower than 1 i.e. 0.902 whereas, portfolio EBL & NIBL, NIBL & SCB and EBL & SCB are aggressive stocks as their betas are greater than 1. They are 1.437, 1.413 and 1.244 respectively. (Table No. 4.33)
14) Required rate of returns of CAPM of all six portfolios EBL & NIBL, EBL & SCB, EBL & HBL, NIBL & SCB, NIBL & HBL and SCB & HBL are 0.176, 0.159, 0.129, 0.174, 0.145 and 0.138 respectively. (Table No. 4.34)

CHAPTER-V

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Summary

This study is focused on how to make investment decision, it explains about CAPM and its implication for making better investment decision. The major objectives of this study are 1. To calculate the risk and expected return of the selected companies listed in NEPSE. 2. To compare expected rates of return with the required rate of return of individual stocks. 3. To identify if the selected companies are under priced or over priced with required rate of return and expected return. 4. To identify the highly aggressive, aggressive, average and defensive stocks among the selected securities. 5. To partition the total risk of individual stock into diversifiable and un-diversifiable risk. 6. To compute and analyze beta and CAPM equations for the selected companies.

The study is made by taking four commercial banks EBL, NIBL, SCB and HBL as sample for the period of eight years from 2005/06 to 2012/13. And all data collected are secondary data from NEPSE, SEBON and annual report issued by the sampled banks.

In the study various statistical and financial tools are used to accomplish the objectives. And to imply CAPM for the investment decision risk return analysis and regression equation has been used.

5.2 Conclusion

Nepalese stock market is very small in size comparatively with other stock markets such as Sensex of India, Nikkei 225 of Japan, Shanghai Composite of China, Dow Jones Industrial Average (DJIA) and S&P 500 of USA, CAC 40 of Canada, etc. At present there are only 338 companies listed in the NEPSE. Among the listed companies only less than 100 are active and in trading. So, while making investment decision investors need to consider these 100 active trading companies and make their portfolio. Thus, it is found that if investors study the market movement, company’s management and performances, country's economy as well as political situation and use analytical method to evaluate the stocks of the companies while making investment decision then the investors can pertain their goals of earning higher return from their investment.

Investors should have set objective for their investment as different investor invest in share market for different purposes. Not having set objective can lead to wrong investment decision by not giving satisfactory return or incur loss too. For instance, if investors objective is capturing a capital gain in a short run then it requires a selection of highly fluctuating companies or newly listed companies such as Mega Bank Ltd., Janata Bank Ltd., SCB, etc. and such investors should avoid investing in shares of finance and insurance companies because their share price is found to fluctuate less as compared to the banks.

The central focus of the study is how to make investment decision and to apply CAPM for the investment decision making. For well financial management investors should know the trade of between risk and return for any investment. The relationship between risk and return is described by investor's perceptions about risk and their demand for compensation. No investors invest in highly risky assets unless s/he is compensated adequate return for the acceptance of risk. But in Nepal, due to lack of information centers and stock analysts centers general public are least understood about the stock market and they are attracted towards the common stocks that give highest expected return. Every return is associated with risk; study showed higher return stocks have higher risk, thus those investors who invested considering only the expected return factor could face crash down in their investment. While making the investment decision not only does the expected return should be considered, investors should know the standard deviation or risk associated with it. Furthermore Coefficient of variation gives better understanding of the common stock to the investors. Investors can evaluate the common stocks with Coefficient of determination or the systematic risk measurement with beta's help to know how much risk of the common stocks are diversifiable and the proportion of risk that cannot be reduced by diversification. Beta is also used to determine the required rate of return of assets using CAPM. The application of the CAPM and beta factors is straight forward as far as stock market tactics are concerned. The CAPM assumes that investors have three options when managing a portfolio: 1. To trade, 2. To hold and 3. To substitute, (i.e. securities for property, property for cash, cash for gold etc).With the result of CAPM investors can make investment decision which options to choose. If the required rate of return is lower than expected rate of return a stock is said to be underpriced so investors should hold long position of such stock, meaning investors should buy and hold such stock as the stock price has high chance to increase in the price in future. Whereas if the required rate of return is higher than the expected rate of return the stock is said to be overpriced. Investors should

hold short position meaning should sell such stock as the stock has the chance to decrease in the price in future. In the study CAPM findings show it is advisable to hold long positioning or buy stocks of all four sampled banks as they are underpriced and they have high chance to rise in price in future.

5.3 Recommendations

Following recommendations are made on the basis of above findings, conclusions and reviewing others' studies;

- On the basis expected returns from finding number 3, it is recommended to buy stocks of SCB because of its highest level of expected return. Among the four sampled banks, investors investing in SCB can gain highest return.
- Finding number 4 indicates that stock of SCB is most risky as it has highest level of standard deviation and stock of HBL is least risky as it has lowest standard deviation. So, it is recommended for risk averse investors to invest in HBL.
- Finding number 5 based on coefficient of variation provides more meaningful basis for comparison to choose among assets with different expected returns and standard deviations. Thus, from the finding it is recommended to invest in stocks of EBL as it has lowest risk per unit of return.
- A profitable trade is accomplished by buying (selling), undervalued (overvalued) securities relative to an appropriate measure of systematic risk, NEPSE Index. If the market is "bullish" and prices are expected to rise generally, it is worth buying securities with high beta values because they can be expected to rise faster than the market. Conversely, if markets are bearish and expected to fall, then securities with low beta factors are more attractive because they can be expected to fall less than prices overall.

  So, on the basis of finding number 6 it is recommended for investors; who want to maximize their return by capital gain in the short run, to invest in stocks of SCB as it is most aggressive stock with highest beta. Such investors can capture maximum capital return in a short period with SCB's high fluctuating prices.
- On basis of finding number 7, asset of EBL has the highest systematic risk from the total risk. So EBL is recommended and SCB has the lowest systematic risk but the highest unsystematic risk that shows weakness in management to deal with internal factors which have created unsystematic risk.

- From finding number 8 and 3, it is concluded that all banks are underpriced as shown in Table No. 4.28. Thus, it is recommended to buy the stocks of EBL, NIBL, SCB and HBL as they have good investment opportunity providing the investors higher return in the near future.
- From finding number 9, according to Markowitz Diversification it is recommended to select and invest in portfolio of SCB and HBL as this portfolio has lowest correlation and investors can achieve significant risk reduction.
- From finding number 10 according to expected return on portfolio it is recommended to invest 78.40% of available investment fund in EBL and remaining 21.60 % in NIBL, as this portfolio combination gives highest expected return.
- From finding number 11, risk averse investors are recommended to invest portfolio of SCB & HBL as it has lowest risk.
- According to coefficient of variation of portfolio from finding number 12, it is recommended to all investors to invest their money in portfolio SCB & HBL because it has lowest risk per unit of return and also the two banks have lowest correlation whereas combination of portfolio EBL & HBL has more than four times risk per unit of return so it is recommended not to buy or hold such combination of stocks.
- According to CAPM analysis, from finding number 14, it is recommended to invest in any of the six portfolios as they are undervalued and have good future return.
- It is further recommended not to completely base on this very study as it only provides inferences based on eight years data of selected 4 commercial banks and only represents one sector and the small proportion of the market. But it does provide the basis for logical judgment.

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APPENDICES

Appendix-1

Calculation of Total Dividend of Sampled Banks

Total Dividend in Rs.= Cash Dividend + % of Stock Dividend x Next year's MPS

Everest Bank Limited (EBL)

Fiscal Year	Closing MPS	Cash Dividend	Stock Dividend	Total Dividend (Rs)
2005/06	1379	25	0	25+0*2430/100 = 25
2006/07	2430	10	30	10+30*3132/100 = 949.6
2007/08	3132	20	30	20+30*2455/100 = 756.5
2008/09	2455	30	30	30+30*1630/100= 519
2009/10	1630	30	30	30+30*1094/100= 358.2
2010/11	1094	50	10	50+10*1033/100= 153.3
2011/12	1033	1.58	30	1.58+30*1599/100= 481.28
2012/13	1599	50.53	10	50.53+10*2631/100=154.141

Nepal Investment Bank Limited (NIBL)

Fiscal Year	Closing MPS	Cash Dividend	Stock Dividend	Total Dividend (Rs)
2005/06	1260	20	35.46	20+35.46*1729/100 = 633.103
2006/07	1729	5	25	5+25*2450/100 = 617.5
2007/08	2450	7.5	33.33	7.5+33.33*1388/100 = 470.1204
2008/09	1388	20	0	20+0*705/100 = 20
2009/10	705	25	0	25+0*515/100 = 25
2010/11	515	25	25	25+25*511/100 = 152.75
2011/12	511	5	25	5+25*781/100 = 200.25
2012/13	781	25	10	25+10*990/100 = 124

Standard Chartered Bank Nepal Limited (SCB)

Fiscal Year	Closing MPS	Cash Dividend	Stock Dividend	Total Dividend (Rs)
2005/06	3775	130	10	130+10*5900/100= 720
2006/07	5900	80	50	80+50*6830/100= 3495
2007/08	6830	80	50	80+50*6010/100= 3085
2008/09	6010	80	50	80+50*3279/100= 1719.5
2009/10	3279	55	15	55+15*1800/100= 325
2010/11	1800	50	0	50+0*1799/100= 50

2011/12	1799	45	15	45+15*1825/100= 318.75
2012/13	1825	40	10	40+10*2799/100= 319.9

Himalayan Bank Limited (HBL)

Fiscal Year	Closing Price	Cash Dividend	Stock Dividend	Total Dividend (Rs)
2005/06	1100	30	5	30+5*1760/100= 118
2006/07	1760	15	25	15+25*1980/100= 510
2007/08	1980	25	20	25+20*1760/100= 377
2008/09	1760	12	31.56	12+31.56*816/100= 269.530
2009/10	816	11.84	25	11.84+25*575/100= 155.59
2010/11	575	16.842	20	16.842+20*653/100= 147.442
2011/12	653	13.421	15	13.421+15*653/100= 120.521
2012/13	714	10.00	5	10+5*714/100= 57.05

Appendix-2

Calculation of Return of Sampled Banks

Annual Rate of Return (R_i) = [(P_t-P_{t-1})+Total Dividend]/(P_{t-1})

Expected Rate of Return (Er_i)= $\sum R_i/(n-1)$

Calculation of Return of EBL

Fiscal Year	Closing MPS	Total Dividend (Rs)	Annual Rate of Return (R_i)
2005/06	1379	25	[(1379-870)+25]/870=0.614
2006/07	2430	949.6	[(2430-1379)+949.6]/1379=1.451
2007/08	3132	756.5	[(3132-2430)+756.5]/2430=0.600
2008/09	2455	519	[(2455-3132)+519]/3132=-0.050
2009/10	1630	358.2	[(1630-2455)+358.2]/2455=-0.190
2010/11	1094	153.3	[(1094-1630)+153.3]/1630=-0.235
2011/12	1033	481.28	[(1033-1094)+481.28]/1033=0.384
2012/13	1599	313.63	[(1599-1033)+313.63]/1033=0.852
			$\sum R_i$ =3.425

Expected Rate of Return (Er_i)= $\sum R_i$ /(n-1) = 3.425/7 = 0.489

Calculation of Return of NIBL

Fiscal Year	Closing MPS	Total Dividend (Rs)	Annual Rate of Return (R_i)
2005/06	1260	633.103	[(1260-800)+633.103]/800=1.366
2006/07	1729	617.5	[(1729-1260)+617.5]/1260=0.862
2007/08	2450	470.120	[(2450-1729)+470.12]/1729=0.689
2008/09	1388	20	[(1388-2450)+20]/2450=-0.425
2009/10	705	25	[(705-1388)+25]/1388=-0.474
2010/11	515	152.75	[(515-705)+152.75]/705=-0.053
2011/12	511	200.25	[(511-515)+200.25]/515=0.381
2012/13	781	124	[(781-511)+124]/511=0.771
			$\sum R_i$ =3.117

Expected Rate of Return (Er_i)= $\sum R_i$ /(n-1) =3.117/7 = 0.445

Calculation of Return of SCB

Fiscal Year	Closing MPS	Total Dividend (Rs)	Annual Rate of Return (R_i)
2005/06	3775	720	[3775-2345)+720]/2345=0.9168
2006/07	5900	3495	[(5900-3775)+3495]/3775=1.4887
2007/08	6830	3085	[(6830-5900)+3085]/5900=0.6805
2008/09	6010	1719.5	[(6010-6830)+1719.5]/6830=0.1317
2009/10	3279	325	[(3279-6010)+325]/6010=-0.4003
2010/11	1800	50	[(1800-3279)+50]/3279=-0.4358
2011/12	1799	318.75	[(1799-1800)+318.75]/1800=0.1765
2012/13	1825	319.9	[(1825-1799)+319.9]/1799=2.5582
			$\sum R_i$ =5.116

Expected Rate of Return (Er_i)= $\sum R_i$ /(n-1) = 5.116/7 = 0.731

Calculation of Return of HBL

Fiscal Year	Closing MPS	Total Dividend (Rs)	Annual Rate of Return (R_i)
2005/06	1100	118	[(1100-920)+118]/1100=0.324
2006/07	1760	510	[(1760-1100)+510]/1100=1.064
2007/08	1980	377	[(1980-1760)+377]/1760=0.339
2008/09	1760	269.53	[(1760-1980)+269.53]/1980=0.025
2009/10	816	155.59	[(816-1760)+155.59]/1760=-0.448
2010/11	575	147.442	[(575-816)+147.442]/816=-0.115
2011/12	653	120.521	[(653-575)+120.521]/653=0.345
2012/13	714	57.05	[(714-653)+57.05]/653=0.181

Average			$\sum R_i$ =1.715

Expected Rate of Return (Er_i)= $\sum R_i/(n-1)$ = 1.715/7 = 0.245

Calculation of Return of NEPSE

Fiscal Year	Market Index	R_m
2005/06	386.83	=(386.83-286.67)/286.67 = 0.349
2006/07	683.95	=(683.95-386.83)/386.83 = 0.768
2007/08	963.36	=(963.36-683.95)/683.95 = 0.409
2008/09	749.1	=(749.1-963.36)/963.36 = -0.222
2009/10	477.73	=(477.73-749.1)/749.1 = -0.362
2010/11	362.85	(362.85-477.73)/477.73 = -0.240
2011/12	389.74	(389.74-362.85)/362.85 = 0.074
2012/13	518.33	(518.33-389.74)/389.74 = 0.330
		$\sum R_m$ = 1.105

Expected Rate of Return (Er_m)= $\sum R_m/N$ = 1.105/8 = 0.138

Appendix-3

Calculation of Standard Deviation and Variance of Sampled Banks

Standard Deviation(σ_i)= $\sqrt{[\{\Sigma(R_i - Er_i)^2\}/ (n-1)]}$

Variance (σ_i^2) = $[\{\Sigma(R_i - Er_i)^2\}/ (n-1)]$

Calculation of Standard Deviation of EBL

Fiscal Year	Closing Price	Total Dividend (Rs)	R_i	Er_i	$R_i - Er_i$	$(R_i - Er_i)^2$
2005/06	1379	25	0.614	0.489	0.125	0.016
2006/07	2430	949.6	1.451	0.489	0.962	0.925
2007/08	3132	756.5	0.600	0.489	0.111	0.012
2008/09	2455	519	-0.050	0.489	-0.539	0.291
2009/10	1630	358.2	-0.190	0.489	-0.679	0.461
2010/11	1094	153.3	-0.235	0.489	-0.724	0.524
2011/12	1033	481.28	0.384	0.489	-0.105	0.011
2012/13	1599	313.63	0.852	0.489	0.363	0.131
					TOTAL	2.371

Standard Deviation(σ_i)= $\sqrt{[\{\Sigma(R_i - Er_i)^2\}/(n-1)]}$ = $\sqrt{(2.371/7)}$ = 0.582

Variance (σ_i^2) = 0.582^2= 0.339

Calculation of Standard Deviation of NIBL

Fiscal Year	Closing Price	Total Dividend (Rs)	R_i	Er_i	$R_i - Er_i$	$(R_i - Er_i)^2$
2005/06	1260	633.103	1.366	0.445	0.921	0.849
2006/07	1729	617.5	0.862	0.445	0.417	0.174
2007/08	2450	470.120	0.689	0.445	0.244	0.059
2008/09	1388	20	-0.425	0.445	-0.870	0.757
2009/10	705	25	-0.474	0.445	-0.919	0.845
2010/11	515	152.75	-0.053	0.445	-0.498	0.248
2011/12	511	200.25	0.381	0.445	-0.064	0.004
2012/13	781	124	0.771	0.445	0.326	0.106
					Total	**3.043**

Standard Deviation(σ_i)= $\sqrt{[\{\Sigma(R_i - Er_i)^2\}/ (n-1)]} = \sqrt{(3.043/7)} = 0.659$

Variance (σ_i^2) = 0.659^2= 0.434

Calculation of Standard Deviation of SCB

Fiscal Year	Closing Price	Total Dividend (Rs)	R_i	Er_i	$R_i - Er_i$	$(R_i - Er_i)^2$
2005/06	3775	720	0.9168	0.731	0.186	0.035
2006/07	5900	3495	1.4887	0.731	0.758	0.574
2007/08	6830	3085	0.6805	0.731	-0.050	0.003
2008/09	6010	1719.5	0.1317	0.731	-0.599	0.359
2009/10	3279	325	-0.4003	0.731	-1.131	1.280
2010/11	1800	50	-0.4358	0.731	-1.167	1.361
2011/12	1799	318.75	0.1765	0.731	-0.554	0.307
2012/13	1825	319.9	2.5582	0.731	1.827	3.339
					Total	**7.258**

Standard Deviation(σ_i)= $\sqrt{[\{\Sigma(R_i - Er_i)^2\}/(n-1)]} = \sqrt{(7.258/7)} = 1.018$

Variance (σ_i^2) = $1.014^2 = 1.037$

Calculation of Standard Deviation of HBL

Fiscal Year	Closing Price	Total Dividend (Rs)	R_i	Er_i	$R_i - Er_i$	$(R_i - Er_i)^2$
2005/06	1100	118	0.323913	0.245	0.079	0.006
2006/07	1760	510	1.063636	0.245	0.819	0.670
2007/08	1980	377	0.339205	0.245	0.094	0.009
2008/09	1760	269.5296	0.025015	0.245	-0.220	0.048
2009/10	816	155.59	-0.44796	0.245	-0.693	0.480
2010/11	575	147.4421	-0.11465	0.245	-0.360	0.129
2011/12	653	120.5211	0.345254	0.245	0.100	0.010
2012/13	714	57.05	0.180781	0.245	-0.064	0.004
					Total	**1.357**

Standard Deviation(σ_i)= $\sqrt{[\{\Sigma(R_i - Er_i)^2\}/n]} = \sqrt{(1.357/7)} = 0.440$

Variance (σ_i^2) = $0.439^2 = 0.194$

Calculation of Standard Deviation of NEPSE

Fiscal Year	Market Index	R_m	Er_m	$R_m - Er_m$	$(R_m - Er_m)^2$
2005/06	386.83	0.349	0.138	0.211	0.045
2006/07	683.95	0.768	0.138	0.630	0.397
2007/08	963.36	0.409	0.138	0.271	0.073
2008/09	749.1	-0.222	0.138	-0.360	0.130
2009/10	477.73	-0.362	0.138	-0.500	0.250
2010/11	362.85	-0.240	0.138	-0.378	0.143
2011/12	389.74	0.074	0.138	-0.064	0.004
2012/13	518.33	0.330	0.138	0.192	0.037
				Total	**1.079**

Standard Deviation(σ_m)= $\sqrt{[\{\Sigma(R_m - Er_m)^2\}/(n-1)]} = \sqrt{(1.079/7)} = 0.393$

Variance (σ^2_m) = $0.393^2 = 0.154$

Appendix- 4

Calculation of Co-efficient of Variation of Sampled Banks

Co-efficient of Variation (C.V.) = σ_i/Er_i

EBL (C.V.) = 0.582/0.489 = 1.190

NIBL (C.V.) = 0.657/0.445 = 1.476

SCB (C.V.) = 1.041/0.731= 1.424

HBL (C.V.) = 0.439/0.245 = 1.792

NEPSE (C.V.) = 0.393/0.138 = 2.848

Appendix- 5

Calculation of Covariance of Sampled Banks with the Market

Cov (r_i,r_m) = [{Σ(Ri-Eri) (Rm-Erm)}/(n-1)]

Calculation of Covariance of EBL with the Market

Fiscal Year	Ri	Eri	Ri-Eri	Rm	Eri	Ri-Eri	(Ri-Eri) (Rm-Erm)
2005/06	0.614	0.428	0.186	0.349	0.489	0.125	0.026
2006/07	1.451	0.428	1.023	0.768	0.489	0.962	0.606
2007/08	0.600	0.428	0.172	0.409	0.489	0.111	0.030
2008/09	-0.050	0.428	-0.479	-0.222	0.489	-0.539	0.194
2009/10	-0.190	0.428	-0.618	-0.362	0.489	-0.679	0.340
2010/11	-0.235	0.428	-0.663	-0.240	0.489	-0.724	0.274
2011/12	0.384	0.428	-0.044	0.074	0.489	-0.105	0.007

2012/13	0.852	0.428	0.423	0.330	0.489	0.363	0.070
Total							**1.547**

Cov (r_i,r_m) = [{Σ(Ri-Eri)(Rm-Erm)}/(n-1)]

= 1.547/7 = 0.221

Calculation of Covariance of NIBL with the Market

Fiscal Year	R_m	Er_m	R_i	Er_i	R_i-Er_i	R_m-Er_m	(R_i-Er_i) (R_m-Er_m)
2005/06	0.349	0.138	1.366	0.445	0.921	0.211	0.195
2006/07	0.768	0.138	0.862	0.445	0.417	0.630	0.263
2007/08	0.409	0.138	0.689	0.445	0.244	0.270	0.066
2008/09	-0.222	0.138	-0.425	0.445	-0.870	-0.361	0.314
2009/10	-0.362	0.138	-0.474	0.445	-0.919	-0.500	0.460
2010/11	-0.240	0.138	-0.053	0.445	-0.498	-0.379	0.188
2011/12	0.074	0.138	0.381	0.445	-0.064	-0.064	0.004
2012/13	0.330	0.138	0.771	0.445	0.326	0.192	0.063
Total							**1.552**

Cov (r_i,r_m) = [{Σ(Ri-Eri)(Rm-Erm)}/(n-1)]

= 1.552/7 = 0.222

Calculation of Covariance of SCB with the Market

Fiscal Year	R_i	Er_i	R_i-Er_i	R_m	Er_m	R_m-Er_m	(R_i-Er_i) (R_m-Er_m)
2005/06	0.9168	0.731	0.1858	0.349	0.138	0.211	0.0393
2006/07	1.4887	0.731	0.7577	0.768	0.138	0.630	0.4774
2007/08	0.6805	0.731	-0.0505	0.409	0.138	0.271	-0.0137
2008/09	0.1317	0.731	-0.5993	-0.222	0.138	-0.360	0.2160
2009/10	-0.4003	0.731	-1.1313	-0.362	0.138	-0.500	0.5660
2010/11	-0.4358	0.731	-1.1668	-0.240	0.138	-0.378	0.4416
2011/12	0.1765	0.731	-0.5545	0.074	0.138	-0.064	0.0354
2012/13	2.5582	0.731	1.8272	0.330	0.138	0.192	0.3507
Total							**2.1128**

Cov (r_i,r_m) = [{Σ(Ri-Eri)(Rm-Erm)}/(n-1)]

=2.1128/7= 0.302

Calculation of Covariance of HBL with the Market

Fiscal Year	R_i	Er_i	R_i-Er_i	R_m	Er_m	R_m-Er_m	(R_i-Er_i) (R_m-Er_m)
2005/06	0.324	0.245	0.079	0.349	0.138	0.211	0.017
2006/07	1.064	0.245	0.819	0.768	0.138	0.630	0.516
2007/08	0.339	0.245	0.094	0.409	0.138	0.271	0.025
2008/09	0.025	0.245	-0.220	-0.222	0.138	-0.360	0.079
2009/10	-0.448	0.245	-0.693	-0.362	0.138	-0.500	0.347
2010/11	-0.115	0.245	-0.360	-0.240	0.138	-0.378	0.136
2011/12	0.345	0.245	0.100	0.074	0.138	-0.064	-0.006
2012/13	0.181	0.245	-0.064	0.330	0.138	0.192	-0.012
Total							**1.101**

Cov (r_i,r_m) = [{Σ(Ri-Eri)(Rm-Erm)}/(n-1)]

= 1.101/7 = 0.157

Appendix- 6

Calculation of Beta Coefficient of Sampled Banks

Beta Coefficient (b_i) = Cov (r_i,r_m)/ $\sigma^2 m$

Calculation of Beta Coefficient of EBL

Beta Coefficient (b_i) = Cov (r_i,r_m)/ $\sigma^2 m$ = 0.221/0.154 = 1.435

Calculation of Beta Coefficient of NIBL

Beta Coefficient (b_i) = Cov (r_i,r_m)/ $\sigma^2 m$ = 0.222/0.154 = 1.442

Calculation of Beta Coefficient of SCB

Beta Coefficient (b_i) = Cov (r_i,r_m)/ $\sigma^2 m$ = 0.302/0.154 = 1.961

Calculation of Beta Coefficient of HBL

Beta Coefficient (b_i) = Cov (r_i,r_m)/ $\sigma^2 m$ = 0.157/0.154 = 1.019

Appendix- 7

Calculation of Proportion of Systematic and Unsystematic Risk

Systematic Risk Proportion = $b_i^2\sigma^2m$

Unsystematic Risk = Total Risk – $b_i^2\sigma^2m$ = Total Risk - Systematic Risk

EBL Systematic Risk proportion = $1.435^2*0.154= 0.317$

EBL Unsystematic Risk proportion = 0.339-0.317 = 0.022

NIBL Systematic Risk proportion = $1.442^2*0.154 = 0.320$

NIBL Unsystematic Risk proportion = 0.434-0.320 = 0.114

SCB Systematic Risk proportion = $1.961^2*0.154 = 0.592$

SCB Unsystematic Risk proportion = 1.037-0.592 = 0.445

HBL Systematic Risk proportion = $1.019^2*0.154= 0.160$

HBL Unsystematic Risk proportion = 0.194-0.160 = 0.034

Appendix- 8

Calculation of Correlation of Portfolios

Correlation, $(\rho_{ij}) = Cov(r_i, r_j) / (\sigma_i\ \sigma_j)$

where;

$(r_i, r_j) = [\{\Sigma(R_i-Er_i)(R_j-Er_j)\}/(n-1)]$

Note: In the following portfolios prior asset is considered at "i" asset and later asset as "j".

Calculation of Correlation Between EBL and NIBL

Fiscal Year	Ri-Eri	Rj-Erj	(Ri-Eri)(Rj-Erj)
2005/06	0.125	0.921	0.115
2006/07	0.962	0.417	0.401
2007/08	0.111	0.244	0.027
2008/09	-0.539	-0.870	0.469
2009/10	-0.679	-0.919	0.624
2010/11	-0.724	-0.498	0.360
2011/12	-0.105	-0.064	0.007
2012/13	0.363	0.326	0.118
		Total	**2.122**

$Cov(r_i, r_j) = [\{\Sigma(R_i-Er_i)(R_j-Er_j)\}/(n-1)] = 2.122/7 = 0.303$

Correlation, $(\rho_{ij}) = Cov(r_i, r_j) / (\sigma_i\ \sigma_j) = 0.303/ (0.582*0.659) = 0.791$

Calculation of Correlation Between EBL and SCB

Fiscal Year	Ri-Eri	Rj-Erj	(Ri-Eri)(Rj-Erj)
2005/06	0.125	0.186	0.023
2006/07	0.962	0.758	0.729
2007/08	0.111	-0.050	-0.006
2008/09	-0.539	-0.599	0.323
2009/10	-0.679	-1.131	0.768
2010/11	-0.724	-1.167	0.845
2011/12	-0.105	-0.554	0.058
2012/13	0.363	1.827	0.662
		Total	**3.403**

$Cov(r_i, r_j) = [\{\Sigma(R_i-Er_i)(R_j-Er_j)\}/(n-1)] = 3.403/7 = 0.486$

Correlation, $(\rho_{ij}) = Cov(r_i, r_j) / (\sigma_i\ \sigma_j) = 0.486/ (0.582*1.018) = 0.821$

Calculation of Correlation Between EBL and HBL

Fiscal Year	Ri-Eri	Rj-Erj	(Ri-Eri)(Rj-Erj)
2005/06	0.125	0.079	0.010
2006/07	0.962	0.819	0.787
2007/08	0.111	0.094	0.010
2008/09	-0.539	-0.220	0.119
2009/10	-0.679	-0.693	0.471
2010/11	-0.724	-0.360	0.260
2011/12	-0.105	0.100	-0.011
2012/13	0.363	-0.064	-0.023
		Total	**1.623**

$Cov(r_i, r_j) = [\{\Sigma(R_i-Er_i)(R_j-Er_j)\}/(n-1)] = 1.623/7 = 0.232$

Correlation, $(\rho_{ij}) = Cov(r_i, r_j) / (\sigma_i\ \sigma_j) = 0.232/ (0.582*0.440) = 0.906$

Calculation of Correlation Between NIBL and SCB

Fiscal Year	Ri-Eri	Rj-Erj	(Ri-Eri)(Rj-Erj)
2005/06	0.921	0.186	0.171
2006/07	0.417	0.758	0.316
2007/08	0.244	-0.050	-0.012
2008/09	-0.870	-0.599	0.522
2009/10	-0.919	-1.131	1.040
2010/11	-0.498	-1.167	0.581
2011/12	-0.064	-0.554	0.035
2012/13	0.326	1.827	0.596
		Total	**3.249**

$Cov(r_i, r_j) = [\{\Sigma(R_i-Er_i)(R_j-Er_j)\}/ (n-1)] = 3.249/7 = 0.464$

Correlation, $(\rho_{ij}) = Cov(r_i, r_j) / (\sigma_i\ \sigma_j) = 0.464/ (0.659*1.018) = 0.692$

Calculation of Correlation Between NIBL and HBL

Fiscal Year	Ri-Eri	Rj-Erj	(Ri-Eri)(Rj-Erj)
2005/06	0.921	0.079	0.073
2006/07	0.417	0.819	0.342
2007/08	0.244	0.094	0.023
2008/09	-0.870	-0.220	0.191
2009/10	-0.919	-0.693	0.637
2010/11	-0.498	-0.360	0.179
2011/12	-0.064	0.100	-0.006
2012/13	0.326	-0.064	-0.021
		Total	**1.417**

$Cov(r_i, r_j) = [\{\Sigma(R_i-Er_i)(R_j-Er_j)\}/ (n-1)] = 1.417/7 = 0.202$

Correlation, $(\rho_{ij}) = Cov(r_i, r_j) / (\sigma_i\ \sigma_j) = 0.202/ (0.659*0.440) = 0.698$

Calculation of Correlation Between SCB and HBL

Fiscal Year	Ri-Eri	Rj-Erj	(Ri-Eri)(Rj-Erj)
2005/06	0.186	0.079	0.015
2006/07	0.758	0.819	0.620
2007/08	-0.050	0.094	-0.005
2008/09	-0.599	-0.220	0.132
2009/10	-1.131	-0.693	0.784
2010/11	-1.167	-0.360	0.420

2011/12	-0.554	0.100	-0.056
2012/13	1.827	-0.064	-0.117
		Total	**1.793**

$Cov(r_i, r_j) = [\{\Sigma(R_i-Er_i)(R_j-Er_j)\}/ (n-1)] = 1.793/7 = 0.256$

Correlation, $(\rho_{ij}) = Cov(r_i, r_j) / (\sigma_i\ \sigma_j) = 0.256/ (1.018*0.440) = 0.572$

Appendix- 9

Calculation of Expected Returns of Portfolios

Portfolios	Wi	Wj	Eri	Erj	Erp = Wi*Eri+Wj*Erj
EBL & NIBL	0.784	0.216	0.489	0.445	0.784*0.489+0.216*0.445= 0.479
EBL & SCB	1.364	-0.364	0.489	0.731	=1.364*0.489+(-0.364)*0.731=0.401
EBL & HBL	-0.550	1.550	0.489	0.245	=(-0.55)*0.489+1.55*0.245=0.111
NIBL & SCB	1.055	-0.055	0.445	0.731	=1.055*0.445+(-0.055)*0.731=0.429
NIBL & HBL	-0.036	1.036	0.445	0.245	=(-0.036)*0.445+1.036*0.245=0.238
SCB & HBL	-0.100	1.100	0.731	0.245	=(-0.10)*0.731+1.10*0.245=0.196

Appendix- 10

Calculation of Standard Deviation of Portfolios

$\sigma_p = \sqrt{[\sigma^2_i W^2_i + \sigma^2_j W^2_j + 2Cov(ri,rj)W_i W_j]}$

Calculation of Standard Deviation of Portfolio EBL & NIBL

$\sigma_p = \sqrt{[\sigma^2_i W^2_i + \sigma^2_j W^2_j + 2Cov(ri,rj)W_i W_j]}$

$=\sqrt{(0.339*0.784+0.434*0.216+2*0.303*0.784*0.216)}$

$=0.680$

Calculation of Standard Deviation of Portfolio EBL & SCB

$\sigma_p = \sqrt{[\sigma^2_i W^2_i + \sigma^2_j W^2_j + 2Cov(ri,rj)W_i W_j]}$

$=\sqrt{(0.339*1.364+1.037*(-0.364)+2*0.486*1.364*(-0.364))}$

$=0.631$

Calculation of Standard Deviation of Portfolio EBL & HBL

$\sigma_p = \sqrt{[\sigma^2_i W^2_i + \sigma^2_j W^2_j + 2Cov(ri,rj)W_i W_j]}$

$=\sqrt{(0.339*(-0.55)+0.194*1.55+2*0.232*(-0.55)*1.55)}$

$=0.511$

Calculation of Standard Deviation of Portfolio NIBL & SCB

$\sigma_p = \sqrt{[\sigma^2_i W^2_i + \sigma^2_j W^2_j + 2Cov(ri,rj)W_i W_j]}$

$=\sqrt{(0.434*1.055+1.037*(-0.055)+2*0.464*1.055*(-0.055))}$

$=0.589$

Calculation of Standard Deviation of Portfolio NIBL & HBL

$\sigma_p = \sqrt{[\sigma^2_i W^2_i + \sigma^2_j W^2_j + 2Cov(ri,rj)W_i W_j]}$

$=\sqrt{(0.434*(-0.036)+0.194*1.036+2*0.202*(-0.036)*1.036)}$

$=0.413$

Calculation of Standard Deviation of Portfolio SCB & HBL

$\sigma_p = \sqrt{[\sigma^2_i W^2_i + \sigma^2_j W^2_j + 2Cov(ri,rj)W_i W_j]}$

$=\sqrt{(1.037*(-0.10)+0.194*1.10+2*0.256*(-0.10)*1.10)}$

$=0.231$

Appendix- 11

Calculation of Coefficient of Variation of Portfolios

Coefficient of Variation of Portfolio($C.V._p$)= σ_p / Er_p

Portfolios	σ_p	Er_p	$C.V._p$
EBL & NIBL	0.680	0.479	=0.680/0.479=1.420
EBL & SCB	0.631	0.401	=0.631/0.401=1.574
EBL & HBL	0.511	0.111	=0.511/0.111=4.603
NIBL & SCB	0.589	0.429	=0.589/0.429=1.373
NIBL & HBL	0.413	0.238	=0.413/0.238=1.735
SCB & HBL	0.231	0.196	=0.231/0.196=1.179

Appendix- 12

Calculation of Beta Coefficient of Portfolios

Portfolio Beta (b_p) = $W_ib_i+W_jb_j$

Portfolios	W_i	W_j	b_i	b_j	b_p
EBL & NIBL	0.784	0.216	1.435	1.442	=0.784*1.435+0.216*1.442=1.437
EBL & SCB	1.364	-0.364	1.435	1.961	=1..364*1.435+(-0.364)*1.961=1.244
EBL & HBL	-0.550	1.550	1.435	1.091	=(-0.550)*1.435+1.550*1.091=0.902
NIBL & SCB	1.055	-0.055	1.442	1.961	=1.055*1.442+(-0.055)*1.961=1.413
NIBL & HBL	-0.036	1.036	1.442	1.091	=(-0.036)*1.442+1.036*1.091=1.078
SCB & HBL	-0.100	1.100	1.961	1.091	=(-0.10)*1.961+1.10*1.091=1.004

Note: Closing market price of FY 2004/05 and 2013/14 of EBL, NIBL, SCB and HBL and Market index of NEPSE.

Banks/NEPSE	2004/05	2013/14
EBL	870	2631
NIBL	800	990
SCB	2345	2799
HBL	920	941
NEPSE	286.67	1036.11