CHAPTER-ONE

INTRODUCTION

1.1 Background of the Study:

Thehistory ofmodernfinancialsysteminNepalbeganafterestablishmentofNepal BankLtdin1937A.D.whichisthefirst systematicbankof Nepal.Itisfoundas1st commercial bankofNepal.Itwas established under the special bankingAct1936 A.D.havingelementaryfunctionof commercialbanksasasemi governmentorganizationwithoutexistenceofa CentralBank in the country. After the founding of Nepal bank limited the organized expansion of banking was apprehended. TheNepal RastraBank (NRB)wasestablishedin26thApril1995objectivesof supervising, protectingand directingthefunctionof commercialbankingactivities.Another commercial bankfullyowned bythe government knownasthe RastriyaBanijyaBank,whichisestablishedin1966A.D.Thenanactpassedforthemodernc ommercial banks (joint venture Bank) in2041 B.S. His majestyGovernment (Nepal Government)introducedthefinancialliberalizationpolicy in2041,whichbecomesasvitalrevolutionsinNepalese financialsectorforit'srapidly growth.Asaresultvariousfinancialinstitutionshave beenestablishedtoservethefinancialservicestothepublic.

Nepalese joint venture banks play the significant role in the economic development of the country. Without economic development, the country has fearsome of losing its existence and identify. Primary need of the county is to boost up its economy development to promote the welfare of the people and the country as well as. Economy is the indicator of measuring the country's development and progress. Hence, country should be economically developed. There should be proper investment in productive activities to enhance the country's economic development. The development of the modern age is going through the banking system. It requires huge amount of capital to invest in the productive sectors. So in this banking age, it is being easier to generate the sources of capital through the banking activities.

In the context of Nepal, Commercial banks, joint venture banks, development banks, employment provident fund, citizen investment fund, insurance companies, saving and credit cooperatives organization and finance companies are playing great role to boost up the economy of the nation by collecting small amount from the Nepalese people and organization and formulating a big amount of capital and investing them in industry line as well as trade lines. They are the source of capital for the people and the business organization for Nepalese economy. Commercial banks are the major institutions to develop the Nepalese economy. They change and mobilize the domestic sources into productive line i.e. industry sector, trade, hotel, tourism, sector and business sector etc. Similarly joint venture banks are playing the leading role in the banking sector of Nepal. Their role is remarkable in capital formulation, foreign capital flows, transfer of technology, and enhancement in management skills, productivity and access in global market. This is the age of globalization. So, Nepal should exits with the global environment to make economic networking relationship through the joint venture banking system the word.A contractualagreement joining together two or more parties for the purpose of executing a particular business undertaking. All partiesagree to share in the profits and losses of the enterprise. In global perspective, joint ventures are the modes of credit partnership among and also form of negotiations between various groups of trades and industries to achieve mutual exchange of goods and services for sharing competition advantages. In conclusion, it is clear that a joint venture is a single business deal, which is jointly undertaken by two or more persons or parties with a view to making and sharing profit(Agrawal, 2012).

According to The Concise Oxford Dictionary, "Agreement by two or more parties to work on a project together. Frequently, a joint venture will be formed when companies with complementary technology wish to create a product or service that takes advantage of the strengths of the participants. A joint venture, which is usually limited to one project, differs from a partnership, which forms the basis for cooperation on many projects."

1.2 Focus of the Study:

Inthisstudy,Investmentdecisiondependsupontwofactors i.e.riskandreturn.The returnwecandefineastherewardforbearingriskandreturnisthe mostimportant outcome froman investment. Return form stockcanbeofholdingperiod return; returnfromspeculationorfromstockcanbeofholdingperiodreturn, returnfrom speculation or from short sell, capital gain and dividend gain etc. But return to investoriseverfollowedby risk,whichisknownastheoccurrenceofunfavorable outcomes and is ever followed by risk, which is known as the occurrence of unfavorableoutcomesandiseverharmfulforthebusiness. Properly made decision about loan and investment by the bank only has such contribution. Portfolio is the best tool in investment decision in order to maximize profit and lower the risk. The main focus of the study is to examine and analyze the investment portfolio of Nepalese commercial banks. The focus is also on individual risk and return on investment on different securities.

InNepalmanytimes,investorinveststheirmoneywithoutanalyzingriskandreturn oncommonstockduetolackofknowledgeaboutriskandreturn.Ontheotherhand theincreasingnumberofthe banksandfinancialinstitutionhascreatedacompetitive environmentinfinancialsectors.Thosetogetmaximumreturnfromaminimumlevel ofrisk,theinvestorshoulddiversifyitsinvestmentby themeansofthestudyisto measureandanalysisthefinancialperformanceof jointVentureBanks,theirriskand return,andportfoliopatternetc.tomakesoundandsuitableinvestmentdecision.

1.3 Statement of Problem:

Banking industry is one of the fast growing businesses in Nepal after the liberalization policy was adopted by government of Nepal. After the liberalization policy was adopted by government. This sector has been developed dramatically. Now, more than two and half dozen banks (32 banks) are in operation.

Every investor should make rational investment decision. For this purpose, knowledge of analysis common stock with using risk, return and portfolio analysis tools are very essential. Risk, return and portfolio analysis is most importance and essential tools in area of investment because by using risk, return and portfolio analysis, a rational investor can find the less risky and the higher profitable investment of the difference

investment alternatives from the security market. Similarly, investor's attitude and perceptions are also play vital role for rational investment decision which is influenced by the knowledge and access to the data required for analysis. Whenever, the investor can't analyze risk, return and portfolio while making investment decision, they aren't secured from the risk.

Thus, this study seeks to answer the following question:

a. What are the risk and return of the common stock of joint venture banks?
b. How are the share of joint venture banks in Nepal valued by risk and return characteristics of individual bank?
c. What are an optimal portfolio among common stock investment, comparative risk and return position of joint venture banks?
d. What are the general environment factors in Nepalese capital market?

1.4 Objective of the Study:

The key objectives of the study are to find out the condition of portfolio management and to estimate an optimal portfolio among the common stock investment of the joint venture banks. The objectives of my study are as follows:-

a. To evaluate the common stock of joint venture banks in terms of risk and return.
b. To study systematic and unsystematic risk associated with securities.
c. To determine whether the share of joint venture banks in Nepal are overpriced, underpriced or correctly valued by risk and return characteristic of the individual bank.
d. To estimate an optimal portfolio among common stock investment of joint venture banks and analyzes comparative risks and return position of these banks.
e. To study general environmental factors in Nepalese capital market.
f. To recommend and suggest for the future development of investment climate.

1.5 Significance Of the Study:

As discussed above main targetof the study is that potentialinvestor who wants to invest in security but repel by imaginary orunreal risk. So the study will bemoresignificantfor exploring andincreasingstockinvestment. StudynotonlyusedapartialfulfillmentofTUcourseofMBS but it also will provide little contributionto Nepalese stock market development.

Intheinvestmentworld,theinvestmentanalysisofany organizationflashesits investmentpolicy.Thesoundinvestmentpolicymakesagoodimpactontheeconomyofthe country.Thesuccessandtheprosperityofany investorsrely heavilyuponthe successfulinvestmentpolicy ifit'savailableresourcesintotheprofitablesectors.But duetolackof knowledgeinvestorsareinvestingtheirvaluablefundsthroughtrialand errorapproach.

Thisstudy isfocusedontheriskandreturnsanalysisofindividualjointVentureBank andestimatesanoptimalportfolioperformanceamongthecommonstockinvestment of JointVentureBanks.Therefore,to providebasicandnecessary informationabout investmentandinvestmentprocess,thecurrentstudyisforwarded.Thiscurrentstudy ishelptoanalyzeandevaluate theinvestmentworthwhileoverthedifferenttime period.Notonly that,thefocus ofthestudyisontheanalysisofrisk,returnand portfolio,whichisenableallthe relatedinvestorstoguidethe investment,related activities.

1.6 Limitations of the Study:

To make the research more specific the study has been conducted with certain limitations. It has the following limitations.

a. The study is based on secondary data, which will be published by joint venture banks, which are not verified.
b. Only joint venture banks are taken under this study.
c. This study covers only the period of five fiscal years from 2006/2007 to 2010/2011 years.
d. According to the nature of this study, time factor is main constraints. Thus the analysis of this study is confined only based on risk, return portfolio of joint venture banks.
e. The study has been conducted to fulfill the partial requirement of the M.B.S. program of TU for a prescribed, not for the generalization purpose.

1.7 Organization of the Study:

Thisstudyisorganizedintofivechapters.Abriefoutlineofthischapterhasoutlined asunder.

Chapter-1 Introduction

In this section thegeneralbackgroundof thestudy,statementoftheproblem, objectivesofthestudy,significanceofthestudy,focusofthestudy,limitationof studyandorganizationof thestudyareconsidered.

Chapter-2 Review of the Literature

This chapter discussedthe briefreviewofliteratureavailable.Itcoversreviewof relatedbooks,articles,previousthesisetc.conceptualframeworkaboutrisk,return andportfolioisdefinedinthischapter.

Chapter-3 Research Methodologies

The research design, population and sample, data collection techniques, tools for analysisandmethodsof presentationandanalysisare discussedinchapter.

Chapter-4 Data Presentation and Analysis and Interpretation

Themainbody oftheresearchwork.Inthissection,datahasbeen collected from various relevant sources are present and analyze byusing various statisticalandfinancialmethods.

Chapter-5 Summary, Conclusion and Recommendation

Last page deals with the suggestion, which includes the summary of the main findings conclusion of the study and recommendation.

Finally, appendices contain list of bibliography, copies of different sheets having information required for the study and dig gerent basis calculation.

CHAPTER-TWO

REVIEW OF LITERATURE

This chapter deals with the study of past research studies and relevant materials. It is an advancement of existing knowledge and in-depth study of subject matters. It starts with a search of a suitable topics and continuous throughout the volumes of similar or related subjects. This chapter deals with about review of literature, deals with the review of the financial system and investment opportunity. The more details are in descriptive manner, for this study, various books, journal and articles as well as the past thesis review were taken into consideration. During the review of this research, in depth study and theoretical investigation regarding portfolio's aspects and their present application and potentialities also are made.

Review of literature gives the framework of the research process. Review of literature facilitates to find out what research studies have been done in one's chosen field of study by which method they have done, what result they get, what are the remaining area in which the research should be conducted. By reviewing of literature research gets or collects the more information or knowledge about their researches, scientific research may be based on past knowledge. The previous studies provide the foundation to the present study. The knowledge of previous studies is obtained by reviewing of literature.

The following are some definitions which explain the meaning, purposes and function of literature review.

A literature review is the process of locating, obtaining, reading and evaluating the research literature in the area of your interest(Haywood & Wagg,1982).

A literature review is a self-contained unit in a study which analyzes critically a segment of a published body of knowledge through summary classification and comparison of prior research studies and theoretical articles (Cardesco& Gatner,1986).

A literature review is an account of what has been published on a topic by accredited scholars and researches(Hart,1989).

A literature review is a body of text that aims to review the critical points of current knowledge on a particular topic(Baker,2002).

A literature review is a classification and evaluation of what accredited scholars and researchers have written on a topic(Polonsky& Waller,2005).

A literature review or (overview) is a summary and analysis of current knowledge about a particular topic or area of enquiry (Walliman, 2006).

Thischapteris consideredof themajorrelatedtheoreticalaspectof thetopic onrisk, returnandaboutthe portfolioanalysisoncommonstockinvestmentinjointventure bankscomprehensive,detailanddescriptivemanner.Every possibleefforthasbeen madetograspknowledgeandinformationthatare availablefromlibraries,journals, articles,annualreports documents,collectioncenter,NepalRastraBanks,Nepalstock exchangecenter,security board,otherinformationmanagingbureausandconcerned JVBs.Similarly itprovidesthefoundationfordevelopingacomprehensivetheoretical frameworkandknowledgeofthestatusoftherelevanttothefieldofresearchinorder toexploretherelevantandtruefactsforthereportingpurpose.Since,thereisnoso muchadequatestudymaterialrelatedwiththistopicpublishedinNepal.Thisstudy hastoreferalmostallthebooksrelatedwiththistopicpublishedinCountriesand othercountriesthanNepal.

There is no any special book and research work related to this topic has been published in Nepal. On other hand, Nepalese stock market is still in creeping stage. So, there are not sufficient materials that provided basic guidelines for this study. Some master degree theses that are available in TU which are related with this thesis have been reviewed. In additional, some independent studies carried out by well-known financial exports are taken in to consideration.

The concept of this portfolio analysis on common stock investment of joint venture banks and its analysis is clear from the following studies:

2.1Conceptual Framework:

Various books which are either dependent or independent deals with theoretical aspects of risk, return and portfolio are taken into consideration in this chapter. Major focus is on the investment of common stock and its impact on individual risk, return and portfolio.

2.1.1 Common Stock:

Common stock is a type of securities that represents the ownership of a company. It is also knownas ordinary share or equity share. Buyer of a common stock becomes owner of the company, depending upon his/her investment. The holder of common stock is known as a shareholder. Common stockholders receive dividend on their investment. Dividend is a part of a profit. Only a company in profit can distribute dividend. But there is no obligation to the company to distribute profit as dividend to the shareholders.

Two basic characteristics of the common stock are the residual claim and limited liabilities. Residual claim is that stock holders have the last priority to receive income (dividend) and the investment return, if the company fails. Limited liability means that the shareholder loses only his/her capital at the bankruptcy. They do not have to put additional capital to pay the liabilities which is uncovered by the assets of the company. But in case of partnership and sole proprietorship business, the owners have to pay the liabilities by bringing from their pockets too. A shareholder has various rights in the company.

A shareholder's rights are collective and specific. Collective rights can be exercised collectively whereas specific rights can be exercised individually.

Collective Rights

- The right to elect the directors of the company. Each common stock has one vote.
- The right to authorize the sale of fixed assets.
- The right to adopt and amend by laws.
- The right to enter into merger.
- The right to issue preferred stock, debentures, bonds and other securities.
- The right to change the amount of authorizes capital, issued capital and paid up capital.
- The right to amend the corporate charter.

Specific Rights

- The right to sell their certificate and to transfer the ownership.
- The right to vote in the manner prescribed by the corporate charter.
- The right to share the residual amount of assets proportionately at the time of liquidation.
- Stockholders also have the right to share new stock proportionately (right share).
- Stockholders have the right to share any distribution of company's earnings in the form of dividends on per share basic, equally.
- The right to inspect the company books (minute).
- The right to participate in general meetings.

Common stock is and ownership in a corporation. Company stock certificates are legal documents that evidence ownership in a company. They are also marketable financial instruments. Common stock is the recipient of the residual income of the corporation. Through the right to vote, holders of common stock have all legal control over the corporation. An element of risk is also involved in equity ownership due to its low priority of claim at liquidation. Common stockholders have limited liability. Common provides a cushion for creditors if losses occur on dissolutions. The equity – to-total-assets ratio is an indicator of the degree by which the amounts realized on the liquidation may decline from the stated book values before creditors suffer losses.

The common stock of must large corporations can be bought or sold freely on one or more stock exchanges. A corporation whose stock is not publicly traded is said to be closely held. The return on common stock investment comes from either of the two sources, the periodic receipt o dividends and capital gains. Common stockholders enjoy a number of rights such as dividend rights, assets rights, preemptive rights (rights share), voting right etc. common stock is the recipient of the residual income of the corporation common stockholders are in an uncertain position about dividend, capital gains and residual claim. Therefore common stockholders must bear the greatest risk. Common stock suitable for the investor who wants to take high risk and return and for a long period too. Common stocks are traded in stock exchanges and Over The-Counter Markets (OCT). Common stock investment alternative is a popular investment alternativein Nepal. Common stocks are traded inNepal Stock

Exchange(NEPSE). Only the listed companies, common stocks are traded in NEPSE(Thapa, Rana, 2011).

Common stocks also known as equity securities or equities represent ownership shares in a corporation. Each share of common stock entitles its owner to one vote on any matters of corporation governance that are put a vote at the corporation's annual meeting and to a share in the financial benefits of ownership.

The corporation is controlled by a board of director electors by the shareholders. The board, which meets only a few times each year, selects managers who actually run the corporation on a day-by-day basis. Managers have the authority to make most business decisions without the board's specific approval. The board's mandate is to oversee the management to ensure that it acts in the best interests of shareholders.

The members of the board are elected at the annual meeting. Shareholders who do not attend the annual meeting can vote by *proxy*, empowering another party to vote in their name. Management usually solicits the proxies of shareholders and normally gets a vast majority of these proxy votes. Thus, management usually has considerable discretion to run the firm as it sees fit-without daily oversight from the equity holders who actually own the firm(Bodie.et.al, 2007).

Common stock is an ownership share in a corporation; therefore the common stockholders are the true owners of a corporation. Each share of common stock represents a fractional ownership interest in the firm. For example, one share of common stock in a corporation that has 1,000 shares outstanding would represent 1/1000 ownership interest. The return on common stock investment comes from either of the two sources- the periodic receipt of dividends and capital gains. Common stockholders enjoy a number of rights such as are dividend rights, assets rights, preemptive right (right share), voting rights etc. Common stock is the recipient of the residuals income of the corporation. Common stockholders are in and uncertain position about dividends, capital gains and residual claim. Therefore, common stockholders must bear the greatest risk. Common stock is suitable for the investor who wants to take high risk and return and for a long period too. Common stocks are traded in Stock Exchange and Over-the-Counter Markets (OCT)(Thapa,Bhattarai,&Basnet,2006).

Among the rights and responsibilities attached to equity, income and control are the

positive considerations and risk is the negative consideration. The right to income, control and risk vary depending on the nature of the firm. In a corporation, common stockholders have residual claim on income. Common stockholders have legal control over the corporation through voting right. They are last in priority of claims at the time of liquidation. So there is an element of risk associated. Common equity provides cushion for creditors and the equity to total assets ratio indicates this cushion.

2.1.2 The Expected Rate of Return of Common Stock:

We invest today in an expectation of earning in the future. That is investment decisions that we make today, are based on expectation of returns in the future. The return which we expect in the future is the weighted average rate of return, using the probability ofeach rate of return as the weight. If we do not use probability and expect a return on the basis of past performance, in this situation the expected return is the arithmetic mean return of the past returns. Therefore, we can expect a return in two ways.

Using Ex-post (Past) Data,

$$E(r) = \sum_{t=1}^{n} r_t/n$$

$$=\frac{r_1+r_2+\cdots+r_n}{n}$$

Where'

E(r) = Expected Return

rt = Single period return at time t

N = Number of observation or returns

Using Probabilities

$$E(r) = \sum_{i=1}^{n} P_t . r_t$$

$$E(r) = P_1.r_2 + P_2.r_2 + \ldots\ldots P_n.r_n$$

Where,

E(r) = Expected return

r_t = Rate of return of event t

P_t = Probability of event t

n = n^{th} event.(Bhattrai,2010).

The expected rate of return for any assets is the weighted average rate of return, using probability of each rate of return as the weight. The expected rate of return is calculated by summing the products of the rates of return and their respective probabilities.

Geometric Mean Return

The multi period (or compounded) rate of return is called the geometric mean return. The geometric mean rate of return for an investment can be calculated with the following equation:

Geometric mean return (GM) = $[(1+r_1)\ (1+r_2)\ldots\ldots\ (1+r_n)]^{1/n}-1$

Alternatively,

$$GM = \sqrt[n]{(1+r_1)(1+r_2)\ldots\ldots(1+r_n)}$$

Where,

GM = The geometric mean return

r_1 = The return for time period 1

r_2 = The return for time period 2

r_n = The total number of time periods(Thapa,et.al,2006).

"The expected rate of return is the increase in the expected after tax value of the initial investment over the holding period. The cash payoff to owners of common stock can be described as two type's i.e.

-Cash dividend [dividend component]

-Capital gain (Loss) [capital appreciation]

Capital appreciation is the difference between ending and beginning value of investment. Returns are defined as the dividend yields plus capital gain/loss. Thus return comes from two sources, income and price appreciation. Return is the main attraction for investors to invest. In a risky security as stock (equity share) accepting a varying degree of risk tolerance. "the return from holding an investment over some period, say a year is simply any cash payment received due to ownership plus the change in market price, derived by beginning price. From common stock we can define single period return as:

Single Period Return (R) = $\frac{\text{Ending price } (p_t) - \text{Beginning price } (P_t - 1) + \text{Dividend } (D_t)}{\text{Beginning price } (P_t - 1)}$

This formula can be used to determine both actual one period return (when based on historical figure), as well as expected one period return (when based on expected dividend and prices). Also note that the term is parenthesis in the number of above equation represents the capital gain of loss during the year (Van Horne, Wachowicz& John, 1995).

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

SimpleArithmetic Mean

$$\text{HPR} = \sum_{t=1}^{n} \text{HPR}_t / n$$

The geometric mean

$$\text{HPRg} = \sum_{t=1}^{n} (1 + \text{HPR})^{1/n} - 1$$

Where,

HPR = Holding period rate of return

n = No of periods

HPR_g = Geometric mean holding period return(Cheney, Moses, 1992).

Return is the additional wealth generated form an investment. There are many ways by which return on an investment can be measured. One way of measuring return is in terms of expected return. The expected rate of return is the weighted average of all possible returns where the returns are weighted by the probability that each will occur. Thus, it is a function of the probability of particulars state of the economy and the possible rate of return for corresponding state. It is calculated as the weighted average of all possible returns, the weighted being the probabilities using equation as follows:

$$\mathbf{E(R)} = \sum_{\mathbf{i=1}}^{\mathbf{N}} \mathbf{P_i . R_i}$$

Where,

E(R) = The expected rate of return

P_i = Probability of occurring each rate of return

R_i = Rate of return in i^{th}state(Thapa, Rana, 2011).

2.1.3 The Risk on Common Stock:

Risk in a financial analysis is the variability of return. The deviation between the expected and actual return brings variability in the return and the variability is termed as risk. The higher the deviation between expected and actual return, the higher will be the risk.

Risk, in other words. Is defined as uncertainty of returns and if there is certainty there is no risk at all. Risk and return in investment go together and without risk no more return can be expected.(Bhattarai, 2010).

Risk is often defined as the chance of loss. In investment theory risk refers to the chance of alternative outcomes. It is measured by variability associated with alternative outcomes. Risk is consistently related with **speculation**. Speculation always involves a *considerable investment* risk to obtain a *commensurate gain.* Here 'considerable investment risk' means that risk is sufficient to affect investment decision, and 'commensurate gain' means that the investment alternative offers risk premium, that is, return in excess of risk-free rate. Speculation always calls for assuming investment risk if the risk premium from the investment is sufficient to commensurate the risk assumed. In contrast, the risk premium that an investment offers is not sufficient to compensate for additional risk involved, the individual is sure to reject such investment.

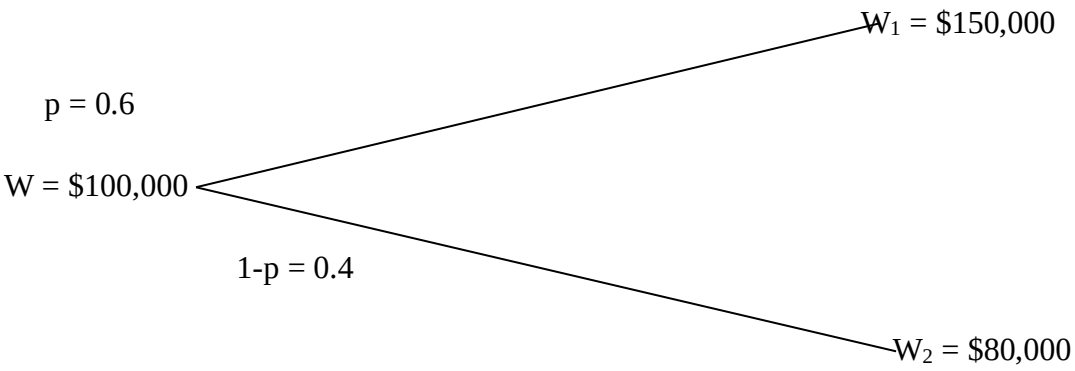
However, the term 'gambling' differs from speculation in a sense that it does not involve a commensurate gain. In other words, the gamble involves risk for no purpose but for enjoying the risk itself. A risk-averse investor requires compensation against the risk assumed in any investment alternative. This implies that if a risky investment involves no risk premium, it is gamble rather than a speculation. For example, suppose you involve in a coin losing bet. If head appears you will win Rs.100 and if tail appears you will lose Rs.100. Because the coin tossing has 50-50 chance of appearing either head or tail the expected value of this bet is zero(that is, 0.5 *Rs.100

-0.5*Rs.100). Obviously, a risk-average investor avoids such kind of bet where there is no risk premium, and here is a gamble rather than speculation. However, if you involve in 10 tosses of coins with the expectation that head appears more than 5 times and your friends bet with you in the sane tossing with the expectation that head appears less than 5 times, than each of you are supposed to have heterogeneous expectation about the same coin tossing events. In such case both of you see each side of financial position as speculating rather than gambling(Thapa,Rana, 2011).

The presence of risk means that more than one outcome is possible. A simple prospect is an investment opportunity in which a certain initial wealth is placed at risk, and there only two possible outcomes. For the sake of simplicity, it is useful to elucidate some basic concepts using simple prospects.

Task as example initial wealth, W. of $100,000, and assume two possible results. With a probability p = 0.6, the favorable outcome will occur, leading to final wealth W_1 = $150,000. Otherwise, with probability 1-p = 0.4, a less favorable outcome, W_2 = $80,000, will occur, we can resent the simple prospect using an event tree:

Figure 2.1



Suppose an investor is offered an investment portfolio with a payoff in 1year described by such a simple prospect. How can you evaluate this portfolio?

First, try to summarize it using descriptive statistic. For instance, the mean or expected end-of-year wealth, denoted E(W), is

$E(W) = pW_1 + (1-p)W_2$

$= (0.6 * 150,000) + (0.4 * 80,000)$

= $122,000(Bodie,et.al, 2007).

Risk is defined as the variability of the returns of a period. The one-period rate of return is the basic random variable used in measuring an investment's risk. The greater the variability of the returns, the riskier the project(Thapa, Bhattarai, Basnet, 2006).

Risk is defined in Wesbter's Dictionary as 'a hazard: a peril: exposure to loss or injury': thus, for most, risk refers to the chance that some unfavorable event will occur. If you invest in speculative stocks (or, really, any stock), you are taking a risk in the hope of making an appreciable return. (Weston, Besely& Brigham, 2003).

It is said that risk refers to the chance that some unfavorable event will occur. If someone invest in speculative stock (really, any stock), he/she is taking a risk in the hope of making an appreciable return. So if one is going to invest in common stock for future return. High return on common stock involves high risk and vice versa. "Risk defined more generally, is a probability the occurrence of unfavorable outcome. But risk has different meaning in different contexts. In our context two measures developed from the probability distribution have been as initial measures of return and risk. They are the mean and standard deviation of probability distribution (Weston & Brigham, 2000).

2.1.3.1The Variance and Standard Deviation:

Financial analysis and statisticians prefer to use a quantitative risk measure called the variance of returns, Denoted by Var(r).

The Variance and Standard Deviation are a statistical measure of the variability of a set of observations. The symbol of Standard Deviation is σ, pronounced "sigma" and Variance is $\sigma^{2,}$ pronounced "sigma square". It is the measure of total risk. The smaller the variance, the lower the riskiness of the stock and vice versa.

"The variance of return, given that we have subjective probability distribution, is defined as average of the mean squared error terms. A mean squared error is simply the squared of the difference between a given return, R_i, and the average of all returns, E(R). To calculate variance of return we use equation given below:

$$\textbf{Variance}, (\boldsymbol{\sigma^2}) = \sum_{i=1}^{N} [R_i - E(R)]^2 P_i$$

Note that variance is measured in the square of units of the data (here percent squared). Percent squared is not intuitively clear or easily interpreted. For this reason, we compute another useful measure of deviation-the **standard deviation.** It is the square root of variance. It is expressed in the same unit of the original data, and hence is easier to comprehend and compare with expected return.

To calculate standard deviation, we take the square root of the variance as presented in equation.

$$\textbf{Standrd deviation}, (\boldsymbol{\sigma}) = \sqrt{\sigma^2}$$

Where,

E(R) = Expected rate of return

P_i = Probability(Thapa, Rana, 2011).

The standard deviation of the rate of return (σ) is a measure of risk. It is defined as the square root of the variance, which in turn is the expected value of the squared deviations from the expected return. The higher the volatility in outcomes, the higher will be the average value of these squared deviations. Therefore, variance and standard deviation measure the uncertainty of outcomes. Symbolically,

$$\boldsymbol{\sigma^2} = \sum_{s} p(s)[r(s) - E(r)]^2$$

Where,

E(r) = Expected rate of return

p(s) = Probability

σ^2 = Variance(Bodie,et.al, 2007).

"Standard deviation is another parameter of return distribution measurement. It measures the tightness or variability of set of outcomes. In another words, Standard deviation measure the magnitude of the difference between best possible return and worst possible return. Thus, it measures the degree of risk of common stock. Because we have defined as the variability of return, we can measure risk by examining the tightness of the probability distribution associated with possible outcomes. In general,

the width of a probability distribution indicates the amount scatter, or variability, of possible outcomes. Therefore, the higher the probability distribution of expected returns, the less is its variability. Thus, the smaller the risk associated with the investment" (Weston, Basley&Bringham, 1996).

The measure we probability use most often is the standard deviation. The symbol for which is σ. To calculate the standard deviation, we proceed as shown in table, taking the following steps:

Calculate the expected rate of return:

$$E(k) = \sum_{i=1}^{n} Pr_i . K_i$$

$$= Pr_1.k_1 + Pr_2.k_2 + \ldots\ldots + .Pr_n.K_n$$

Where,

Pr = probability

K = expected rate of return

- First, we subtract the expected rate of return [E(K)] from each possible outcome (ki) to obtain a set of deviations from (k):

Deviation = ki – E(k)

Where,

E(k) = expected rate of return

- Next, we square each deviation, multiply the result by the probability of occurrence for its related outcome, and then sum these products to obtain the variance of the portability distribution:

$$\sigma^2 = \sum_{i=1}^{n} \{k_i - E(k)\} \times Pr_i$$

Where,

E(k) = expected rate of return

P(r) = probability

- Finally, we take the square root of the variance to obtain the standard deviation:

$$\sigma_i = \sqrt{\sigma_i^2} = \sqrt{\sum_{i=1}^{n} \{K_i - E(k)^2\} \times Pr_i}$$

Where,

E(k) = Expected rate of return

Pr_i = Probability

σ_i = Standard Deviation

Thus the standard deviation is a weighted average deviation from the expected value, and it gives an idea of how far above or below expected value the actual value is likely to be(Weston, Besely& Brigham,2003).

2.1.3.2Coefficient of Variation (C.V.):

Standard deviation is an absolute measure of variability; it is generally not suitable for comparing investments with different expected returns. In these cases, the coefficient of variation provides a better measure of risk.

$$CV = \frac{\sigma}{E(r)}$$

Where,

CV = Coefficient of Variation

σ = Standard Deviation

E(r) = Expected rate of return

For Example:

Table 2.1

Assets	Σ	E(r)	CV	Result
A	20%	25%	0.8	Less risky
B	18%	10%	1.8	More risky

Assets A look riskier than B while comparing the standard deviation but the expected returns of the assets are different. Hence it is not a relative measure, the relative measure can be the coefficient of variation and it shows that asset B is riskier as compared to asset A.

Therefore, CV is another method of measuring the risk. It is the standardized measure of the risk per unit of return, calculated as the standard deviation dividend by the

expected return. The coefficient of variation shows the risk per unit of return and it provides a more meaningful basis for comparison when the expected return on the two alternatives is the same(Bhattarai, 2010).

The coefficient of variation provides additional information regarding risk and return of the investment; however, investors would not solely base their decision even of coefficient of variation. They need to incorporate their preference towards risk in the final selection. The choice is determined by investor's attitude towards risk, and there is no single right answer. Coefficient of variation relates risk to return and measures risk in terms of per unit of return. It is calculated as:

$$\textbf{Coeficient ofvriation } (\mathbf{CV}) = \frac{\sigma}{\mathrm{E(R)}}$$

Where,

E(R) = Expected rate of return

σ = Standard Deviation(Thapa, Rana, 2011).

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

$$\boldsymbol{CV} = \frac{\sigma}{\mathrm{E(r)}}$$

Where,

σ = Standard Deviation

E(r) = Expected rate of return

A project with a low C.V. has less risk per rupee than a project with a higher C.V.(Thapa, Bhattarai&Basnet, 2006).

2.1.3.3Systematic Risk and Unsystematic Risk:

Systematic risk has its source factors that affect at the marketable assets and thus can't be diversified away.The sources of systematic risk are market-pervasive. The measure if systematic risk permits an investor to evaluate an asset required rate of return relative to systematic risk of the stock. Unsystematic (company specific/unique) risk

can be reduced through diversification. The relationship among total risk, systematic risk and unsystematic risk are shown below:

Total risk = Systematic Risk + Unsystematic Risk

While Systematic Risk = (σ_j) (ρ_{jm}) and unsystematic Risk = (σ_j) $(1-\rho_{jm})$

In this equation ρ_{jm} is the correlation between the return of given stock (i) and the return on market portfolio (Neupane, 2013).

Systematic risk is market related risk. It is also called market risk or non-diversifiable risk. For example; Inflation, interest rates, war etc. This portion of total risk is non-diversifiable and can't be reduced by diversification. The systematic risk is rewarded in the form of risk premium. Unsystematic risk is non-market related risk. It is also called non-market risk or Company-unique risk or company specific risk of diversifiable risk. For example winning a new contract, an industrial dispute, and the discovery of a new technology, labor strike etc. This portion of total risk is diversifiable and it is possible to reduce or eliminate through diversification of investments. The unsystematic risk is not rewarded because it can be reduced to zero. (Thapa, Bhattarai&Basnet, 2006).

There are two broad sources of risk.

- First the risk that comes from the condition in general economic such as business cycle inflection, interest rate, and exchange rate. None of these macro economic factors can be predicted with certainty.
- Second risk comes from firm specific influences such as successes in research and development, personal changes management, labor dispute etc.

Let us consider diversification. If we diversify into many more securities, we continue to spread out our exposure to firm-specific factor, and portfolio volatility should continue to fall ultimately, however, even with a large number of stocks we can't avoid risk altogether, since virtually all securities are affected by the common macroeconomic factor.

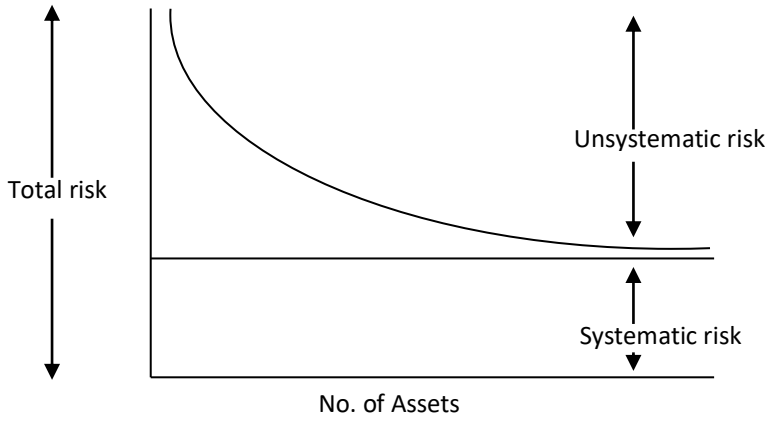
When common sources of risk affect all firms, however, even extensive diversification cannot eliminate risk portfolio standard deviation falls as the number of securities increases, but it can't be reduced to zero.

The risk that remains even after expensive diversification in called market risk or systematic risk or nondiversifiable risk. In contrast, the risk that can be eliminated by diversification is called unique risk or nonsystematic risk or diversifiable risk(Bodie,et.al 2007).

The relationship between systematic risk and unsystematic risk are shown in given figure.

Figure 2.2

Relation between S.D. of portfolio and Number of Assets in portfolio



Relationshipamongsystematicrisk,unsystematicriskandtotalriskareshownbelow

Totalrisk=systematicrisk+unsystematicrisk

$$\boldsymbol{\sigma_i^2 = \beta_i^2 \sigma_m^2 + \sigma_{ei}^2}$$

Where,

σ_i^2 = Total risk of individual asset(variance)

β_i = Beta of individual asset

σ_m = Standard deviation of market

σ_{ei} = Unsystematic risk on individual asset

Proportionof unsystematicrisk =1- proportionof systematicrisk

Where,

Proportion of systematic risk of individual asset $= \dfrac{\boldsymbol{\beta_i^2 . \sigma_m^2}}{\boldsymbol{\sigma_i^2}}$

Proportion of unsystematic risk of individual asset $= \dfrac{\boldsymbol{\sigma_{ei}^2}}{\boldsymbol{\sigma_i^2}}$

2.2 Portfolio:

A portfolio is a combination of investment assets. The portfolio is the holding of securities and investment in financial assets i.e. bond, stock portfolio management is related to the efficient portfolio investment in financial assets. The portfolio analysis is performed to develop a portfolio that has the maximum return at whatever level of risk and investor thinks appropriate. If portfolio is being constructed they can reduce unsystematic risk without losing considerable return, therefore, we need to extend our analysis of risk and return to portfolio context.

A portfolio simply represents the practice among the investors of having their funds in more than one asset. The combination of investment assets is called a portfolio(Western & Brigham,1992).

Portfolio is a collection of securities. An investor who has been paying someone to actively manage his or her portfolio has every right to insist knowing what sort of performance was obtained. Such information can be used to alter either the constraint placed in the manager, the investment objective given to the manager, or the amount of money allocated to the forcefully communicate his or her interest to the investment manager, and in all likelihood, affect the way in which his or her portfolio is managed in the future. Moreover, an investment manager, by evaluating his or her own performance, can identify sources of strengths weaknesses.

Most financial assets neither are nor held in isolation; rather, they are held as parts of portfolio. Banks, pension, insurance companies, mutual funds, and other financial institutions are required by law to hold diversified portfolios. Even individual investors- at least those whose security holding constitute a significant part of their total wealth generally hold stock portfolios, not the stock of only one firm. This begin case, from an investor's standpoint the fact a particular stock goes up or down is not very important; what is important is the return on his/her portfolio, and the portfolio's risk/ logically, then, the risk and return of an individual security should be analyzed in terms of how that security affects the risk and return of the portfolio in which it is held(Weston & Brigham, 1992).

An investor wants to minimize the risk of investment and maximize return but it is not possible through investment in single assets. He/she needs to invest in two or more

securities. This collection of securities is called *portfolio.* The basic assumption of portfolio theory is that investors we want maximize the returns from our investments for a given level of risk. It also assumes that investors are basically risk averse, meaning that, given a choice between two assets equal rates of return they will select the asset with the lower level of risk. Risk is the deviation of actual returns from an expected return. The more the deviation, the more will be the risk. To minimize the deviation, we need to diversify our fund into different securities or assets. Portfolio analysis considers the determination of future risks and returns in holding various blends of securities. The objective of portfolio analysis is to develop a portfolio that has the maximum return at whatever level of risk the investor deems appropriate. Diversification of portfolio helps to minimize risk and different diversification techniques have been developed for reducing portfolio's risk(Neupane, 2013).

A portfolio is simply defined as the combination of investments in various securities and the portfolio theory deals with the selection of efficient portfolio, which maximizes return for a given level of risk, or minimizes risk for a given level of return. Portfolio is the combination on collection of assets. Portfolio investment is the investment in two or more than two assets. The primary objectives of portfolio are:

- To minimize risk
- To maximize return

Whereas it's secondary objectives are as follows:

- Regular income
- Price appreciation/ capital gain
- Tax advantages
- Easy marketability
- Safely of investment etc.

Investor usually diversifies their portfolio in order to maximize their risk given the rate of return. To minimize the risk of portfolio and individual invest in securities with different risk and return characteristics. This procedure is called diversification. The degree of diversification varies depending on how risk avert the investor is. This determines the level of risk and return of the portfolio. An efficient portfolio is that portfolio which maximizes return for given risk or minimizes risk for a given return. The efficient frontier may be defined as the collection of all possible portfolios that

are not dominated or that have the maximum possible expected return, given a level of risk or standard deviation.

Portfolio can be classified as below:

i. Growth oriented portfolio and
ii. Income oriented portfolio

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

2.2.1 Expected Return of portfolio, $E(r_p)$:

Expected return of the portfolio is the weighted average expected return of assets included in the portfolio. Where the weighted are the proportion of investment initially made in each asset included in the portfolio(Bhattrai, 2010).

'The expected return on a portfolio, $E(r_P)$ is simply the weighted average of the expected returns on the individual assets in the portfolio whit the weighted being the fraction of the total portfolio invested in each assets(Thapa,Bhattarai&Basnet, 2006).

"The expected rate of return on a portfolio is weighted average of the returns on each individual security, which the weights being the proportion of wealth invested in each security.

$E(R_p) = W_A.E(R_A) + W_B.E(R_B)$ *(For two risky Assets A & B)*

Where,

$E(R_p)$ = Expected rate of return of portfolio

W_A = Weight of asset A

$E(R_A)$ = Expected rate of return of asset A

W_B = Weight of asset B

$E(R_B)$ = Expected rate of return of asset B

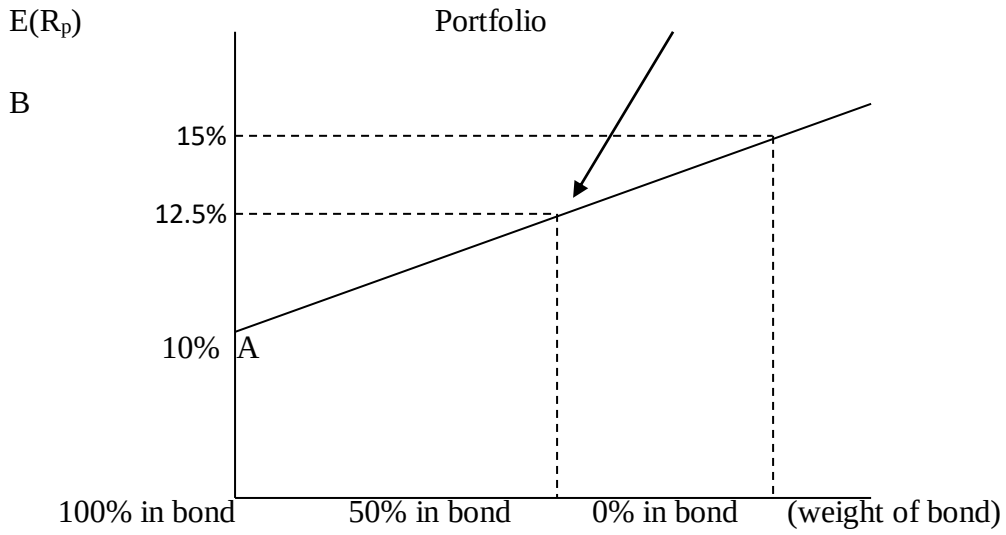
Suppose our portfolio consists of two risky assets- asset A (say bond) and asset B (say stock) with the risk return statistics given in table 2.2

Table 2.2

Statistics	Bond	stock
Expected rate of return E(R)	**10%**	**15%**
Standard deviation, σ	**14%**	**22%**
Covariance, Cov (R_A, R_B)	**154**	
Correlation, ρ_{AB}	**0.5**	

Expected returns on a portfolio always represent a linear relationship with proportion of wealth devoted to each of the assets in the portfolio. This linear relation is illustrated in figure 2.3.

Figure 2.3



In figure 2.3, line AB represents all possible expected return when investment is made jointly in boards and stocks with varying proportion of wealth. Investment in bonds along has 10% expected rate of return and that on stocks has 15%. Combining 50% investment in each of these two assets in a proportion yields an expected rate of return equal to 12.5%. As we increase the proportion of investment in stocks, the expected return on portfolio also increases lineally and reaches to the maximum 15 % when all funds are invested in the stocks. In contrast, if we increase the proportion of investment in bonds, the expected return on portfolio declines linearly and drops to the 10% when all funds are invested in the bonds(Thapa, Rana, 2011).

A. If portfolio is formed by two Assets A and B:

$$\mathbf{E(R_p) = W_A.E(R_A) + W_B.E(R_B)}$$

Where,

$E(R_p)$ = Expected rate of return of portfolio

W_A = Weight of asset A

$E(R_A)$ = Expected rate of return of asset A

W_B = Weight of asset B

$E(R_B)$ = Expected rate of return of asset B

B. If portfolio is formed by three or more Assets A, B, C……..n:

$$\mathbf{E(R_p) = W_A.E(R_A) + W_B.E(R_B) + W_C.E(R_C) +\ldots\ldots\ldots\ldots + W_n.E(R_n)}$$

Where,

$E(R_p)$ = Expected rate of return of portfolio

W_A = Weight of asset A

$E(R_A)$ = Expected rate of return of asset A

W_B = Weight of asset B

$E(R_B)$ = Expected rate of return of asset B

W_C = Weight of asset C

$E(R_C)$ = Expected rate of return of asset C

n = No. of Assets

2.2.2 Portfolio Risk:

"A statistical measure of total risk is the variance or its square root, the standard deviation. The standard deviation or the variance of return from an investment is the total risk of our investment. This total risk is measured by using the following equation:

$$\mathrm{Var}(r_p) = \sum_{i=1}^{n}\sum_{j=1}^{n} W_i . W_j . \mathrm{Cov}_{ij}$$

Where,

Wi = Proportion (weight) of investment in security i

Wj = Proportion (weight) of investment in security j

Cov_{ij} = Covariance of the returns between security i and security j,

n = Number of assets included in the portfolio,

$Var(r_p)$ = Variance of return of portfolio i.e.σ_p^2

Alternatively,

The following equations explain the standard deviation of portfolio in simple way.

Portfolio of two risky Securities like A and B

$$\sigma_p = \sqrt{W_A^2.\sigma_A^2 + W_B^2.\sigma_B^2 + 2Cov_{AB}.W_A W_B}$$

$$\sigma_p^2 = W_A^2.\sigma_A^2 + W_B^2.\sigma_B^2 + 2Cov_{AB}.W_A W_B$$

Portfolio of three securities like A, B and C

$$\sigma_p = \sqrt{W_A^2.\sigma_A^2 + W_B^2.\sigma_B^2 + W_C^2.\sigma_C^2 + 2Cov_{AB}.W_A.W_B + 2Cov_{AC}.W_A.W_C + 2Cov_{BC}.W_B.W_C}$$

$$\sigma_p^2 = W_A^2.\sigma_A^2 + W_B^2.\sigma_B^2 + W_C^2.\sigma_C^2 + 2Cov_{AB}.W_A.W_B + 2Cov_{AC}.W_A.W_C + 2Cov_{BC}.W_B.W_C$$

Where,

W_A = Weight of security A

W_B = Weight of security B

W_C = Weight of security C

Cov_{AB} = Covariance between securities A & B

Cov_{AC} = Covariance between securities A & C

Cov_{BC} = Covariance between securities B & C

σ_A = Standard deviation of security A

σ_B = Standard deviation of security B

σ_C = Standard deviation of security C

σ_p = Standard deviation of portfolio

σ_p^2 = Variance of portfolio(Bhattrai, 2010).

2.2.2.1 Covariance:

"The covariance is an absolute (as opposed to relative) measure of the degree of relationship between the returns a pair of securities. In other words covariance is the

joint variance of any two securities. It is a statistical measure of the relationship between two random variables. That is, it is a measure of how two random variables, such as the return on securities A and B, move together. A positive value for the covariance indicates that the securities returns tend to move in the same direction. A negative value of the covariance indicates the return of securities move in the opposite direction and the zero value of the covariance indicates no relationship between the securities' return. The covariance between the securities' return can be calculated by using the following equation:

a) If past data are used (if probabilities are not used)

$$\mathrm{Cov}(r_{ij}) = \frac{\sum[r_i - E(r_i)][r_j - E(r_j)]}{n}$$

b) If probabilities are used

$$\mathrm{Cov}(r_{ij}) = \sum P[r_i - E(r_i)][r_j - E(r_j)]$$

Where,

Cov (r_{ij}) = Covariance between return on securities i and j,

r_i, r_j = Single period return on securities i and j,

E(r) = Expected rate of return

n = Number observations

P = Probability of return

2.2.2.2 Correlation:

Correlation is a relative measure of relationship that is bounded by +1.0 and -1.0. It is a statistical measure of the extent to which the returns on any two securities are related, however, it denotes only association not causation. Covariance and correlation are closely related. The correlation measure the degree of relationship of movement of securities' return. Correlation is measure by using the following equation:

$$\boldsymbol{\rho_{ij} = \frac{Cov(r_{ij})}{\sigma_i . \sigma_j}}$$

Note: ρ is a Greek letter and pronounced as 'rho'

The correlation coefficient always lies between +1 and -1. A value of +1 represents a perfectly positive correlation and value of -1 represents a perfectly negative correlation(Bhattrai, 2010).

2.2.3 Optimal Portfolio Selection:

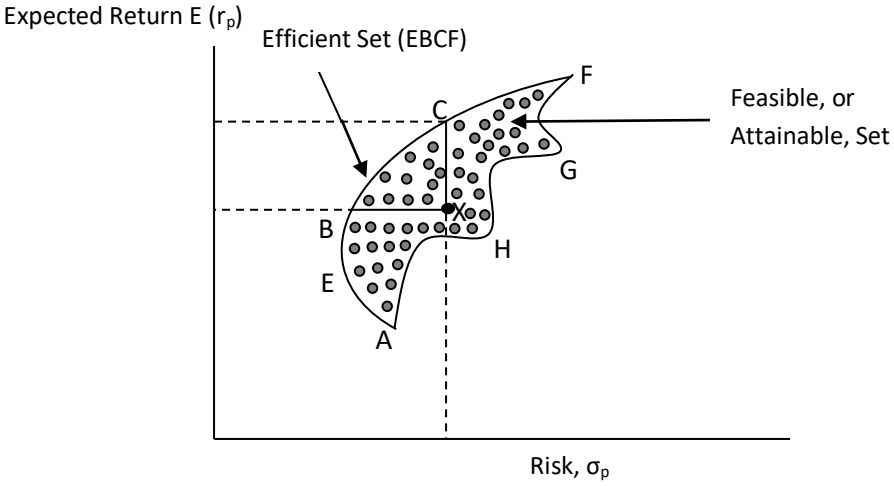
There are two steps to select a portfolio by an investor.

Step –I

Convexity of the Efficient Frontier:-

If we consider the infinite number of portfolios that could be formed from two or more securities and plotted portfolios' expected return and risk, we would create a graph like one in the figure 2.4. The efficient frontier is represented by the line from EBCF. Portfolios along EBCF dominate all other investment possibilities.

The figure (2.4)of Efficient Frontier



An efficient frontier or portfolio is a portfolio that

1. Offers maximum expected return for varying levels or risk, and
2. Offers minimum risk for varying levels of expected return

Portfolios to the left of the efficient frontier are not possible, because they lie outside the attainable set. Portfolios to the fight of the efficient frontier are inefficient because some other portfolio could provide either a higher return. In figure above, C is the portfolio that provides higher return than portfolio X with same level of risk. Another portfolio B is the portfolio that provides the same return as portfolio X with less risk.

Because of both portfolio C and B lies in efficient frontier (Thapa, Bhattarai&Basnet, 2006).

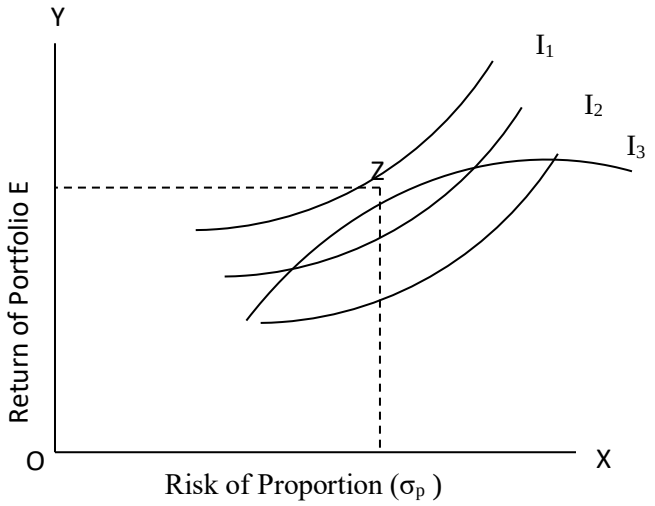
Step-II

Selection of Optimal Portfolio:-

After finding the efficient frontier, select the optimal portfolio, which maximize the utility of investors with the help of indifference curve as shown in figure below.

Figure 2.5

Optimal Portfolio Selection



The indifference curve of the investor and the portfolio becomes optimal for him. Indifference curve I1 tangent with efficient frontier at point Z. here investor's optimal portfolio is Z. that's why this point Z makes a highest level of satisfaction an investor can achieve.

2.2.4 Minimum Variance Portfolio

It is the portfolio with the lowest level of risk in the efficient frontier. It is also called risk minimizing weight. It is two-stock portfolio, the risk minimizing weight to invest is stock i and j are calculated as followings:

$$\mathbf{w_i} = \frac{\boldsymbol{\sigma_j^2 - \rho_{ij} \times \sigma_i \times \sigma_j}}{\boldsymbol{\sigma_i^2 + \sigma_j^2 - 2 \times \rho_{ij} \times \sigma_i \times \sigma_j}}$$

$$\mathbf{W_j = 1 - W_i}$$

Where,

W_i = Risk minimizing weight to invest in stock i

W_j = Risk minimizing weight to invest in stock j

2.2.5 Optimal Risky Portfolio

According to Markowitz we have to find out the risky assets of optimal portfolio, after identifying the possible portfoliosthat can be made by risky return of portfolios are made on the basis of effective portfolio. We have to determine the reward-to-volatility ratio on the basis of risky assets of optimal portfolio. William Sharpe has introduced the reward-to-volatility ratio so, it is also called sharp ratio. Reward to volatility ratio shows proportion of risky to earn higher than risk free rate of return.

$$\textbf{Reward to volatility} = \frac{\mathbf{E(r_p) - r_f}}{\boldsymbol{\sigma_p}}$$

The individual asset of covariance and expected return are to be calculated and included in portfolio to ascertain the ratio of capital in every investment of asset.

$$\mathbf{W_1} = \frac{\mathbf{E(R_1)\sigma_2^2 - E(R_2)Cov_{1,2}}}{\mathbf{E(R_1)\sigma_2^2 + E(R_2)\sigma_1^2 - [E(R_1) + E(R_2)Cov_{1,2}}}$$

$$\mathbf{W_2 = 1 - W_1}$$

Where,

W_1 = Weighted of stock 1

W_2 = Weighted of stock 2

E (R_1) = Excess return on stock 1 [i.e. E(r_1) – RF]

E (R_2) = Excess return on stock 2 [i.e. E(r_2) – RF]

σ_1^2 = Variance of stock 1

σ_{2V}^2 = Variance of stock 2

$Cov_{1,2}$ = Covariance between stock1 and stock2

RF = Risk free rate of return

2.2.6 Portfolio Performance Evaluation

The simplest and most popular way to adjust returns for portfolio risk is to compare rates of return with those of other investment funds with similar risk characteristics.

Thus, comparison of performance with other similar investment is useful first step in evaluating performance. However, such rankings can be mis-leadings. For instance, within a particulars group (universe) some managers may concentrate on particular subgroups, so that portfolio characteristics are not truly comparable.

Method of risk adjusted performance evaluation using mean-variance criteria came on stage simultaneously with the Capital Assets Pricing Model [CAPM]. Three great scholars / academicians namely William Sharpe, Jack Treynor and Michael Jensen recognized immediately the implication of the CAPM for rating the performance of investment portfolio. Hence, some risk adjusted performance measures can be listed as:

a. Sharpe's measure (S_i)
b. Treynor's measure (T_i)
c. Jensen's measure (J_i)

1) Sharpe's Portfolio Performance Measure

It was derived by William Sharpe. Sharpe's measure divides average portfolio excess return over the sample period by the standard deviation of return over that period.
The Shape's measure of portfolio performance (designated S_i) is stated as

$$S_i = \frac{\bar{r}_i - \bar{R}_f}{\sigma_i}$$

Where,

Si = Sharpe's index of portfolio performance
$\bar{r}_i$ = Average return on portfolio 'i' during a specified time period
R_f = Average risk free rate during the same time period
σ_i = Standard deviation of portfolio 'i'

2) Treynor's Portfolio Performance Measure

It was develop by Jack Treynor. Treynor was interested in a measure of performance that would apply to all investors-regardless of their risk performances. Building on developments in capital market theory, he introduced a risk free asset that could be combined with different portfolio, to form a straight portfolio possibility line. He showed that rational risk average investors would always prefer portfolio possibility lines with lager slopes because such high slope lines would place investor on higher

indifference curves. The slope of this portfolio possibility line (designed T_i) is the Treynor's portfolio performance measure and it is given by

$$\mathbf{T_i} = \frac{\bar{r}_i - \bar{R}_f}{\beta_i}$$

Where,

r_i = The average rate of return for portfolio 'i' during a special time period

R_f = The average rate of return on a risk free investment during the same time period

β_i = The slope of the find's characteristic line during that time period (i.e. portfolio 's beta coefficient)

3) Jensen's Portfolio Performance Measure

Michael Jensen develiped this measure for portfolio performance. This measure is based on CAPM. The aversion of CAPM which is used to compute security's or portfolio's expected rate of return is given by

$$\boldsymbol{E(r_i) = R_f + \beta_i[\bar{r_m} - R_f]}$$

Where,

$E(r_i)$ = The expected return on security or portfolio 'i'

R_f = One period risk free rate of return

β_i = The expected return on market portfolio

Jensen's measure is the average realized return on the portfolio over the return predicted by the CAPM given the portfolio's

Jensin's measure ($\acute{\alpha}_p$) = $E(r_p) – [R_f + \beta_p[E(r_m) - R_f]$

Hence, jensen's measure ($\acute{\alpha}_p$) represents how much of the rate of return on the portfolio is greater than the average returns adjusted for risk (or average return assigned by CAPM). A+ve άp indicates the superior portfolio performance or selecting under valued portfolios.

The jensen's measure of portfolio performance has advantages over the Trynor and Sharpe. First it is easier to interpret in that an alpha value of 0.02 indicates that the portfolio generated a return of 2% per period more than what was expected given the portfolio's risk level. Second, it assists to know whether an assets is over or undre valued.

If $\acute{\alpha}_p$ is +ve asset (portfolio) is under valued.

If $\acute{\alpha}_p$ is –ve asset (portfolio) is over valued.

For ranking the portfoio according to their performance to their performance, it is advisable to divide the $\acute{\alpha}_p$ by β_p so as to achieve a relative measure and provide a reliable rank.

2.3 Capital Assets Pricing Model (CAPM)

Capital assets are long term financial as well as real assets and CAPM is based on the pricing of these assests. Modern portfolio theory of Markowitz suggests that the investment decision should be based on the total risk and the price of assets should also be determined on the basis of the total risk but the CAPM suggests that any investor can creat a portfolio of assets that will eliminate virtually all diversifiable risk, the only relevent risk is non-diversifiable risk, therefore the investment decision and the pricing of capital assets should be based on the undiversifiable risk. This is the primary importance of selecting assets with the most desired risk return characteristics. The CAPM futher suggest that the price of capital assets should be deretmined in a way that compensates the systematic risk. Capital market theory assumption.

a. Investors evaluate portfolio by looking at the expected returns and standrad deviation of the portfolio over one-period horizon
b. Investors are risk averse. So when they are given two alternative portfolios they will choose one having higher expected retuen and lower standared deviation
c. Capital markets are highly efficient so that all invstors get market information perfectly.
d. Individual securities can be dividend infinitely and can be bought in fraction as well.
e. No transaction cost occurs in capital market.
f. There is a certain risk-free rate at which an investor lends or borrows money. The risk free rate is same for all investors.
g. No invstor is able to affect the market price of securities

2.3.1CAPM and Single Index Model or CAPM Equation

The requied rate of return to bear a certain level of systematic risk can be determined by using the following equation:

$$\mathbf{E(r_i) = rf + [E(r_m) - rf]\beta_i}$$

Where.

$E(r_i)$ = Required rate of returen on assets I,

rf = Risk free rate of return,

$E(r_m)$ = Expected return on market porfolio,

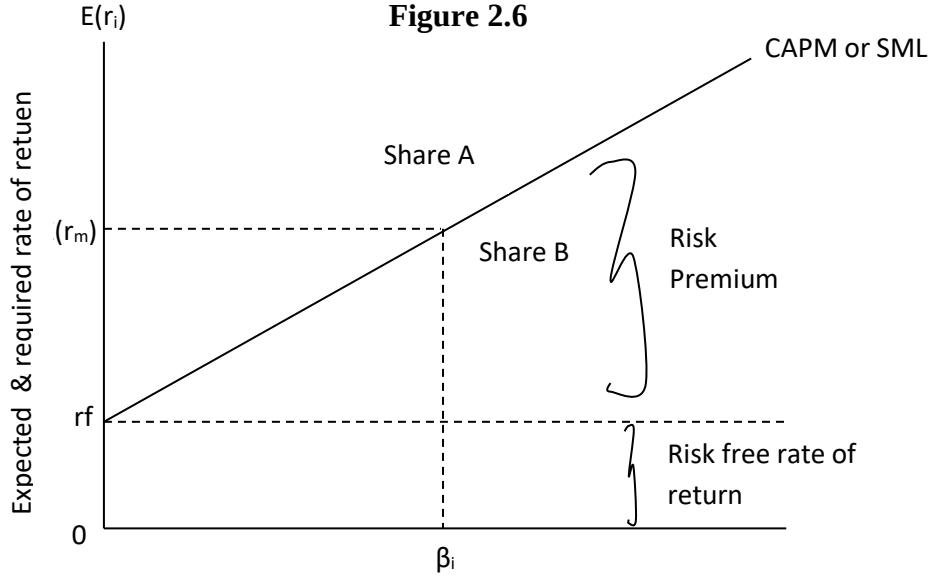
β_i = Beta or systematic risk index of assets I,

The above equation is called CAPM or security market line (SML) equation.

2.3.2Security Market Line (SML)

Security market line is the line showing the relationshop between the systematic risk index (beta) and the required rate of return.

Figure 2.6



Overpriced and Underpriced

The primary concern of portfolio management is to identify the under-price securities. Over-priced and under-priced securities are identified either by a comparison of their value with market price or a comparison of the required rate of return (return calculated by using CAPM equation) and expected return. If

Table 2.3

Condition	**Pricing**
1. Required rate of return > Expected return	Over-priced
2. Required rate of return < Expected return	Under-priced
3. Required rate of return = Expected return	Exactly priced

Suppose that in the given diagram the security line is drawn on the basis of what investors as a whole know to be the approximate relationship between the required rate of return and systematic or unavoidable risk. For some reason two stock calls them A & B are improperly priced. Share A lies above the SML. It is expected to offer a return greater than that required by the market for that level of risk. Its expected return is greater than its required return, $E(r_i) > r_i$. Share A is undervalued or underpriced. Alternatively share B lies below the SML it is expected to provide a return below that required by the market for that corresponding level of risk. When the expected rate return is greater than the required rate investors will try to purchase shares of the stock this will drive the price upward.
If the expected rate of return is less than the required rate, investors will desire to sell the stock; there will also be a tendency for the price to decline.

Capital assets pricing model (CAPM) is a model that indicates what should be the expected or repaired rate of return on risky assets. This transition is important because it helps you to evaluate an asset by providing an appropriate discount rate to use in any valuation model. Alternatively, if you have already estimated the rate or return that you think will earn on an investment, you can compare this estimated rate of return to the required implied by the CAPM and determine whether the assets is undervalued, overvalued, or properly valued.

To accomplish the foregoing, we demonstrate the creation of security market line (SML) that visually represents the relationship between risk and expected or the required rate or return on asset. The equation of this SML, together with estimates for the return on risk-free asset and so on the market portfolio, can generate expected or required rate of return to any asset based on its systematic risk. You compare this required to return to the rate that you estimate that you will earn on investment to determine if the investment is undervalued or overvalued. After demonstrating this procedure, we finish the section with demonstration of how to calculate the systematic risk variable for a risky asset(Neupane, 2013).

2.4 Arbitrage Pricing Theory (APT)

The exploitation of security mispricing in such a way that risk free economic profit can be earned is called arbitrage. It involves the simultaneous purchase and sales of

equivalent securities in order to profit from differences in their price relationship.

Arbitrage opportunity and profit

- Arbitrage opportunity arises when the law of one price is violated.
- When an asset is trading at difference prices in two markets, or simultaneous trade in two markets can produce a sure profit without any investment.
- One simply sales short the asset higher price market and buy it in low price market. The net proceed are positive and there is no risk because the long and short position offset each other.
- In other words, the arbitrage opportunity arises when an investor to construct a zero investment portfolio that will yield a sure profit.
- The APT no-money-invested assumption presumes that arbitraging short sellers are able to obtain 100% of the proceeds from their short sales to finance the purchase of their long position.

2.4.1The APT and well diversification portfolio

Stephen Rose developed the APT in 1976. We began with a simple version of the model which assumes only one systematic factor affects security returns. Rose starts by examining a single factor model. As in model uncertainty assets returns has two sources: A common or macroeconomic factor and a firm specific event.

If we call F the deviation of common factor from its expected value β_i (beta) the sensitivity of the firm 'i' to that factor and e_i the firm specific disturbance, the factor model states that the actual return firm i will equals its initially expected return plus a (zero expected value) random amount attributable to unanticipated economy wide events plus another (zero expected value) random amount attributable to firm specific events.

Formally, the single-factor-model is described by equation

$$\mathbf{r_i = E(r_i) + \beta_{i.}F + e_i}$$

Where,

$E(r_i)$ = Expected return on stock

$\beta_{i.}$ = Beta of i asset

F = Value of the factor under consideration

e_i = Random error term

All known systematic components return the e_i are uncorrelated amount themselves and uncorrelated with the factor F. To make a factor model more clear let's us consider and example. Suppose the macro factor F is taken to be the unexpected percentage change in gross domestic product (GDP) and the consensus GDP by will increase by 4% this year. Suppose also that a stock's beta value is 1.2, if GDP increases by only 3% then the value of F would be -1%. Representing a 1% disappointment in actual growth versus expected growth. Give the stock's beta value this disappointment would translate in to a return on the stock that is 1.2% lower than previously expected. These macro surprise together with the firm specific disturbance e_i, determine the total departure of the stock's return from its originally expected value.

2.4.2 Multifactor Arbitrage Pricing Theory

We have assumed so far that there is only one systematic factor affecting stock returns. This implying assumption is in fact too simplistic. It is easy to think of several factors driven by the business cycle that might affect stock returns (interest rate, fluctuations, inflection rates, oil price and so on). Exposure to any of these factors will affect a stock's risk and hence it's expected return. We can drive a multifactor version of the APT to accommodate these multiple sources of risk.

The equation of two factor model

$$\mathbf{r_i = E(r_i) + \beta_{i1}.F_1 + \beta_{i2}.F_2 + e_i}$$

Factor 1 might be departure of GDP growth from expectation and factor 2 might be unanticipated inflection. Each factor has a zero expected value, because each measures each measures the surprise in the systematic variable rather than level of the variable. Similarly the firm specific component of unexpected return e_i also has zero expected value(Bodie,at.al,2007).

To have arbitrage profit

- Assets should be undervalued
- There should be zero initial cash outlay
- Zero incremental risk

2.5 Reviews from relevant studies from Articles, Journals and Reports

2.5.1 Reviews of Journals and Articles:

Very limitednumbers of journalsareavailablein managementand itis furtherhard to find any journalsinthesubjectmatterof financeincontextof Nepal.IntheNepalesecontext,thereare very limited numbers of articles can be found relating to management of commercial banks of Nepal.Specially,itisrareinthecaseofthis researchtopic. However,thereareavailablesome independent-studieswhich are relatedto theNepaleseStockMarket,Portfoliomanagementand Shareholders democracy are summarized below in detail

Shrestha,Monohar Krishna:2057 B.S. in his article "Commercial Banks Comparative Performance Evaluation" concluded that the Joint Venture banks are new operationally more efficient, having superior performance while comparing with local banks that are operating in Nepal. Better performance of joint venture banks is due to their sophisticated technology, modern banking method and skill. There better performance is also due to the government's branching policy in rural area. Local banks are efficient and expertise in rural sectors but having number of deficiencies. Thus, local banks are facing growing constrains of socio-economic, political system on one hand spectrum and that of the issues and challenge of joint venture banks commanding significant banking business on other spectrum.

Chopra,
Sunil:2046B.S.inhisarticle"TheRoleofForeignBankinNepal"concludesthatthe jointventurebanksarealreadyplayingadynamic andvitalroleinthe economicdevelopmentof the country and this will undoubtedly increase with time.

Pradhan, RadheShyam:1993
A.D.carriedoutastudyonthetopicof"StockMarketBehaviorina smallcapitalmarket:acaseinNepal"in1993,thestudywasbasedonthedatacollectedfor 17 enterprisesfrom1983through1990.Oneofthemajor objectives, which are related

to this study, was “To access the stock market behavior in Nepal.” Pradhan has summarized the following findings:

-Dividend per share and Market price per share was positively correlated.
-Higher the earning on stock, larger the ratio of dividends per share to market price per share.
-There are positive relationship between dividend payment and liquidity.

Mr. Mahat,L.D.has publishedanarticleregarding"EfficientBanking"in the Kathmandu PostDaily"onApril282004.Hewrites,aftertherestorationof democracy,Nepalhasadoptedmoreliberalandopeneconomicpolicies.Theopen andliberal policyofthegovernmentinthefinancialsectorhashelped inestablishing many banksandfinancialinstitutioninthecountry.Thesebankshavecontributed towardsintroductionnewtechnology, newbankingsystemsandefficientservice deliveryin thecountry.

Bankingindustrywasbooming untilrecentpast.But,therecenteconomicslowdown they startedaffecting theperformanceofcommercialbanks.Theprinciple ofsurvival ofthefittestwillholdwellundersuchascenario.Therefore, abankhastoincrease efficiencyto winthecompetition.

Theefficiency ofbankscanbemeasuredusingdifferentparameters.Theconceptof productivityandprofitabilitycanbeappliedwhileevaluatingefficiencyofbanks. Thetermproductivity referstotherelationshipbetweenthequantityofinputsand outputs.Ifmoreoutputcanproducedfromthesameinputsorthesameoutputscan beproducedfromfewerinputs,itissaidthatproductivityhasincreased.

Asthegovernment banksareatdistress,thesebanksareleftoutforevaluation. Similarly,Siddhartha bank,LaxmiBankandKumariBankarelateentrantsinthe industryandareintheprocessorincreasingbusinessvolumetoachieveeconomics of therefore,figuresofthesebanksalsomayleadto misinterpretation.

SCBLandHBLarewellahead intermsofotherincometointerest incomeratio. On theotherhadLUBL,MBL,NCCBandNSBIhavepoorotherincome tointerest incomeratio.Banks withhigher ratiocanbeconsideredefficient,butalsovulnerable inthesensethatareductioninotherincomewillhittheprofitability.

Interestexpensestointerestincomeratioreflectstheefficiency intheuseoffunds. SCBL couldbeconsideredthemostefficientbankunderthisparameterwhileLUBL isthemostefficient bank.LUBLandMBLstandefficientastheyhavehigher operatingprofittototalincomeratio.Theoperatingprofittototalincomeratiohelps inassessingwhetherbanksaredoingtherightinternally.

Theanalysisofoperationalefficiency ofbankswillhelptounderstandtheextentof vulnerability ofbanksunderthechangedscenarioandindecidingwhomtobank upon.Thismayalsohelptheinefficientbankstoupgradetheirefficiency andbe winnerinthesituat3ion developingduetoslowdownintheeconomy.Theregulars shouldalsobe concernedonthefactthatthebankswithunfavorableratios maybring catastropheinthebankingindustry.

2.5.2 Review of Thesis:

Some of the related studies are reviewed here:

(Khanal, Shishir: 2008)

A thesis entitled with "Portfolio investment in common stock of Joint Venture Banks in Nepal (with reference to NABIL Bank, Himalayan Bank, Everest bank and SBI Bank). The major objectives which are to analyze the risk and return of common stock investment of joint venture banks and provide suggestions to general people:

Mr. Khanal has used some tools for fulfill his objectives, the tools are following:

- Market price of stock
- Dividend
- Return on common stock investment
- Expected rate of return
- Standard deviation
- Correlation coefficient
- Coefficient of variation

The major finding of the study are return of all stock are positive correlated with the market and coefficient of correlation of most of the stock are negatively correlated. The recommendation of the study are the standard deviation is lowest with the HBL and risk averter investment would go for it and the occurrence of the national and international events impacts upon the overall economy.

(Koirala, Pradip: 2010)

A thesis entitled with "portfolio Analysis of Common Stock Investment of Joint Venture Banks of Nepal (with reference to NABIL, SCBNL, HBL, EBL and SBIBL). The main and basic objectives of this study are:

a. To analyze the risk and return of common stock investment of the joint venture banks
b. To estimate and optimal portfolio amount of common stock investment of Nepalese J. V. banks

Tools used for analysis

- Market price of stock
- Dividend
- Return on common stock of investment
- Expected return on common stock
- Standard deviation
- Co-efficient of variation
- Beta
- Correlation co-efficient
- Portfolio risk and return

Major Findings:

- ✓ The expected return on common stock of NABIL is maximum i.e. 0.9251 (92.51%) which is very high. The expected rate of return of the common stock of HBL is found minimum i.e. 0.3958 (39.58%).
- ✓ The S.D. of HBL is lower i.e. 0.2731 and that of NABIL is higher i.e. 1.3365 so NABIL's C.S. is high risky where as HBL's is low risky.
- ✓ The C.V. of HBL is lower (0.6870) whereas C.V. of NABIL is found higher i.e. 1.4447.
- ✓ While creating the portfolio between the two assets of all the sample bank the optimal portfolio of NABIL bank and HBL bank gives the maximum portfolio return that is 1.0578 (105.78%) whereas the portfolio of HBL and SCBNL gives the lowest portfolio return i.e. 0.4881 (48.81%). Considering the portfolio risk, the portfolio of NABIL and SCBNL has maximum S.D. that is 1.6586 but the portfolio of HBL and SCBNL has the lowest S.D. that is

0.339.

- ✓ Correlation between NABIL and HBL is found 0.9877 which is highest between mentioned banks under the study and the correlation of EBL and SBI is 0.3983 that is the lowest correlation, however all the banks are positively correlated but they are neither perfectly correlated nor negatively correlated.

Recommendations:

Investor should be rational; he/she should carefully look after risk and return before investment on common stock of joint venture banks. It is better to invest on such common stock .which has fewer betas and finally investors need to diversify their fund to reduce the risk. Political environment should be sound and government should static for long term.

(Pokhrel, Basanta: 2009)

A thesis entitled "Portfolio Management of Joint Venture Banks in Nepal"isbasedonstudyoffourjointventurebanks.
Theyare:NepalBangladeshBankLtd., StandardCharteredBank Ltd.,HimalayanBank Ltd. and Everest Bank Ltd... The general objectiveof this study is to identify the situation of portfolio managementof joint venture banks in Nepal.
The major findings of this study are given below:

- AmongtheselectedbankonratiosofEverestBankLtd,aremoreconsistentamongthe four joint venture banks.
- SCBNLisnotinvestingitsfundonNRBbondafter2007andnogovernmentsec urities after 2008.
- HBL is not investing its fund in NRB bond after 2007 and investing very high amount of fund on government securities.
- NBBLisinvestingveryhighamountofitsfundingovernmentsecurities.EBLisnot investingitsfundonNRBbondafter2007butis investinghighamountoffundon government securities.
- SCBNLisprovidingveryhighamountofitsloans&advancestotheprivatesector.It has also given the second priorityforeignbillspurchase and discount.

- HBLisprovidingveryhighamountofitsloans&advancestotheprivatesectorin increasingtrends. It has also giventhesecond priorityto foreign bills purchase and discount.
- NBBLisprovidingveryhighamountofitsloans&advancestotheprivatesector. Ithas also given the second priority to government securities by providing very low amount of loans to the foreign billspurchaseanddiscount.
- EBLisprovidingveryhighamountofitsloans&advancestotheprivatesectorandhas given the second priority to the foreign bills purchase and discount. It is not providing amount of loans & advances to government enterprises.

(Shresth, Sahes: 2009)

A thesis entitled with "Analysis of Risk & Return and application of SML on common stock commercial bank in Nepal". In this study she has taken three banks as a sample size from listed commercial banks of NEPSE. The main objective of the study is to analyze the risk, return, and other relevant variable that help in marking decision about investment on securities of the commercial bank.

The specific objectives of the study are:

- To analyze and awareness of individual investors regarding common stock investment.
- To solve the SML (security Market Line) and to analyze whether the stock in underpriced or overpriced.
- To show the security characteristic line (SCL) of individual stock.

Major Findings

A. 30.12% respectively return is an income received by investors for bearing risk within the stock. Expected return on common stock of NBB as the highest with 0.4705 i.e. 47.05%, SCBL and NABIL bank has the expected return of 39.02%
B. Where there is return there will be risk also, common stock of NBB is most risky with standard deviation of 0.5542 whereas NABIL bank has standard deviation of 0.6162.
C. C.V. measures the risk in unitary basis that means it shows how many unit of

risk should be bear to gain one unit if return. In terms of C.V. SCBL has lowest C.V. i.e. 1.4203 and highest in NABIL bank with 0.0458.

D. Among the three stock, NBB's stock in more volatile having beta of 2.1785 and least volatile stock is SCBL's stock with 1.2142 beta co-efficient. In fact all of them are volatile than the market portfolio or aggressive stock having beta greater than 1.
E. All three stocks are underpriced having grater S.D. i.e. 0.5045 and lowest S.D. in trading sector with 0.0833.
F. Among the sectors banking sector is more volatile with market having highest beta with 1.0728 and the stock of trading sector is defensive having lowest beta with 0.0372. After banking sector other sector has the maximum beta with 0.7201.
G. Nepalese stock market is in the emerging stage in our country. Nepalese investors are not able to analyze the securities as well as market properly due to lack of information and poor knowledge on common stock.

2.6 Research Gap:

AlthoughsomepreviousMBSstudentshaveconductedtheirthesisinthe similartopic thepresentresearcherhasselected,thereis fundamental differencebetweenthoseand thispresentresearchone.Thepreviousresearcherfocusedonly ontheriskandreturn aspect of selectedjointventurebanksfrominvestorsperspectives.Thisresearchhas furthertriedtoidentifythecorrelationamong returns ofthejointventurebanksunder studywhichplaysasignificantroleintheriskreductionbyportfolioconstructionand systematicandunsystematicriskhasbeenidentifiedforeachbank and minimum variance portfolio and optimum risky portfoliowhichisnotdone by previousresearchersandthisresearchincludesthatfinancialperformanceofjoint venturebanksthroughcommonstockinvestmentportfoliostrategiesandshare of joint venturebanksunderprice,overpriceorcorrectlyvaluedbyanalyzingtheriskand returncharacteristic of individualbank. The portfolio performance has also been evaluated with using Jensen's Portfolio Performance Measure, which has not been calculatd on other studies.

CHAPTER-THREE

RESEARCH METHODOLOGY

A research is systematic and in-depth study or searches of any particular topic by formulating hypothesis, collecting information, analyzing and interpreting them through the valid results. It is also called a creative inquiry (investigation) to new insight to phenomena.

Research is essentially a systematic inquiry seeking facts through objectives verifiable methods in order to discover the relationship among them and to deduce them broad principles or laws(Joshi 2003).

Research methodology is the science of systematic and organized method; which proves into depth the facts of the problem in order to discover new information or relationship and to expand, verify existing knowledge for some specific purpose. In other word, a systematic process adopting by the researcher to study problem with certain objective in view is known as research methodology. Research Methodology includes all the method and procedures; from theoretical framework to the collection and analysis of the data with the purpose of finding answer to the problem. As most of data are quantitative, the research is based on scientific methods were the both parts of technical and logical aspects are composed. In this study, all the observed data, which are based on the historical data, are analyzed with using financial and statistical tools.Results are presented in simple way using tables, graphs and diagrams.

3.1 Research Design:

A research design is a plan or blue print of investigation for the collection and analysis of data. It helps the researcher in the right direction in order to achieve the goal.

A research design is the arrangement of conditions for collection and analysis of data in a manner that aims to relevant facts the research purpose with economy in procedure(Kothari, 2002).

This study is more analytical, empirical and less descriptive. Analytical in the sense that all the available data are analyzed by using various statistical tools and

techniques. Such as: standard deviation, coefficient of variation, and correlation model etc. all the data used in this study have been taken from related sources. The study is purely empirical due to purely historical data. The research is based on recent historical data, which are collected from various secondary sources. The research study covers 5 years of period from fiscal year 2006/07 to 2010/11 A.D. it relates with the study of risk, return and portfolio analysis of JVBs on the basis of available information.

3.2 Population and sample:

The large group about which the generalization is made is called the population under study or the

universes and small portion on which the study is made is called the sample of the study. There are altogether thirty two commercial banks, out of them there are seven Joint Venture banks. This study is based on the portfolio analysis on common stock investment of only four JVBs of Nepal. Thus, this research work covers only four Joint Venture Banks. That's why it implies the study of (4/7) 57.1429% population out of total number of the Joint Venture Banks. However, it becomes only 12.5% out of total number of commercial banks in Nepal.

It is not possible to study all data related with all bank of Nepal. There are altogether thirty one listed commercial banks in the country and their stocks are traded actively in stock market. Out of them, four commercial banks are selected sample for the study. The sample banks are as following:

Table 3.1

S.No.	Name of Bank	Established Date	Listing date in NEPSE
1.	NABIL Bank Ltd.	1984 A.D.	24/11/1985
2.	Himalayan Bank ltd.	1992 A.D.	04/07/1988
3.	Nepal SBI Bank ltd.	1993 A.D.	17/01/1995
4.	Everest Bank ltd.	1992 A.D.	07/04/1996

(Sources: www.nepalstock.com)

3.3 Sources of Data:

This study is based on the secondary data. Basically most of sources are secondary. Most of all data used in the analysis are the secondary data. Hence, the justification of this analysis fully depends upon the reliability of those secondary data.

The major sources of secondary data are follows:

- ✓ Website of Nepal Stock Exchange
- ✓ Previous study thesis, reports and articles
- ✓ Fiancé websites
- ✓ Websites of concerned banks.

3.4 DatacollectionProcedures:

This study is based on secondary data concerned Joint Venture Banks. Nepal Rastra Bank, Securities Board of Nepal (SEBON), and different library are provides of the data. The review of literature of the proposed study is based on the text books, journals, and websites. During the study period, informal opening survey is also taken with the individual investor, related Joint Venture Banks of officials, Nepal Stock Exchange (NEPSE) etc.

3.5DataAnalysisTools:

VariousFinancialandStatisticaltoolsareusedtoanalyzethedata.

There are several tools which are applied in order to analyze the performance of Joint Venture banks like Market Price of Stock (MPS), dividend, return on common stock investment, expected return on common stock, standard deviation, co-efficient of variation, beta, correlation co-efficient, portfolio risk and return, systematic risk, unsystematic risk, minimum variance portfolio, optimal risky portfolio, Sharpe's portfolio, Treynor's portfolio, Jensen's portfolio performance measure respectively. This can described one by one as follows:

3.5.1 Market Price of Stock (P):

The market price of stock is the most importance tools because without market price, we can't further calculation. There are three types of prices of the share, i.e. high price, and closing of each year, which are summarized and published by Nepal Stock Exchange (NEPSE). For the analysis, single one is needed. Therefore, two approach either average price (i.e. average of high and low price) or closing price can be used.

It is denoted by symbol of "P". it may be very closer result if it is used average price that represents the price of whole year but it is very difficult to obtain the real average. To get the real average, volume and price of each transition of the stock and the duration of the time of each transaction in the whole year are necessary. But, it is very hard and difficult to include all information. In this regard, it is very difficult to use average price as a market price of stock. Thus, the closing price of each year is used as the market price of the stock (MPS).

3.5.2 Dividend (D_t)

Management should try to maintain regular dividend. For regular dividend, the firm will have sufficient earnings. Management will set a lower regular dividend rate than firms with the same average earnings but less volatility. Management may also declare extra dividends in year when earning are high and fund are available.

Cash dividend

Cash dividend is the dividend, which is distributed to the shareholders in cash out of the earnings of the company. When cash dividend is distributed both total assets and net worth of the company decrease as cash and earnings decrease. The market price of the share drops in most cases by the amount of the cash dividend distributed. The market price after dividend is calculated as follows:

Market price per share after cash dividend = Market price per share before cash dividend – dividend per share.

Stock Dividend

A stock dividend involves a bookkeeping transfer from the retained earning to the capital stock account. It is paid in share of stock instead of cash. A stock dividend reduces the retained earnings.

In case of stock Dividend:

Total Dividend = Cash dividend + Stock Dividend % × Next Year's MPS

Where,

MPS = Market price per share

It is denoted by symbol as 'D'

3.5.3 Return on Common Stock (R_i)

Single period return may be defined as the change in value plus any cash distributions expressed as a percentage of the beginning of period investment value. It is denoted by "R_i"

Symbolically,

$$\mathbf{(R_i)} = \frac{\textbf{Ending price } (\mathbf{p_t}) - \textbf{Beginning price } (\mathbf{P_t - 1}) + \textbf{Dividend } (\mathbf{D_t})}{\textbf{Beginning price } (\mathbf{P_t - 1})}$$

3.5.4 Expected Rate of Return E(r)

Expected rate of return is one of the main tools to measure the performance of company. Expected rate of return is the average rate of return on common stock, which is calculated by the arithmetic mean of historical returns.

Symbolically,

$$\mathbf{E(rj)} = \sum_{t=1}^{n} \mathbf{R_{tj}/n}$$

$$= \frac{R_{j1} + R_{j2} + \cdots + R_{jn}}{n}$$

Where,

E(rj) = Expected rate of return of stock 'j'

R_{tj} = Return of stock 'j' at time t

n = Number of years that the return is taken

$\sum$ = Sign of summation

3.5.5 Standard Deviation (σ)

It is statistical measure of the variability of a set of observations. The symbol is 'σ' pronounced

'sigma'. It is the measure of total risk. The smaller the standard deviation is the lower the riskiness of the stock and vice versa.

$$\boldsymbol{\sigma_j} = \sqrt{\frac{\sum[\mathbf{R_j} - \mathbf{E(r_j)}]^2}{\mathbf{n - 1}}}$$

Where,

σj = Standard deviation of returns on stock 'j' during the time period n

Note – When the observation (in this case the returns) are considered to be a sample from the total population of observation, dividing by 'n-1' provides on unbiased estimate of the true population variance or standard deviation. If observations represent to entire population, the sum of the square deviations is divided by n. Since in corporate financial management, we are almost always sample, therefore 'n-1' will be used in denominator, in case of investments most authors prefer to use 'n' in denominator since true population is used (Thapa, Koirala, 2065).

3.5.6 Coefficient of variation (C.V)

Standard deviation is an absolute measure of variability; it is generally not suitable for comparing investments with different expected returns. In these cases, the coefficient of variation provides a better measure of risk.

$$\mathbf{CV_j = \frac{\sigma_j}{E(rj)}}$$

Where,

CV = Coefficient of Variation of stock 'j'

σ = Standard Deviation of stock 'j'

E(r) = Expected rate of return of stock 'j'

3.5.7 Beta (β):

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

Mathematically the systematic risk (beta) is measured as the covariance of the stock returns with the market returns expressed per unit of market variance as follows:

$$\text{Beta coefficient } (\beta_j) = \frac{\mathbf{Cov(r_m.r_j)}}{\mathbf{\sigma_m^2}}$$

Where,

Cov ($r_m.r_j$) = Covariance between the returns of security j and market

σ_m^2 = variance of market return

- If probability is not given

$$\mathbf{Cov(r_m.r_j)} = \frac{\sum[R_m - E(R_m)] \times [R_j - E(R_j)]}{n-1}$$

- If probability is given

$$\mathbf{Cov(rm.rj)} = \sum[R_m - E(R_m)] \times [R_j - E(R_j)] \times \mathbf{Pi}$$

An asset or a portfolio with a beta grater than 1 is considered to be aggressive (more risky than the market). An asset or portfolio with a beta less than 1 is considered to be defensive (less risky than the market). Beta coefficient of market is always equal to 1.

3.5.8 Required Rate of Return (RRR):

The required rate of return to bear a certain level of systematic risk can be determined by using the following equation:

$$\mathbf{RRR_j = R_f + \beta_j[R_m - \bar{R}_f]}$$

Where,

$\bar{R}_m$ = The expected return on market

R_f = One period risk free rate of return

B_j = Beta or systematic risk index of Assets 'j'

The above equation is called CAPM or security market line (SML) equation.

3.5.9 Correlation co-efficient (ρ)

The correlation co-efficent between two assets. It can be taken on a value ranging from -1 to +1. Correlation and co-variance are related by the following equation.

Symbolically,

$$\boldsymbol{\rho_{ij} = \frac{Cov_{ij}}{\sigma_i . \sigma_j}}$$

Where,

Cov_{ij} = Covariance betweem returns on stocks i and j

σi = Standard deviation of stock i

σj = Standard deviation of stock j

Interpretation of Correlation Coefficient

a. It lies always between +1 to -1

b. When ρ = +1 (there is perfect posative correlation). It is indicated that the return of the stocks would move and down together and a portfolio two such stocks

would be exactly as risky as the individual stocks. Thus, the diversification cannot reduce risk if the portfolio consists of prefectly posative correlated stocks.

c. When ρ = -1 (there is perfoct negative correlation). It is indicated that the return of stocks would move perfectly together but in exactly opposite direction. In this conditation, risk can be completely eliminated.
d. When ρ = 0 (there is no correlaiton) when the correlation between tow stocks is exactly 0, there is no relationship between the returns of the two stocks. In cuch case some risk can be reduced.
e. When ρ lies between 0.7 to 0.999 (-0.7 to -0.999) there is a high degree of positive (or negative) correlaion between two stocks.
f. When ρ lies between 0.5 to 0.699, there is a moderate degree of correlation of two stocks
g. When ρ is less than 0.5 there is low degree of correlation of two stocks.

3.5.10 Market Return (R_m)

Market return is independent variable of characteristic line. In the context of Nepalese Financial market, average return of market return can be found by using NEPSE index.

Market return can be calculated as follows:

$$\mathbf{R_m = \frac{NEPSE_{t+1} - NEPSE_t}{NEPSE_t} \times 100}$$

Where,

$NEPSE_{(t+1)}$ = Market Price Index at the beginning of period t

$NEPSE_t$ = Market Price Index at end of period t

3.5.11 Portfolio Risk and Return:

Portfolio is combination of individual or a group of assets. Investors have different types of investment opportunity but they have limited resource of investment so that investors have to choose that investment opportunity which maximizes return for a given level of risk or minimize risk for a given level of return. Thus the combination of these investments is called portfolio.

1) Portfolio Return $E(R_p)$:

Expected return of the portfolio is the weighted average expected returns of assets included in the portfolio. Where the weights are the proportion of investment initially made in each assets included in the portfolio.

- In case of two assets:-

$$\mathbf{E(R_p) = W_A.E(R_A) + W_B.E(R_B)}$$

- In case of three assets:-

$$\mathbf{E(R_p) = W_A.E(R_A) + W_B.E(R_B) + W_C.E(R_C)}$$

Where,

$E(R_p)$ = Expected rate of return of portfolio

W_A = Weight of asset A

$E(R_A)$ = Expected rate of return of asset A

W_B = Weight of asset B

$E(R_B)$ = Expected rate of return of asset B

W_C = Weight of asset C

$E(R_C)$ = Expected rate of return of asset C

2) Portfolio Risk:

A statistical measure of total risk is the variance or its square root, the standard deviation, the standard deviation or the variance of returns from an investment is the total risk of our investment. This total risk is measured by using following equation:

In case of two assets:

$$\boldsymbol{\sigma_p = \sqrt{W_A^2.\sigma_A^2 + W_B^2.\sigma_B^2 + 2Cov_{AB}.W_AW_B}}$$

$$\boldsymbol{\sigma_p^2 = W_A^2.\sigma_A^2 + W_B^2.\sigma_B^2 + 2Cov_{AB}.W_AW_B}$$

In case of three assets:

$$\boldsymbol{\sigma_p = \sqrt{W_A^2.\sigma_A^2 + W_B^2.\sigma_B^2 + W_C^2.\sigma_C^2 + 2Cov_{AB}.W_A.W_B + 2Cov_{AC}.W_A.W_C + 2Cov_{BC}.W_B.W_C}}$$

$$\boldsymbol{\sigma_p^2 = W_A^2.\sigma_A^2 + W_B^2.\sigma_B^2 + W_C^2.\sigma_C^2 + 2Cov_{AB}.W_A.W_B + 2Cov_{AC}.W_A.W_C + 2Cov_{BC}.W_B.W_C}$$

Where,

W_A = Weight of security A

W_B = Weight of security B

W_C = Weight of security C

Cov_{AB} = Covariance between securities A & B

Cov_{AC} = Covariance between securities A & C

Cov_{BC} = Covariance between securities B & C

σ_A = Standard deviation of security A

σ_B = Standard deviation of security B

σ_C = Standard deviation of security C

σ_p = Standard deviation of portfolio

σ_p^2 = Variance of portfolio"

3) Minimum Variance Portfolio:

An investor can develop many portfolios from the limited fund and each portfolio gives its own

standard deviation and expected return but what proportion of investment in two different assets give minimum (lowest) variance that is calculated using following equation:

$$\mathbf{w_A = \frac{\sigma_B^2 - \rho_{AB} \times \sigma_A \times \sigma_B}{\sigma_A^2 + \sigma_B^2 - 2 \times \rho_{AB} \times \sigma_A \times \sigma_B}}$$

$$\mathbf{W_B = 1 - W_A}$$

Where,

W_A = Risk minimizing weight to invest in stock A

W_B = Risk minimizing weight to invest in stock B

σ_A = S.D of stock A

σ_B = S.D of stock B

ρ_{AB} = Correlation coefficient between stock A and B

4) Optimal Risky Portfolio:

The optimal risky portfolio shows what proportion of investment in two different assets given higher return in lower variance, which is calculated using following equation:

$$W_A = \frac{E(R_A)\sigma_B^2 - E(R_B)Cov_{A,B}}{E(R_A)\sigma_B^2 + E(R_B)\sigma_A^2 - [E(R_A) + E(R_B)]Cov_{A,B}}$$

$W_B = 1 - W_A$

Where,

W_A = Weighted of stock A

W_B = Weighted of stock B

E (R_A) = Excess return on stock A [i.e. E(r_A) – RF]

E (R_B) = Excess return on stock B [i.e. E(r_B) – RF]

σ_A^2 = Variance of stock A

σ_B^2 = Variance of stock B

$Cov_{A,B}$ = Covariance between stock A and stock B

RF = Risk free rate of return

5) Systematic and Unsystematic Risk:

Total risk or total variability of returns of an asset or portfolios is measured by variance and standard deviation. The total risk can be divided into two parts; Systematic and Unsystematic risk:

Total risk = Systematic risk + unsystematic risk

$$\sigma_i^2 = \beta_i^2\sigma_m^2 + \sigma_{ei}^2$$

Systematic risk is market related risk. For example inflection, interest rates, war etc

Proportion of systematic risk of individual asset'i' $= \frac{\text{Systematic risk}}{\text{Total risk}} = \frac{\beta_i^2 . \sigma_m^2}{\sigma_i^2}$

Where,

σ_i^2 = Total risk of individual asset(variance)

β_i = Beta of individual asset

σ_m = Standard deviation of market

σ_{ei} = Unsystematic risk on individual asset

Unsystematic risk is nonmarket risk for example winning a new contract, an industrial dispute and the discovery of a new technology, labor strike etc.

Proportion of unsystematicrisk =1- proportionof systematicrisk

Where,

Proportion of unsystematic risk of individual asset'i' $= \frac{\textbf{Unystematic risk}}{\textbf{Total risk}} = \frac{\sigma_{ei}^2}{\sigma_i^2}$

6) Sharpe's Portfolio Performance

It was derived by William Sharpe. Sharpe's measure divides average portfolio excess return over the sample period by the standard deviation of return over that period.

The Shape's measure of portfolio performance (designated S_i) is stated as

$$S_i = \frac{\bar{r}_i - R_f}{\bar{\sigma}_i}$$

Where,

Si = Sharpe's index of portfolio performance

$\bar{r}_i$ = Average return on portfolio 'i' during a specified time period

R_f = Average risk free rate during the same time period

σ_i = Standard deviation of portfolio 'i'

7) Treynor's Portfolio Performance Measure:

It was develop by Jack Treynor. Treynor was interested in a measure of performance that would apply to all investors-regardless of their risk performances. Building on developments in capital market theory, he introduced a risk free asset that could be combined with different portfolio, to form a straight portfolio possibility line. He showed that rational risk average investors would always prefer portfolio possibility lines with lager slopes because such high slope lines would place investor on higher indifference curves. The slope of this portfolio possibility line (designed T_i) is the Treynor's portfolio performance measure and it is given by

$$T_i = \frac{\bar{r}_i - \bar{R}_f}{\beta_i}$$

Where,

r_i = The average rate of return for portfolio 'i' during a special time period

R_f = The average rate of return on a risk free investment during the same time period

β_i = The slope of the find's characteristic line during that time period (i.e. portfolio 's beta coefficient)

8) Jensen's Portfolio Performance Measure:

Michael Jensen develiped this measure for portfolio performance. This measure is based on CAPM. The aversion of CAPM which is used to compute security's or portfolio's expected rate of return is given by

$$\mathbf{E(r_i) = R_f + \beta_i[\bar{r_m} - R_f]}$$

Where,

$E(r_i)$ = The expected return on security or portfolio 'i'

R_f = One period risk free rate of return

β_i = The expected return on market portfolio

Jensin's measure ($\acute{\alpha}_p$) = $E(r_p) - [R_f + \beta_p[E(r_m) - R_f]$

Hence, jensen's measure ($\acute{\alpha}_p$) represents how much of the rate of return on the portfolio is greather htan the average returns adjusted for risk (or average return assigned by CAPM). A+ve άp indicates the superior portfolio performance or selecting under valued portfolios.

The jensen's measure of portfolio performance has advantages over the Trynor and Sharpe. First it is easier to interpret in that an alpha value of 0.02 indicates that the portfolio generated a return of 2% per period more than what was expected given the portfolio's risk level. Second, it assists to know whether an assets is over or undre valued.

If $\acute{\alpha}_p$ is +ve asset (portfolio) is under valued.

If $\acute{\alpha}_p$ is –ve asset (portfolio) is over valued.

For ranking the portfoio according to their performance to their performance, it is advisable to divide the $\acute{\alpha}_p$ by β_p so as to achieve a relative measure and provide a reliable rank.

CHAPTER-FOUR

DATA PRESENTATION, ANALYSIS & INTERPRETATION

To achieve the objectives of the research study collected data and information are presented and analyzed comparatively. In this chapter data and information collected from different sources are classified, tabulated, analyzed and interpreted following the research methodology described in the third chapter. This chapter the effort has been made to analysis risk, return and portfolio behavior on the basis of common stock investment of joint venture banks in Nepal. The presentation and analysis of data consists of organizing, tabulating and accessing financial and statistical result. The detail data of market price per share (MPS), dividend per share (DPS) of each bank and NEPSE index of each sector with market is presented and their analysis and interpretation are included in this chapter. On the background of various reading and literature review, it is tried to analyze and diagnose the recent Nepal Stock Market movement with taking a special reference with Joint Venture Banks of Nepal. Different tables, diagrams, pie chart and trend line have drawn in separately for the same data to make simpler, readable and understandable.

4.1 Analysis of Individual Joint Venture Banks:

As the study has been taken special reference to Joint Venture Banks, the common stock of each joint venture banks which are listed in NEPSE are analyzed here individually. This study is based on the portfolio analysis on common stock investment of only four JVBs of Nepal. Thus, this research work covers only four Joint Venture Banks. The names of such Banks that are included under study are shown as follows in Details.

A. NABIL Bank Limited (NBL):

1) Data Analysis:

Market price, Earning per share and dividend records of common stock of NABIL

are shown in table 4.1. Closing MPS is taken into account for the purpose of calculating return on common stock for the years. Total dividend includes cash as well as stock (Bonus) dividend.

Table 4.1

MPS, EPS and Dividend data of NABIL Bank

Fiscal year	Closing MPS	Cash dividend	Stock Dividend in %	Total Dividend	EPS	Net profit/total income %
2005/06	2240	85	-	85	129.21	
2006/07	5050	100	40	2210	137.08	32.16
2007/08	5275	60	40	2019.6	108.31	29.68
2008/09	4899	35	50	1227	106.76	30.56
2009/10	2384	30	40	530.8	78.61	24.11
2010/11	1252	30	-	30	70.67	22.29

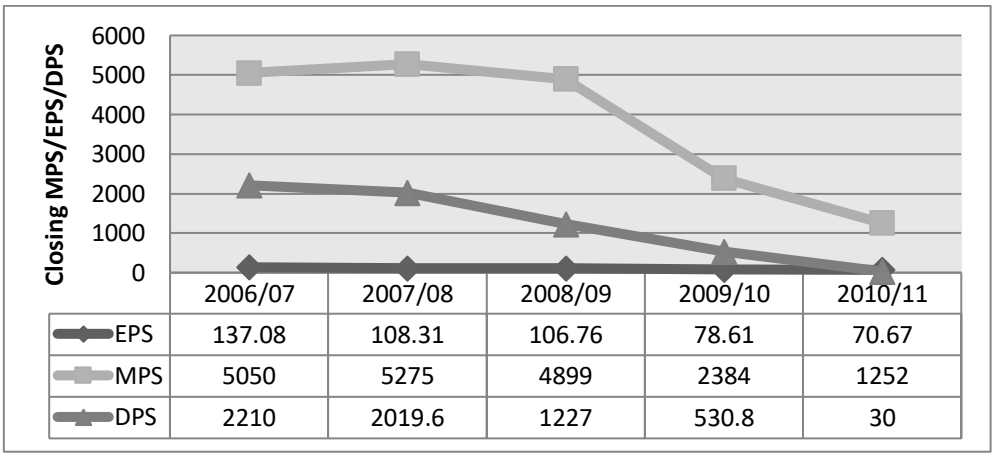
(Source: Annual report of NABIL Bank of Nepal)

Market price of next year 2011/12 is Rs.1355

Total Dividend = Cash Dividend + Stock dividend% of next year's market price.

Figure 4.1

Closing MPS, Total DPS and EPS Trend of NABIL Bank

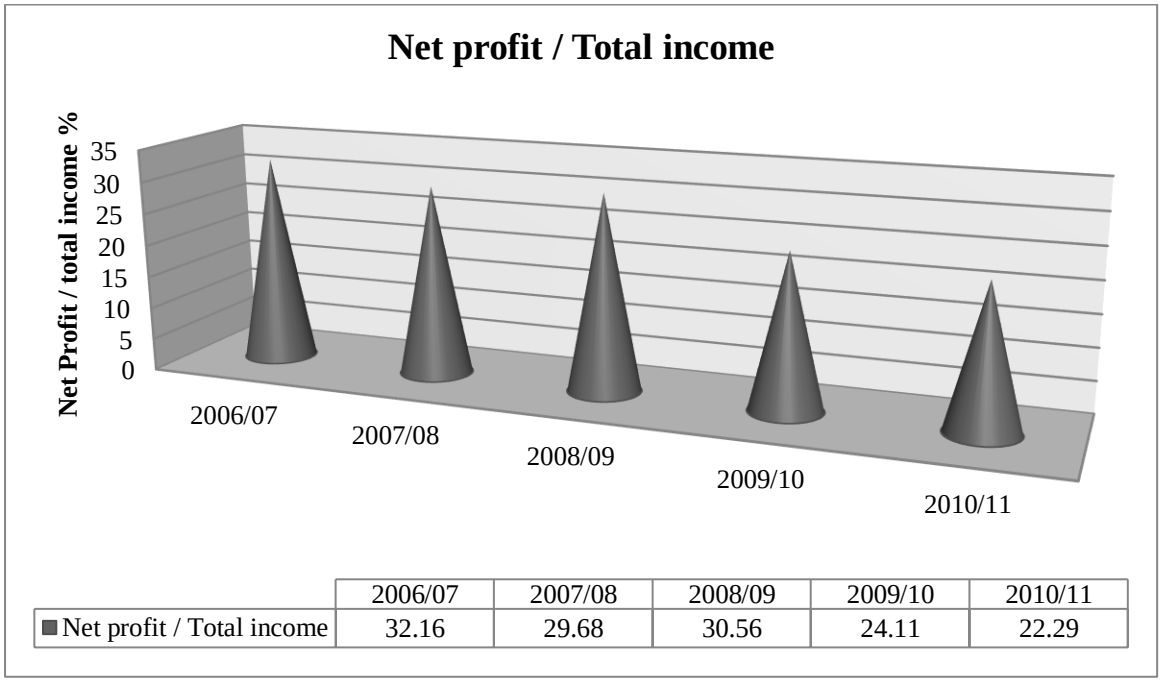


Fiscal Year

The closing MPS in shown in figure 4.1 MPS of NABIL was very lowest in 2010/11 i.e. Rs.1252 but in 2007/08, it was abnormally very high i.e. Rs.5275. then it is in decreasing trend from 2007/08 to 2010/11. NABIL Bank has been paying

cash or stock dividend frequently to their shareholders. In this figure seems the earning per share is increasing till 2006/07 then it is in decreasing trend to 2010/11. Total dividend is decreasing trend from fiscal year 2006/07 to 2010/11. Only cash dividend is distributed at fiscal year 2010/11 i.e. Rs.30.

Figure 4.2



	2006/07	2007/08	2008/09	2009/10	2010/11
Net profit / Total income	32.16	29.68	30.56	24.11	22.29

From the above figure, it is observed that the highest Net income / Total incomeof NABIL Bank is in fiscal year 2006/07 i.e. 32.16% and the lowest return is in fiscal year 2010/11 i.e. 22.29%. If we see in overall scenario of Net income / total income ratio, then it is in decreasing trend.

2) Single Period Return (R), Expected Return E(r), Standard Deviation (σ) and Coefficient of Variation (C.V) of NABIL Bank:

Realized Return (R), Expected return E(r), Standard deviation (σ) and Coefficient of Variation (C.V) are the main required terms. Return on security consists of the dividend yield and capital gain yield. On the based in table 4.1 by using closing MPS and total dividend amount following calculations are made.

Table 4.2

Fiscal Year	Closing MPS	Dividend	$R_n = \frac{D_t + (P_t - P_{t-1})}{P_{t-1}}$	$R_n - E(r_n)$	$[R_n - E(r_n)]^2$
2005/06	2240	85			
2006/07	5050	2210	2.2410714	1.845151	3.404581
2007/08	5275	2019.6	0.4444752	0.048554	0.002358
2008/09	4899	1227	0.161327	-0.23459	0.055034
2009/10	2384	530.8	-0.405021	-0.80094	0.641508
2010/11	1252	30	-0.462248	-0.85817	0.736454
			$\sum R_n$= 1.98		$\sum[R_n - E(r_n)]^2$ =4.84

We have,

$$Expected\ return\ E(r_n) = \frac{\sum R_n}{n}$$

$$= \frac{1.98}{5}$$

=0.396= i.e. 39.6%

$$\text{Standard Deviation } (\sigma_n) = \sqrt{\frac{\sum[R_n - E(r_n)]^2}{n-1}}$$

$$= \sqrt{\frac{4.84}{5-1}}$$

=1.100 = i.e. 110%

Variance (σ_n^2) = 1.100^2 = 1.21

Coefficient of Variation (C.V_n) = $\frac{\sigma_n}{E(r_n)}$= $\frac{1.1}{0.396}$ =2.778

Here, from above the calculation, it is found that expected return of the common stock of NABIL Bank is 39.6% and the risk is (σ) 110%, similarly, the co-efficient of variation is 2.778, which indicates that to earn 1 unit of return, the investors should bear 2.778 unit of risk.

B. Himalayan Bank Ltd (HBL):

1) Data Analysis:

Market price, Earning per share and dividend records of common stock of Himalayan Bank are shown in table 4.3.Closing MPS is taken into account for the

purpose of calculating return on common stock for the years. Total dividend includes cash as well as stock (Bonus) dividend.

Table 4.3

MPS, EPS and Dividend data of Himalayan Bank

Fiscal year	Closing MPS	Cash dividend	Stock Dividend in %	Total Dividend	EPS	Net profit/total income
2005/06	1100	30	5	118	59.24	
2006/07	1760	15	25	502.5	60.66	34.9
2007/08	1980	25	20	377	62.74	41.58
2008/09	1760	12	31.5557	269.49	61.9	39.96
2009/10	816	11.84	25	155.6	31.8	22.13
2010/11	575	16.8421	20	147.442	44.66	25.46

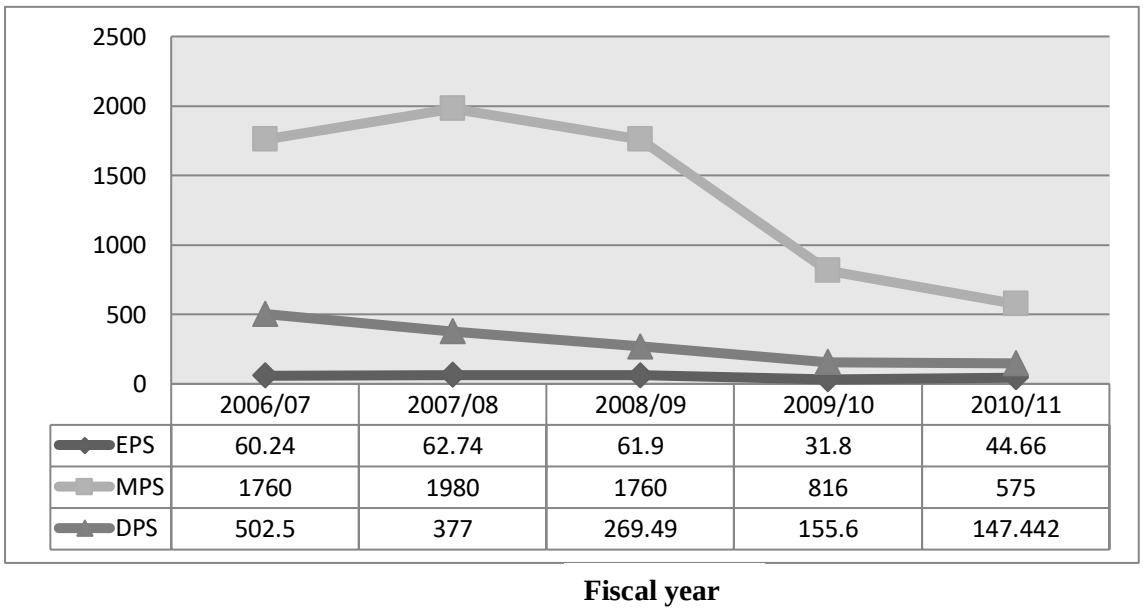
(Source: Annual report of Himalayan Bank of Nepal)

Market Price of next year 2011/12 is Rs.653

Total Dividend = Cash Dividend + Stock dividend% of next year's market price.

Figure 4.3

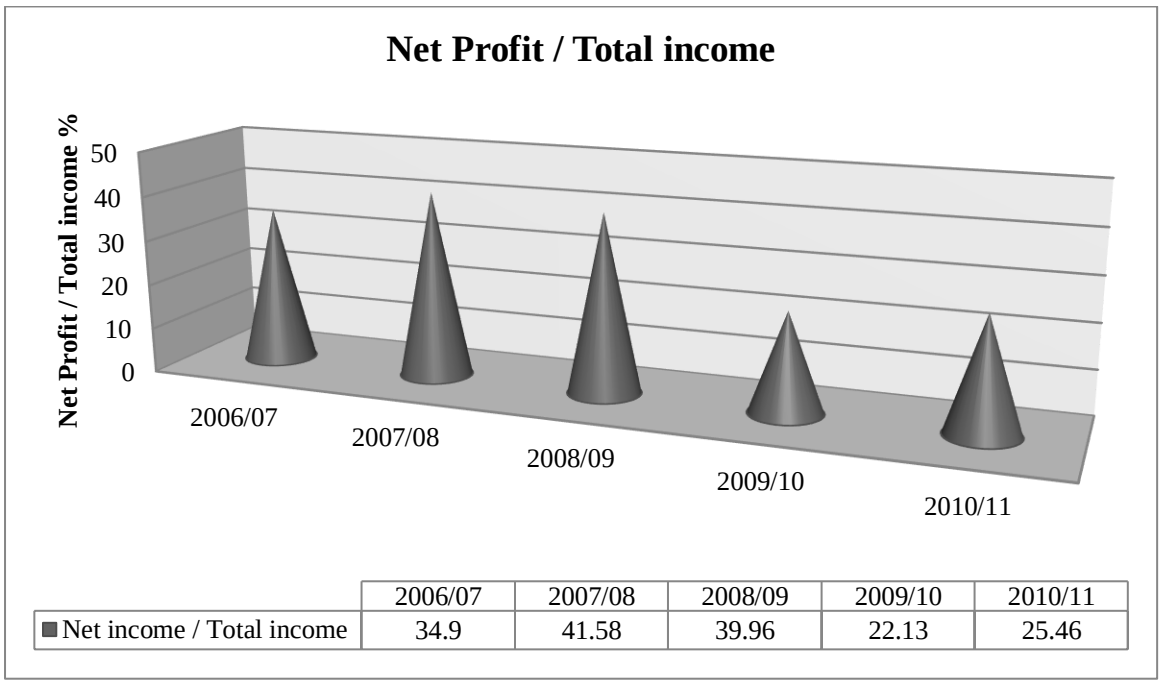
Closing MPS, Total DPS and EPS Trend of Himalayan Bank



The closing MPS in shown in figure 4.3 MPS of Himalayan Bank was very lowest in 2010/11 i.e. Rs.575 but in 2007/08, it was abnormally very high i.e. Rs.1980,then

it is in decreasing trend from 2007/08 to 2010/11. Himalayan Bank has been paying cash or stock dividend frequently to their shareholders in every year. In this figure seems the earning per share is increasing till 2006/07 then it is in decreasing trend to 2010/11.

Figure 4.4



From the above figure, it is observed that the highest Net income / Total income of Himalayan Bank is in fiscal year 2007/08i.e. 41.58% and the lowest Net income / Total income is in fiscal year 2009/10 i.e. 22.13%. If we see in overall scenario of Net income/Total income, then it is in up down trend.

2) Single Period Return (R), Expected Return E(r), Standard Deviation (σ) and Coefficient of Variation (C.V) of Himalayan Bank:

Realized Return (R), Expected return E(r), Standard deviation (σ) and Coefficient of Variation (C.V) are the main required terms. Return on security consists of the dividend yield and capital gain yield. On the based in table 4.3 by using closing MPS and total dividend amount following calculations are made.

Table 4.4

Fiscal Year	Closing MPS	Dividend	$R_H = \frac{D_t + (P_t - P_{t-1})}{P_{t-1}}$	$R_H - E(r_H)$	$[R_H - E(r_H)]^2$
2005/06	1100	118			
2006/07	1760	502.5	1.056818	0.885134	0.783463
2007/08	1980	377	0.339205	0.167521	0.028063
2008/09	1760	269.49	0.024995	-0.14669	0.021518
2009/10	816	155.6	-0.44795	-0.61963	0.383946
2010/11	575	147.442	-0.11465	-0.28633	0.081987
			$\sum R_H$= 0.85842		$\sum[R_H - E(r_H)]^2$ =1.3

We have,

$$Expected\ return\ E(r_H) = \frac{\sum R_H}{n}$$

$$= \frac{0.858}{5}$$

=0.172 =i.e. 17.2%

$$\text{Standard Deviation } (\sigma_H) = \sqrt{\frac{\sum[R_H - E(r_H)]^2}{n-1}}$$

$$= \sqrt{\frac{1.3}{5-1}}$$

=0.57 =i.e.57%

Variance (σ_H^2) = 0.57^2 = 0.3249

Coefficient of Variation (C.V_H) = $\frac{\sigma_H}{E(r_H)}$= $\frac{0.57}{0.172}$=3.31

Here, from above the calculation, it is found that expected return of the common stock of Himalayan Bank is 17.2% and the risk is (σ) 57%, similarly, the co-efficient of variation is 3.31, which indicates that to earn 1 unit of return, the investors should bear 3.31 unit of risk.

C. Everest Bank Limited (EBL):

1) Data Analysis:

Market price, Earning per share and dividend records of common stock of Everest Bank are shown in table 4.5. Closing MPS is taken into account for the purpose of calculating return on common stock for the years. Total dividend includes cash as well as stock (Bonus) dividend.

Table 4.5

MPS, EPS and Dividend data of Everest Bank

Fiscal year	Closing MPS	Cash dividend	Stock Dividend in %	Total Dividend	EPS	Net profit/total income
2005/06	1379	25	-	25	62.78	
2006/07	2430	10	30	949.6	78.42	21.62
2007/08	3132	20	30	756.5	91.82	24.17
2008/09	2455	30	30	519	99.99	24.92
2009/10	1630	30	30	358.2	100.16	16.49
2010/11	1094	50	10	153.03	83.18	14.27

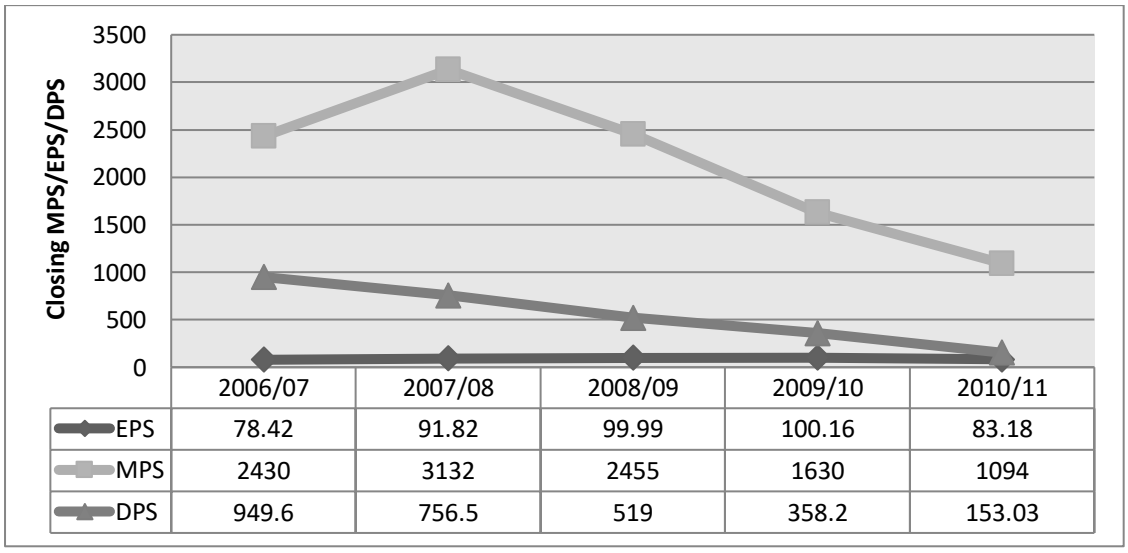
(Source: Annual report of Everest Bank of Nepal)

Market Price of next year 2011/12 is Rs.1033

Total Dividend = Cash Dividend + Stock dividend% of next year's market price.

Figure 4.5

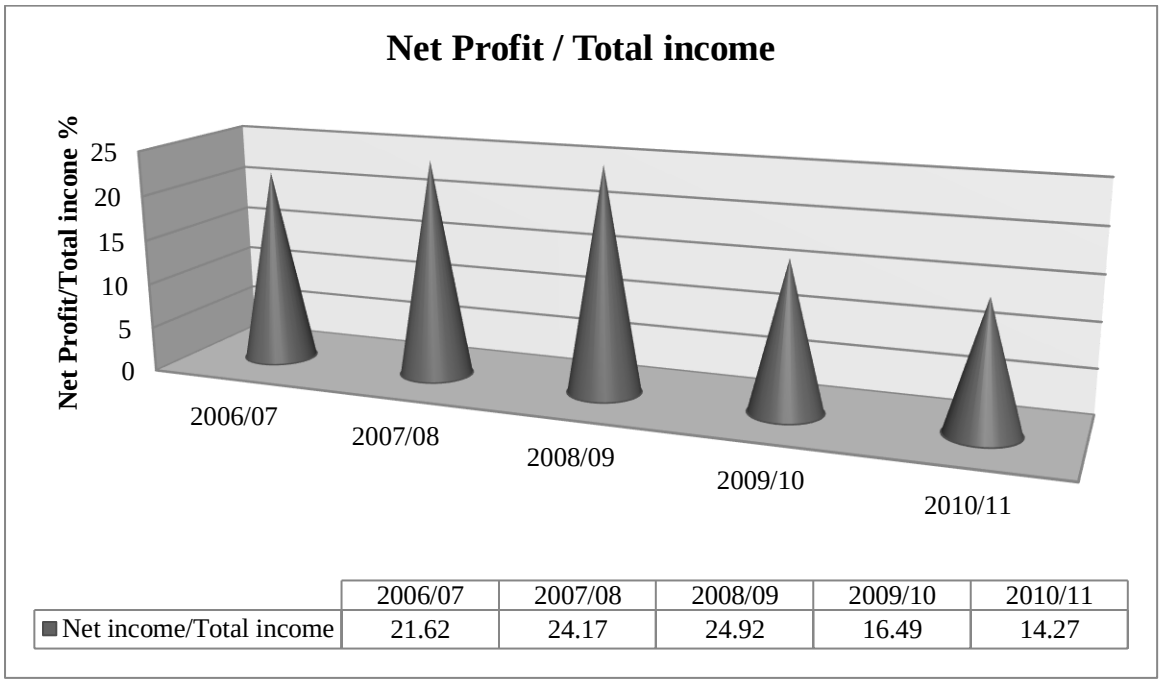
Closing MPS, Total DPS and EPS Trend of Everest Bank



The closing MPS in shown in figure 4.5 MPS of Everest Bank was very lowest in 2010/11 i.e. Rs.1094 but in 2007/08, it was abnormally very high i.e. Rs.3132. then it is in decreasing trend from 2007/08 to 2010/11. Everest Bank has been paying cash or stock dividend frequently to their shareholders in every year. In this figure

seems the earning per share is increasing up to 2009/10 then it is in decreasing in fiscal year 2010/11.

Figure 4.6



	2006/07	2007/08	2008/09	2009/10	2010/11
Net income/Total income	21.62	24.17	24.92	16.49	14.27

From the above figure, it is observed that the highest Net income/Total income of Everest Bank is in fiscal year 2008/09 i.e. 24.92% and the lowest income is in fiscal year 2010/11 i.e. 14.27%. If we see in overall scenario of Net income/Total income, then it is in increasing from Fiscal year 2006/07 to 2008/09, after fiscal year 2008/09 it is in decreasing trend.

2) Single Period Return (R), Expected Return E(r), Standard Deviation (σ) and Coefficient of Variation (C.V) of Everest Bank:

Realized Return (R), Expected return E(r), Standard deviation (σ) and Coefficient of Variation (C.V) are the main required terms. Return on security consists of the dividend yield and capital gain yield. On the based in table 4.5 by using closing MPS and total dividend amount following calculations are made.

Table 4.6

Fiscal Year	Closing MPS	Dividend	$R_E = \frac{D_t + (P_t - P_{t-1})}{P_{t-1}}$	$R_E - E(r_E)$	$[R_E - E(r_E)]^2$
2005/06	1379	25			
2006/07	2430	949.6	1.450761	1.135661	1.289727
2007/08	3132	756.5	0.600206	0.285106	0.081285
2008/09	2455	519	-0.05045	-0.36555	0.133625
2009/10	1630	358.2	-0.19014	-0.50524	0.25527
2010/11	1094	153.03	-0.23495	-0.55005	0.302556
			$\sum R_E$= 1.575		$\sum[R_E - E(r_E)]^2$ =**2.0625**

We have,

$$Expected\ return\ E(r_E) = \frac{\sum R_E}{n}$$

$$= \frac{1.575}{5}$$

=0.3151 =i.e. 31.51%

$$\text{Standard Deviation } (\sigma_E) = \sqrt{\frac{\sum[R_E - E(r_E)]^2}{n-1}}$$

$$= \sqrt{\frac{2.0625}{5-1}}$$

=0.7181 =i.e. 71.81%

Variance (σ_E^2) = 0.7181^2 = 0.51562

Coefficient of Variation (C.V_E) = $\frac{\sigma_E}{E(r_E)} = \frac{0.7181}{0.3151} = 2.279$

Here, from above the calculation, it is found that expected return of the common stock of Everest Bank is 31.51% and the risk is (σ) 71.81%, similarly, the co-efficient of variation is 2.279, which indicates that to earn 1 unit of return, the investors should bear 2.279 unit of risk.

D. SBI Bank Limited (SBL):

1) Data Analysis:

Market price, Earning per share and dividend records of common stock of SBI Bank are shown in table 4.7. Closing MPS is taken into account for the purpose of calculating return on common stock for the years. Total dividend includes cash as well as stock (Bonus) dividend.

Table 4.7

MPS, EPS and Dividend data of SBI Bank

Fiscal year	Closing MPS	Cash dividend	Stock Dividend in %	Total Dividend	EPS	Net profit/total income
2005/06	612	5	-	5	18.27	
2006/07	1176	12.59	35	541.44	39.35	26.95
2007/08	1511	-	-	-	28.33	22.67
2008/09	1900	2.11	40	298.51	36.18	19.14
2009/10	741	5	12.5	75.625	23.69	15.36
2010/11	565	5	12.5	84.375	24.85	13.21

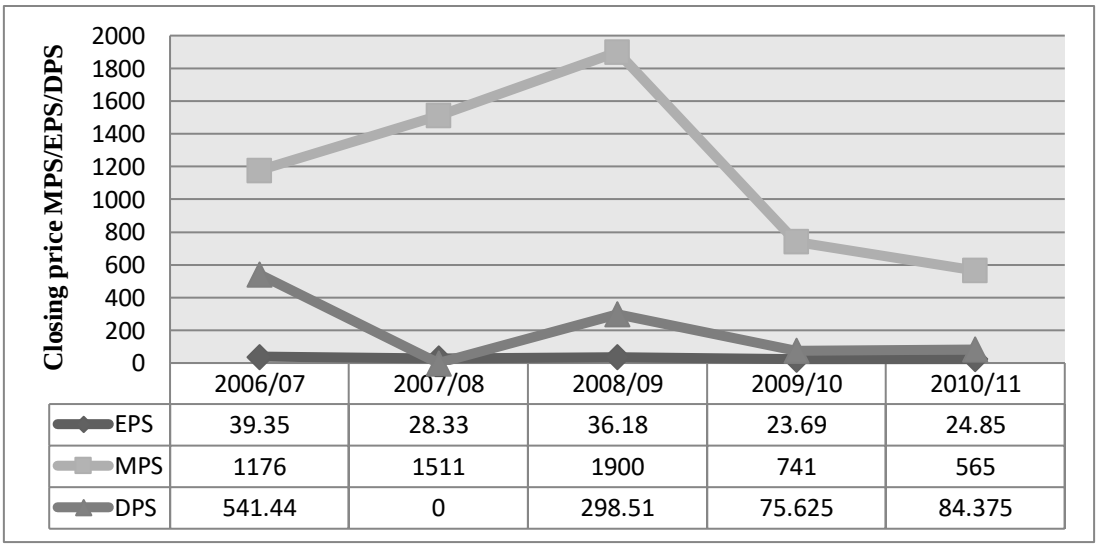
(Source: Annual report of SBI Bank of Nepal)

Market Price of next year 2011/12 is Rs.635

Total Dividend = Cash Dividend + Stock dividend% of next year's market price.

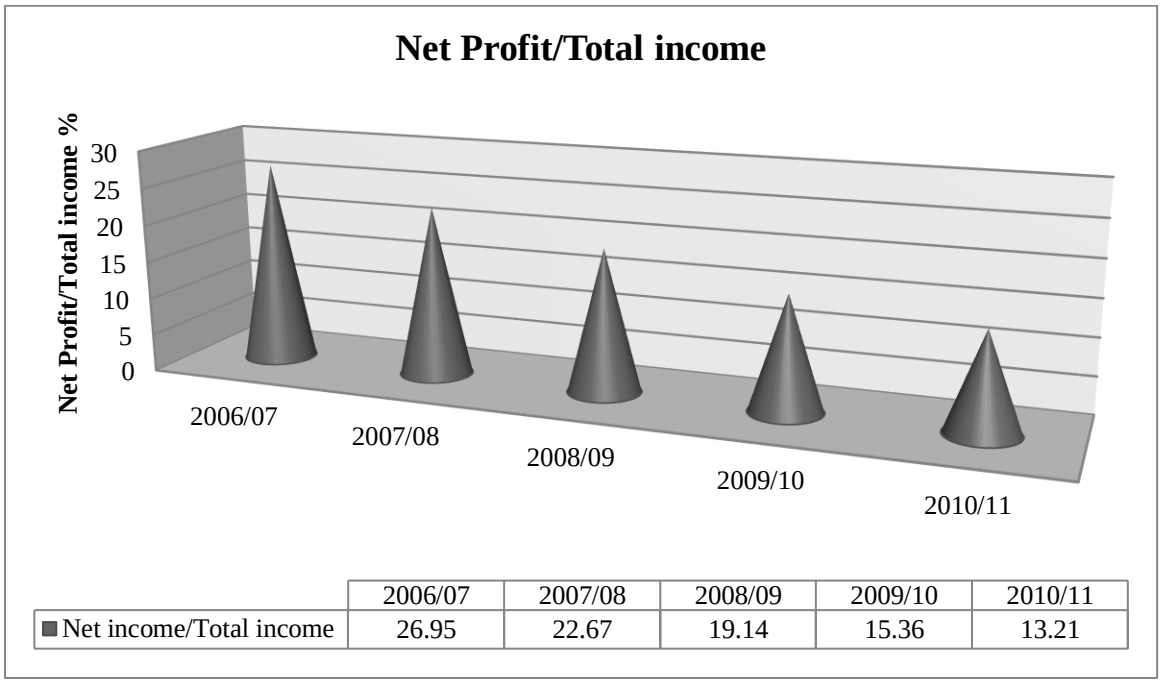
Figure 4.7

Closing MPS, Total DPS and EPS Trend of SBI Bank



The closing MPS in shown in figure 4.7 MPS of SBI Bank was very lowest in 2010/11 i.e. Rs.565 but in 2008/09, it was abnormally very high i.e. Rs.1900. then it is in decreasing trend from 2008/09 to 2010/11. SBI Bank has been paying cash or stock dividend frequently to their shareholders but SBI bank didn't pay any dividend in fiscal year 2007/08. In this figure seems the earning per share is in up down trend.

Figure 4.8



Fiscal year

From the above figure, it is observed that the highest Net income/Total income of SBI Bank is in fiscal year 2006/07 i.e. 26.95% and the lowest income is in fiscal year 2010/11 i.e. 13.21%. If we see in overall scenario of Net income/Total income, then it is in decreasing trend.

2) Single Period Return (R), Expected Return E(r), Standard Deviation (σ) and Coefficient of Variation (C.V) of SBI Bank:

Realized Return (R), Expected return E(r), Standard deviation (σ) and Coefficient of Variation (C.V) are the main required terms. Return on security consists of the dividend yield and capital gain yield. On the based in table 4.7 by using closing MPS and total dividend amount following calculations are made.

Table 4.8

Fiscal Year	Closing MPS	Dividend	$R_S = \frac{D_t + (P_t - P_{t-1})}{P_{t-1}}$	$R_S - E(r_S)$	$[R_S - E(r_S)]^2$
2005/06	612	5			
2006/07	1176	541.44	1.806275	1.435815	2.061563
2007/08	1511	-	0.284864	-0.0856	0.007327
2008/09	1900	298.51	0.455003	0.084543	0.007148
2009/10	741	75.625	-0.5702	-0.94066	0.884836
2010/11	565	84.375	-0.1223	-0.49411	0.244145
			$\sum R_S = 1.8523$		$\sum[R_S - E(r_S)]^2 = 3.205$

We have,

Expected return $E(r_S) = \frac{\sum R_S}{n}$

$= \frac{1.8523}{5}$

=0.37 =i.e. 37%

Standard Deviation $(\sigma_S) = \sqrt{\frac{\sum[R_S - E(r_S)]^2}{n-1}}$

$= \sqrt{\frac{3.205}{5-1}}$

=0.895 =i.e. 89.5%

Variance $(\sigma_S^2) = 0.895^2 = 0.80125$

Coefficient of Variation $(C.V_S) = \frac{\sigma_S}{E(r_S)} = \frac{0.895}{0.37} = 2.4189$

Here, from above the calculation, it is found that expected return of the common stock of SBI Bank is 37%% and the risk is (σ) 89.5%, similarly, the co-efficient of variation is 2.4189, which indicates that to earn 1 unit of return, the investors should bear 2.4189 unit of risk.

4.2 Inter Firm Comparison

4.2.1 On the basis of Risk and Return

According to the analysis of the return from the section 4.1, a comparative analysis of risk and return is performed in this section. The expected return, standard deviation of returns, coefficient of variation of each bank for the fiscal year 2006/07 to 2010/11 is given in table no 4.9

Table 4.9

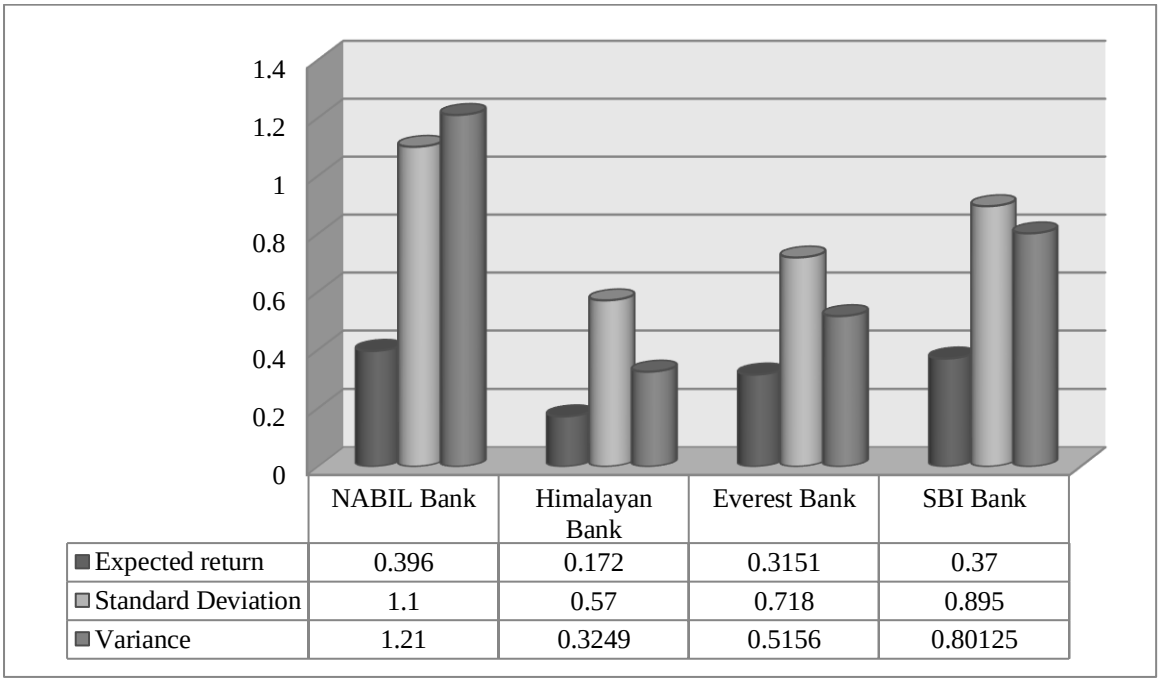
Inter Firm Comparison on the Basis of Risk and Return

Banks	Expected Return E(r)	Variance (σ^2)	Standard Deviation (σ)	Coefficient of variation C.V	Remarks
NABIL	0.396	1.21	1.1	2.778	Highest in terms of risk and highest return.
HBL	0.172	0.3249	0.57	3.31	Lowest in terms of risk and lowest return
EBL	0.3151	0.51562	0.7181	2.279	Medium in terms of risk and medium return
SBI	0.37	0.80125	0.895	2.4189	Medium in terms of risk and medium return.

(Source: Appendix – 2, 3, 4 and 5)

Figure 4.9

Expected return standard deviation and variance of Joint Venture Banks



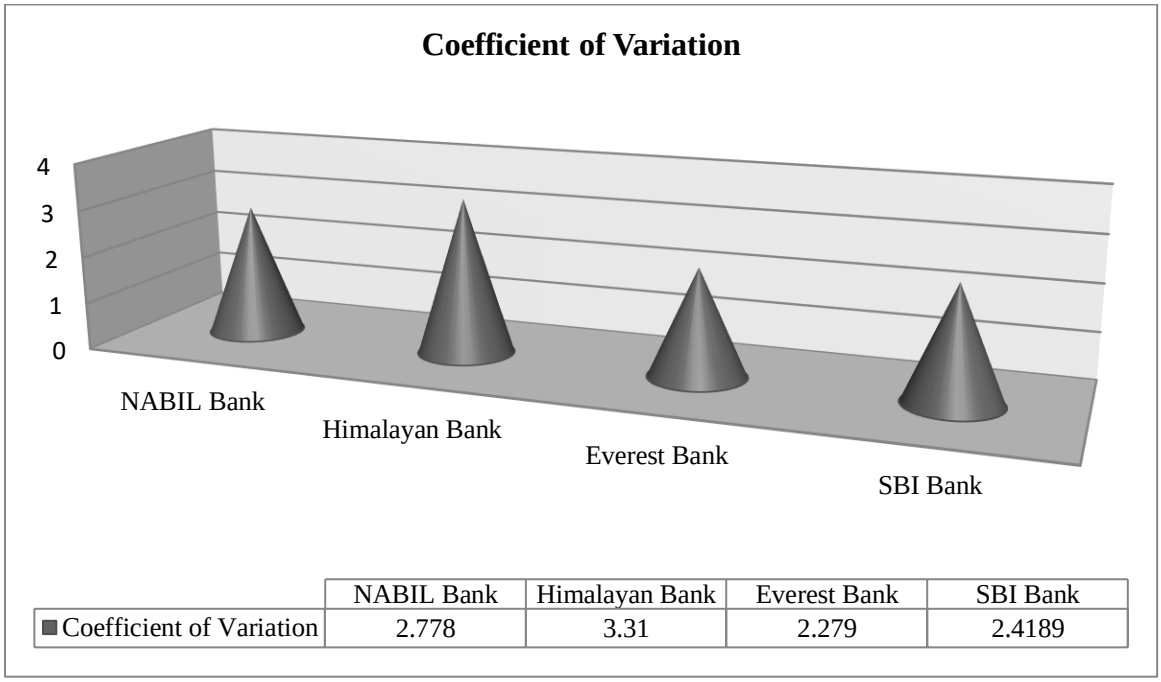
Joint Venture Banks

From the analytical table and figure that is based on historical analysis of past five fiscal year date it can stated that the NABIL Bank has the highest expected return (i.e. 39.6%) and the Himalayan Bank has lowest expected return (i.e. 17.2%) on common

stock investment, similarly from risk side, NABIL Bank has the highest standard deviation (i.e.110%) and Himalayan Bank has the lowest standard deviation.

Figure 4.10

Coefficient of Variation of Joint Venture Banks



	NABIL Bank	Himalayan Bank	Everest Bank	SBI Bank
Coefficient of Variation	2.778	3.31	2.279	2.4189

From the above figure of coefficient of variation, it is shows that the Himalayan Bank has the highest coefficient of variation and Everest Bank has the lowest coefficient of variation, which shows that the risk per unit of return. Remaining other banks expected return and risk lies between these values. Thus, the rational investor should select the bank having lowest coefficient of variation (C.V.) for the investment purpose but it depends upon the investors' attitude toward the risk and return.

In conclusion for risk taker investor should invest on thecommon stock which has high degree of C.V. is appropriate and risk averter investor should invest on that common stock whose has low degree of C.V.

4.2.2 On the Basis of Market Capitalization of Listed Four Joint venture Banks

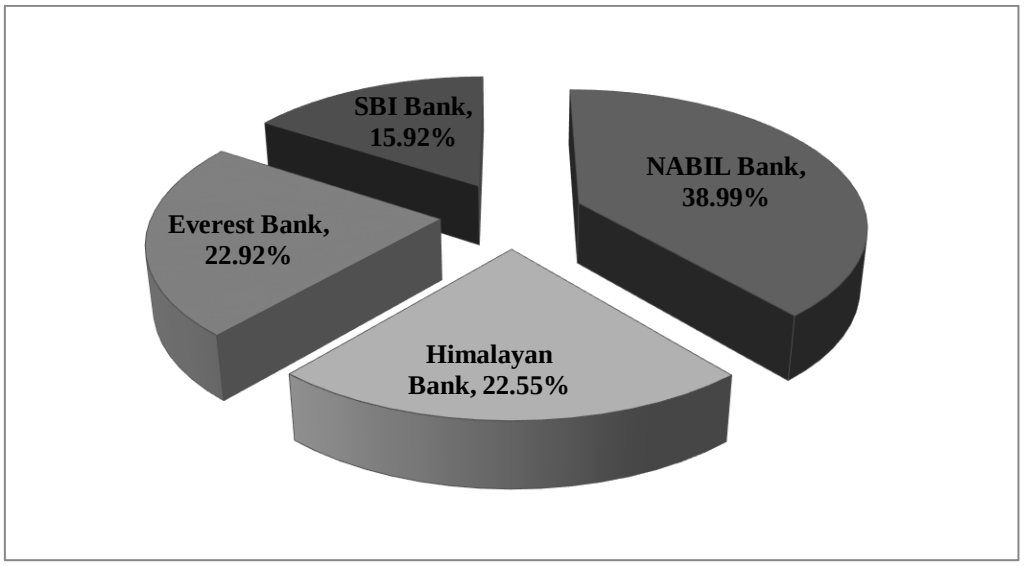
Based on the market capitalization at mid July 201, size of each bank is presented in table 4.10. The market capitalization of 4 joint venture banks at the end of the fiscal year 2010/11 is presented here.

Table 4.10
Market Capitalization of Listed 4 Joint Venture Banks

Name of the Banks	Market Capitalization in Million	Weight (in %)
Himalayan Bank	6993.24	22.55284402
NABIL Bank	12091.15	38.99334499
SBI Bank	4935.16	15.91564049
Everest Bank	6988.69	22.5381705
Total	**31008.24**	**100**

(Source: Annual report of Sebon 2010/11)

Figure 4.11
Market Capitalization of Listed 4 Joint Venture Banks



From the above market capitalization NABIL Bank has the highest market capitalization i.e.38.99% and the lowest is 15.92% of SBI Bank among the four joint venture banks.

4.3 Inter Industry Comparison

The main objective of the study is Portfolio Analysis on Common Stock Investment of Four joint venture Banks of Nepal as our research topic; however effort has been doing here to show the financial outcomes of various industries that contribute their effort in Nepalese economy. Banking sector is not only one route of economic development of any country but also other various means are contributing their own effort. Such of them are manufacturing and processing sector, hotels, trading industries, finance and insurance companies and other also.

Table 4.11
Market Capitalization and Paid-up Capital of Different Sector 2010/11 in Million

S.N	Sector	Market Capitalization	Percentage %	Paid-up capital	Percentage %
1	Commercial Bank	111938.05	46.34848215	41806.19	41.71
2	Development Bank	13210.54	5.469886936	16864.69	16.82
3	Finance Company	13756.06	5.695762087	15301.08	15.26
4	Insurance Company	9937.18	4.114536655	3585.29	3.58
5	Hotel	3040.64	1.258991458	1615.15	1.61
6	Mfg. & Processing Company	9577.84	3.965750219	2539.74	2.53
7	Trading Company	1380.74	0.571701966	83.42	0.083
8	Other Company	78672.9	32.57488853	18443.29	18.399

(Source: Annual report on sebon 2010/11)

Figure 4.12
Market Capitalization of Different Sector 2010/11

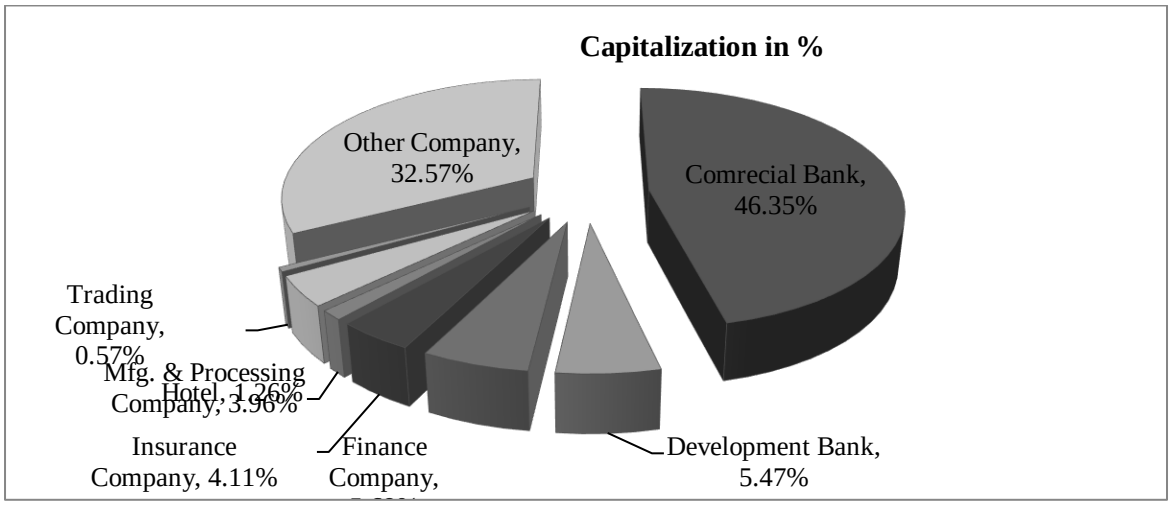
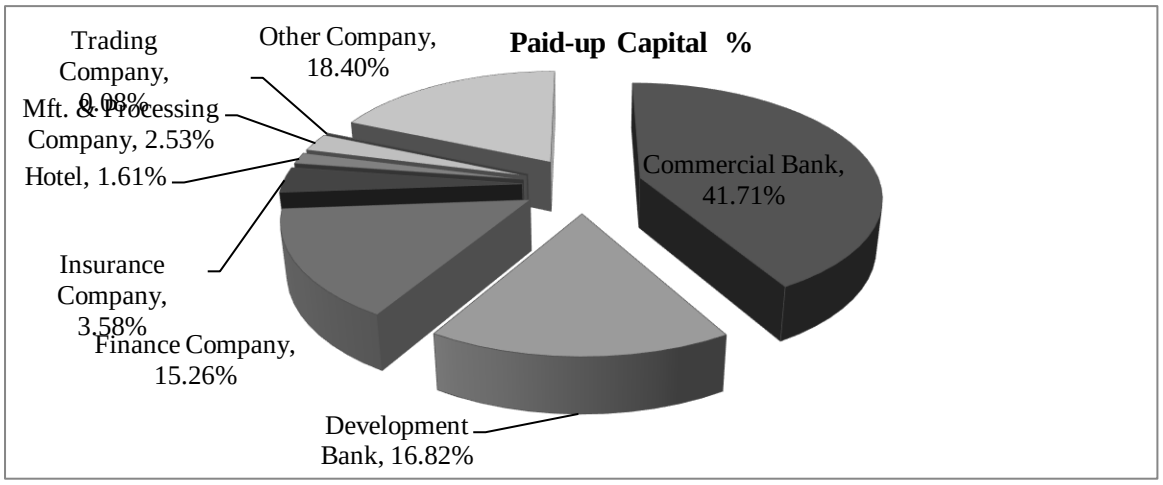


Figure 4.13

Paid-up Capital of different sector 2010/11



From the above table and diagram, it has become clear that major portion i.e. 46.35% and 41.71% of the total market capitalization and paid-up capital occupies by banking industry. So that we can say that Nepalese share market is largely depend upon the banking industry and banking sector plays a vital role n national economy due to its highest value. However remaining others are also contributing their effort in our national economy from their place.

4.4 Comparison with Market

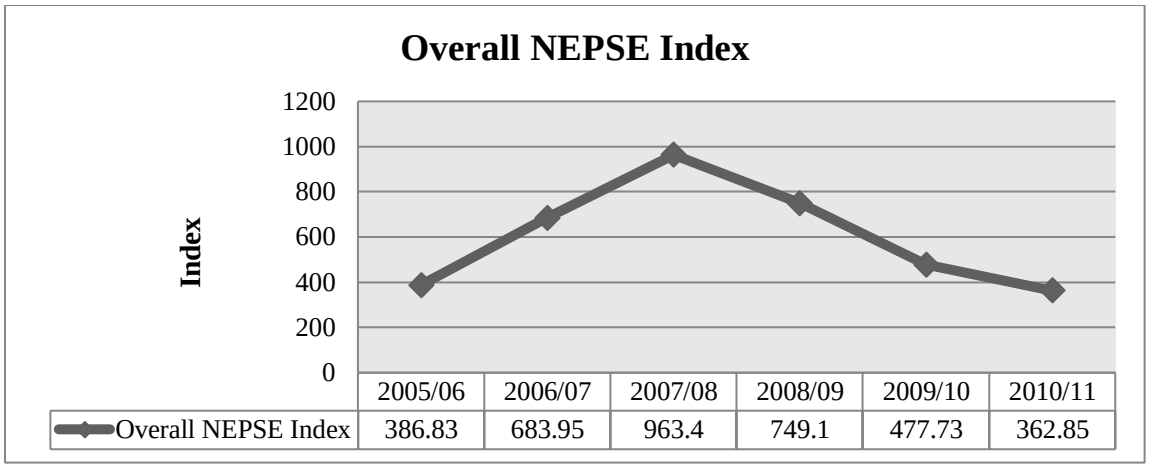
There is only one stock market exit in Nepal namely Nepal Stock Exchange Limited (NEPSE). It is a non-profit organization operating under, securities Exchange Act, 2040. The former Securities Exchange Center was converted in to NEPSE under the program initiated to reform the capital market. Overall market movement is represented by the market index i.e. NEPSE index. In this section risk and return of each industry is compared with market risk and return. Overall NEPSE index of fiscal year 2010/11 are given below.

Table 4.12
Overall NEPSE Index

Fiscal Year	Overall NEPSE Index
2005/06	386.83
2006/07	683.95
2007/08	963.4
2008/09	749.1
2009/10	477.73
2010/11	362.85

(Source: Annual report of sebon 2010/11)

Figure 4.14



From the above figure, it is observed that the highest NEPSE index of Nepalese market is in fiscal year 2007/08 i.e. 963.4% and the lowest NEPSE index is in fiscal year 2010/11 i.e. 362.85%. If we see in overall scenario of NEPSE Index, then it is in increasing from Fiscal year 2005/06 to 2007/08, after fiscal year 2007/08 it is in decreasing trend.

4.4.1 On the basis of Market Risk and Return:

Market return, standard deviation, variance and co-efficient of variation of market are given below.

Table 4.13

Calculation of Expected Return, Standard deviation, Variance and Co-efficient of variation of market

Fiscal Year	NEPSE	$R_m = \frac{NEPSE_{t+1} - NEPSE_t}{NEPSE_t} \times 100$	$R_m - E(r_m)$	$[R_m - E(R_m)]^2$
2005/06	386.83	-	-	-
2006/07	683.95	0.7681	0.6978	0.486925
2007/08	963.4	0.4086	0.3383	0.114447
2008/09	749.1	-0.222	-0.2923	0.085439
2009/10	477.73	-0.362	-0.4323	0.186883
2010/11	362.85	-0.240	-0.3103	0.096286
Total		$\sum R_m$=0.3515		$\sum[R_m - E(R_m)]^2$= 0.97

We have,

Expected Return of Market $E(r_m)$

$$E(r_m) = \frac{\sum R_m}{n}$$

$= \frac{0.3515}{5}$ =0.0703 = i.e. 7.03%

Standard Deviation of Market (σ_m)

$$(\sigma_m) = \sqrt{\frac{\sum[R_m - E(r_m)]^2}{n-1}}$$

$$= \sqrt{\frac{0.97}{5-1}}$$

$$=0.492$$

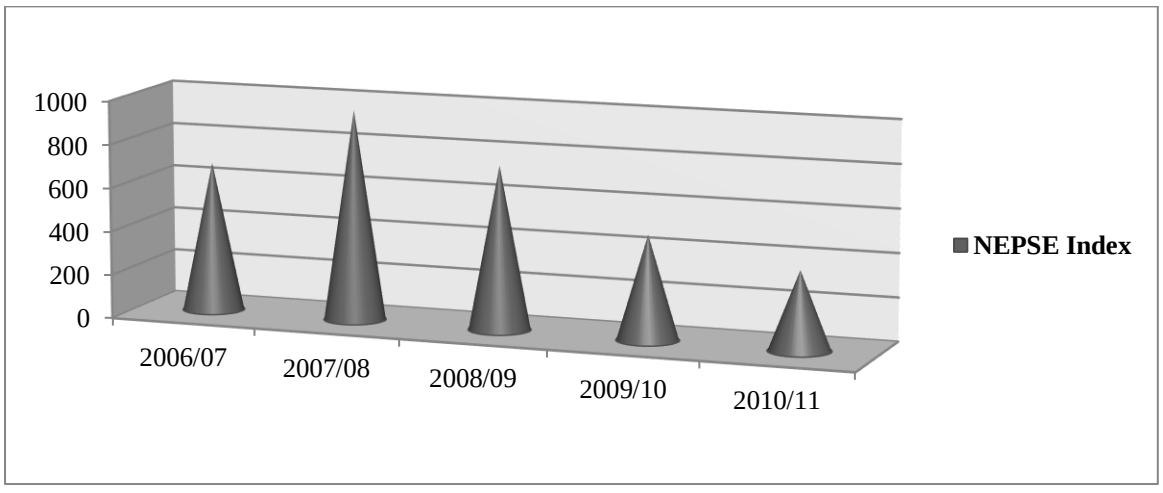
Variance of Market (σ_m^2) = 0.492^2 = 0.2425

Coefficient of Variation (C.V.$_m$) = $\frac{\sigma_m}{E(r_m)}$ = $\frac{0.492}{0.0703}$ = 6.998

Here, from above the calculation, it is found that expected return of the NEPSE of market is 7.03% and the risk is (σ) 49.2%, similarly, the co-efficient of variation is 6.998, which indicates that to earn 1 unit of return, the investors should bear 6.998 unit of risk.

Figure 4.15

The year wish market movement is shown below



From the above figure, it is observed that the highest NEPSE of market is in fiscal year 2007/08 i.e. 963.4 and the lowest NEPSE is in fiscal year 2010/11 i.e. 363.85.

If we see in overall scenario of NEPSE, then it is in increasing from Fiscal year 2006/07 to 2007/08, after fiscal year 2007/08 it is in decreasing trend.

4.4.2 On the Basis of Market Sensitivity of Common Stock of Four Joint Venture Banks:

Market sensitivity is explained by its beta coefficient. The beta is known as systematic risk which can not be eliminated through the means of diversification as mentioned in chapter II. Beta of market is always equal to 1. The beta of common stock more than 1 is 'aggressive'. And the beta of common stock less than 1 called 'defensive'. Especially aggressive denotes more risky and highly returnable and defensive denotes less risky and less returnable.

Calculation of Beta of Stock (β_S)

Mathematically the systematic the system risk (beta) is measured as the covariance of the stock returns with the market returns expressed per unit of market variance as follows:

$$\textbf{Beta coefficient } (\beta_S) = \frac{\mathbf{Cov}\,(r_m, r_s)}{\sigma_m^2} = \frac{\rho_{sm} \times \sigma_s \times \sigma_m}{\sigma_m^2} = \frac{\rho_{sm} \times \sigma_s}{\sigma_m}$$

Where,

$\text{Cov}\,(r_m, r_s)$ = Covariance between returns of Security 'S' and market

σ_m^2 = Variance of market return

ρ_{sm} = Correlation between the returns of security 'S' and market

Calculation of Market Beta (β_m)

Beta of a market return equals to 1 and beta coefficient as an index of systematic risk is used to rank the assets. If beta is larger than 1, then the asset is more volatile than the market is called an aggressive beta. If the beta is less than 1 the asset is called a defensive beta and its price fluctuation is less volatile than the market.

$$\textbf{Market Beta } (\beta_m) = \frac{\mathbf{Cov}_{mm}}{\sigma_m^2} = \frac{\rho_{mm} \times \sigma_m \times \sigma_m}{\sigma_m^2} = \frac{1 \times \sigma_m^2}{\sigma_m^2} = 1$$

Table 4.14

Beta Coefficient of Different Banks

Name of Banks	Beta Coefficient	Remarks
NABIL Bank	2.0465	Most Aggressive
Himalayan Bank	1.1071	Aggressive
Everest Bank	1.4569	Aggressive
SBI Bank	1.555	Aggressive

(*Source: Appendix –7, 8, 9 and 10)*

The beta of common stock of NABIL Bank is most aggressive because the beta coefficient of this is higher than the other banks i.e. 2.0465 which mean that if market return is increased by 1%, then NABIL's stock returns will rise by 2.0465. The beta coefficient of Himalayan Bank, Everest Bank and SBI Bank are 1.1071, 1.4569 and 1.555 respectively, thus their common stocks are also known as aggressive.

4.5 Calculation of Systematic Risk and Unsystematic Risk of Individual Bank

Systematic risk has its source factors that affect at the marketable assets and thus can't be diversified away. The sources of systematic risk are market-pervasive. The measure if systematic risk permits an investor to evaluate an asset required rate of return relative to systematic risk of the stock. Unsystematic (company specific/unique) risk can be reduced through diversification. The comparative analysis of beta, systematic risk and unsystematic risk of each joint venture bank are performed here. Similarly they are shown in table 4.15 and the systematic risk and unsystematic risk also are shown in diagram.

Table 4.15

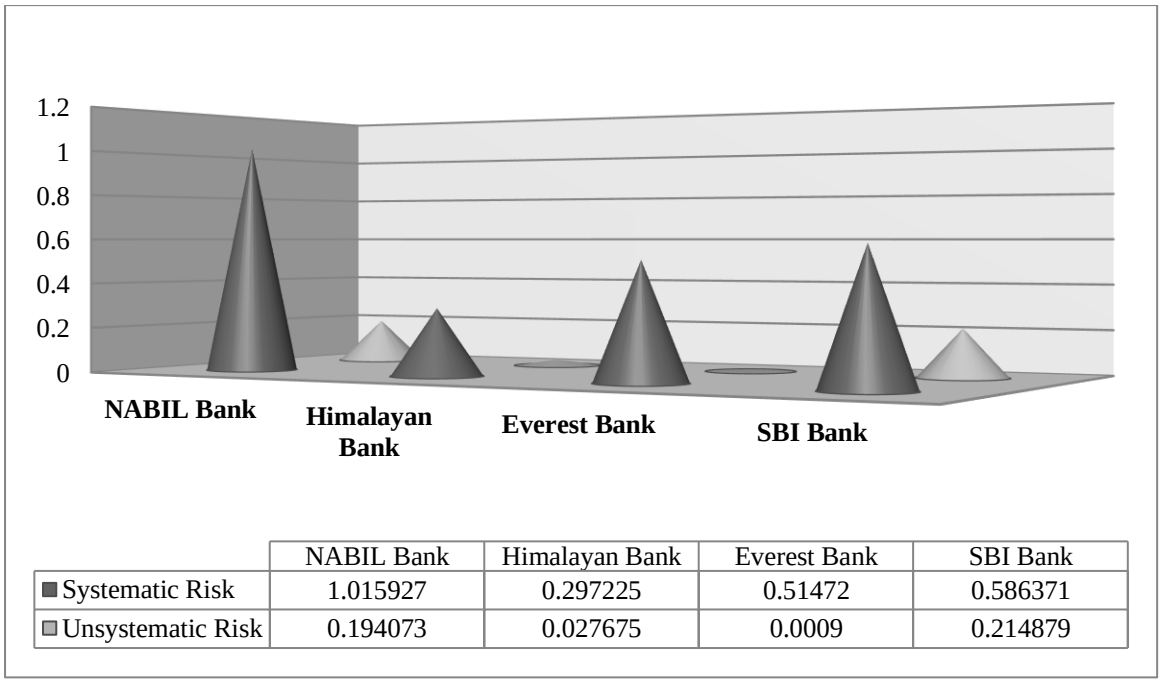
Systematic and Unsystematic Risk of Individual Bank

Banks	Beta	Variance	Systematic risk	Unsystematic risk
NABIL Bank	2.0465	1.2100	1.015927	0.194073
Himalayan Bank	1.1071	0.3249	0.297225	0.027675
Everest Bank	1.4569	0.51562	0.51472	0.0009
SBI Bank	1.555	0.80125	0.586371	0.214879

(Source: Appendix-11)

Figure – 4.16

Systematic and Unsystematic Risk of Individual Bank



The risk is the composed of systematic risk and unsystematic risk. Among them NABIL Bank's stock is highly risky because it has highest total risk. Himalayan Bank's stock is less risky because it has lowest total risk. But if investor consider systematic risk as a decision factor NABIL Bank is highly risky stock (i.e. 1.0159) among other stocks.Unsystematic risk is called non-market risk or Company-unique risk or company specific risk or diversifiable risk;it is arise from poor management, labor dispute etc. so SBI Bank has higher unsystematic risk (i.e. 0.2148) and Everest

Bank has lower unsystematic risk (i.e. 0.0009) it indicates that the Everest Bank has strong and believable management and SBI Bank has poor and unbelievable management.

4.6 On the Basis of Price Evaluation of Common Stock of Each Banks

Security Market Line

The relevant risk for an individual asset is systematic risk (or market related risk) because non market risk can be eliminated by diversification. The relationship between an asset's return and its systematic risk index (beta) can be expressed by the CAPM, which is also called the security market line (SML). The equation for the SML is

Required Rate of Return (RRR)

$$\mathbf{RRR = K_{rf} + [E(r_m) - K_{rf}) \times \beta_i}$$

Where,

K_{rf} = Risk free rate of return

$E(r_m)$ = Expected rate of return of market

β_i = Beta of stock 'i'

Comparison of required rate of return and expected rate of return gives the result whether the common stock is under priced or over priced. Generally there are three conditions of price evaluations that are as followings.

Table 4.16

Condition	Pricing
4. Required rate of return > Expected return	Over-priced
5. Required rate of return < Expected return	Under-priced
6. Required rate of return = Expected return	Exactly priced

The discount rate of Treasury bill (T-bill) issued by Nepal Rastra Bank is taken as risk free rate of return (K_{rf}) in Nepal. NRB issue four type of T-bill i.e. 28 days, 91days, 182days, 364days but according to the suggestion of T-bill section of NRB it is better to take 364 days weighted average discount rate as risk free rate. T-bill rate will be differs in various issue but in this study I have taken 8.3512% as risk free rate.

Interest Rate of Treasury Bills (Short Term) Table 4.17

Weighted Discount Rate

S.N.	Treasury Bills	2006/07	2007/08	2008/09	2009/10	2010/11
		Annual Average	Annual Average	Annual Average	Annual Average	Annual Average
1	28-Days	-	4.16%	6.27%	6.78%	6.10%
2	91-Days	2.42%	4.18%	5.61%	6.50%	7.41%
3	182-Days	-	4.60%	5.45%	7.26%	8.31%
4	364-Days	3.50%	5.22%	6.05%	7.60%	8.35%

(Source: Annual report of NRB)

Table 4.18

Required Rate or Return, Expected Return, & Price Evaluation of Joint Venture Banks

Name of Bank	Beta	Required rate of return		Expected return	Price evaluation
NABIL Bank	2.0465	0.056486	<	0.396	Under-priced
Himalayan Bank	1.1071	0.0688	<	0.172	Under-priced
Everest Bank	1.4569	0.06427	<	0.3151	Under-priced
SBI Bank	1.555	0.06297	<	0.37	Under-priced

(Source: Appendix 12)

Where,

Risk free rare of return (K_{rf}) = 8.35%

Expected rate of return of Market [($E(r_m)$] = 7.03%

From the above table it is observed that the pricing of common stock of all the banks under study are under priced. Thus, under pricing situation of common stock of the banks indicates that all the sample joint venture banks' stock demands are very good investment opportunity. The investors can gain from buying the under priced stocks. It is recommended to purchase under priced stock but rational and efficient investment decision – maker need to analyze other dimensions as well to invest from the investment point of view.

4.7 Portfolio Analysis

From all above calculations and analysis we can see that there are some risk factors in various assets. Risk can be reflected by standard deviation of different assets. Construction portfolio can diversify some of the risk which is unsystematic. Portfolio is the combination of different investment assets. The portfolio would be able to reduce systematic risk or diversifiable risk. Thus, investors want to invest in portfolio assets because of diversification of risk. Therefore, the analysis within this study is based on two assets and the tools for analysis are based on two assets that are presented in chapter III.

a. Minimum Variance Portfolio

The main objective of portfolio is reduction of unsystematic risk, from which the investor can get optimum return in certain degree of risk by constructing efficient portfolio. In making portfolio investment, the total available fund is divided in to proper amount or proportion for different securities that means, in this study investment making in common stock of different banks. The total weighed of a portfolio is equal to 100%. In this chapter co-variance of returns of the given two stocks and proportion of stock i.e. the risk minimizing weighted is calculated to minimized the risk and to find the risk and return of the portfolio.

Table 4.19

Minimum variance portfolio's Risk, Return and Co-variance between Banks

S.N.	Portfolio	Weight	Co-variance (Cov.)	Portfolio Return $E(r_p)$	Portfolio Risk (σ_p)
1.	NABIL & Himalayan	W_N = -0.8574 W_H = 1.6864	0.6044	0.2179	0.2735
2.	NABIL & Everest	W_N = -0.6864 W_E = 1.6864	0.7679	0.4456	0.5084
3.	NABIL &SBI	W_N = -1.4217 W_S = 2.4247	0.9524	0.7194	0.7677
4.	Himalayan & Everest	W_H = 2.3364 W_E = -1.3364	0.3943	0.2385	0.482
5.	Himalayan & SBI	W_H = 2.17754 W_S = -1.1775	0.49212	0.2487	0.3577
6.	Everest & SBI	W_E = 1.3422 W_s = -0.3422	0.5806	0.3845	0.6289

(Source: Appendix-13 to 18)

Risk is the deviation of actual returns from an expected return. The more the deviation, the more will be the risk. To minimize the deviation, we need to diversify our fund into different securities. Portfolio analysis considers the determination of future risks and returns in holding various blends of securities. Diversification of portfolio helps to minimize risk and different diversification techniques have been developed for reducing portfolio's risk. As mentioned above in table 4.19 risk is minimized by doing portfolio between joint venture Banks for example before diversification, S.D. of NABIL Bank and Everest Bank were 1.1 and 0.7181 respectively and average risk was 0.909, but after diversification portfolio risk of NABIL and Everest Bank is 0.5084, risk is decrease by 0.4006 which means considerable reduction in risk that previous. Similarly, before diversification S.D. of Himalayan and SBI were 0.57 and 0.895 respectively and average risk was 0.7325, but after diversification portfolio risk of Himalayan and Everest bank is 0.3577, which is decrease by 0.3748, it means that there is considerable reduction risk. We can reduce the risk of portfolio (NABIL Bank and Himalayan Bank), before

diversification the risk of NABIL and Himalayan Bank ware 1.1 and 0.57 respectively and average risk was 0.835 but after diversification their portfolio risk become 0.2735 the risk of portfolio is reduced by 0.5615, which is the considerable reduction in risk without losing return.

Diversification can only reduce risk but can't increase return. Portfolio return is simply the average of weighted of high return individual's security returns. Hence, average of high return is also high. According to table 4.19 portfolio return between NABIL and SBI is very high i.e. 0.7194 (71.94%). Likewise, the lowest portfolio returns is 0.2179 (21.79%) between NABIL and Himalayan Bank because of lowest expected return of Himalayan Bank. Risk is minimized till 0.2735 (27.35%) between NABIL and Himalayan Bank by doing portfolio.

In case of weight on the way of doing portfolio there is seem some borrowing portion. On 1stportfolio weight between NABIL Bank and Himalayan Bank are -0.8574 and 1.686 respectively,its mean that the investor borrowing 85.74% loan of his investing fund from NABIL Bank in interest rate 12.5% to invest in Himalayan Bank. On 2nd portfolio weight between NABIL Bank and Everest Bank are -0.6864 and 1.6864 respectively, its mean that the investor borrowing 68.64% loan of his investing fund from NABIL Bank in interest rate 12.5% to invest in Everest Bank. On 3rd portfolio weight between NABIL Bank and SBI Bank are -1.42172 and 2.42472 respectively, its mean that the investor borrowing 142.17% loan of his investing fund from NABIL Bank in interest rate 12.5% to invest in SBI Bank. On 4th portfolio weight between Himalayan Bank and Everest Bank are 2.33645 and -1.33645 respectively, its mean that the investor borrowing 133.645% loan of his investing fund from Everest Bank in interest rate 12.22% to invest in Himalayan Bank. On 5th portfolio weight between SBI Bank and Himalayan Bank are -1.17754 and 2.17754 respectively, its mean that the investor borrowing 117.754% loan of his investing fund from SBI Bank in interest rate 11.24% to invest in Himalayan Bank.On 6th portfolio weight between SBI Bank and Everest Bank are -0.3422 and 1.3422 respectively, its mean that the investor borrowing 34.22% loan of his investing fund from SBI Bank in interest rate 11.24% to invest in Everest Bank.

b. Optimal Risky Portfolio

According to Markowitz we have to find out the risky assets of optimal portfolio, after identifying the possible portfolios that can be made by risky return of portfolios are made on the basis of effective portfolio. We have to determine the reward-to-volatility ratio (Slope) on the basis of risky assets of optimal portfolio. William Sharpe has introduced the reward-to-volatility ratio so, it is also called sharp ratio. Reward to volatility ratio shows proportion of risky to earn higher than risk free rate of return.

Table 4.20

Optimal risky portfolio's Risk, Return and Co-variance between Banks

S.N.	Portfolio	Weight	Portfolio Return $E(r_p)$	Portfolio Risk (σ_p)	Slope
1.	NABIL & Himalayan	W_N = -1.42 W_H = 2.42	0.2387	0.4339	0.3577
2.	NABIL & Everest	W_N = -0.7091 W_E = 1.7091	0.45	0.5045	0.7265
3.	NABIL &SBI	W_N = -0.8475 W_S = 1.8475	0.577	0.788	0.6263
4.	Himalayan & Everest	W_H = 8.561 W_E = -7.561	0.5485	1.497	0.311
5.	Himalayan & SBI	W_H = 3.4094 W_S = -2.4094	0.3156	0.5855	0.3964
6.	Everest & SBI	W_E = 0.59205 W_s = 0.4079	0.3374	0.7710	0.329

(Source: Appendix – 19 to 24)

An investment opportunity set, our objective is to maximize the slope of CAL (Capital allocation line). This can be attained by assigning optimal proportion of fund into two risky assets. In this case of two risky assets, the solution for the weights of the optimal risky portfolio, P is given by equation 2.2.5 that in equation of optimal risky portfolio denotes to excess return rather than total return. It can be obtained by subtracting risk-free rate of return from the total expected return of two risky assets. The risk-free rate is 8.35%.

The slope of CAL shows the incremental return required in the total portfolio per incremental risk. Base above the Table 4.20 of optimal risky portfolio, in 1st portfolio of NABIL Bank and Himalayan Bank has shown weightis -1.42 and 2.42 respectively, portfolio return is 0.2387, portfolio riskis 0.4339 and slope is 0.3577. It means that the investor borrowing 142% loan of total investing fund from NABIL Bank in 12.5% interest rate to invest in Himalayan Bank. If he/she investsin Himalayan Bank, he/she is able to get 0.3577 units excess return on 1 unit portfolio risk; in other word he/she can get the optimal risky portfolio when CAL (0.3577) is tangent to the efficient frontier (0.2387 portfolio return).In 2nd portfolio of NABIL Bank and Everest Bank has shown weight is -0.7091 and 1.7091, respectively, portfolio return is 0.45, portfolio risk is 0.5045 and slope is 0.7265. It means that the investor borrowing 70.91% loan of total investing fund from NABIL Bank in 12.50% interest rate to invest in Everest Bank. If he/she invests in Everest Bank, he/she is able to get 0.7265 units excess return on 1 unit portfolio risk; in other word he/she can get the optimal risky portfolio when CAL(0.7265) is tangent to the efficient frontier (0.45 portfolio return). In 3rdportfolio of NABIL Bank and SBI Bank has shown weight is -0.8475 and 1.8475 respectively, portfolio return is 0.577, portfolio risk is 0.788 and slope is 0.6263. It means that the investor borrowing 84.75% loan of total investing fund from NABIL Bank in interest rate 12.50% to invest in SBI bank. If he/she invests in SBI bank, he/she is able to get 0.6263 units excess return on 1unti portfolio risk; in other word he/she can get the optimal risky portfolio when CAL (0.6263) is tangent to the efficient frontier (0.577 portfolio return). In 4th portfolio of Himalayan Bank and Everest Bank has shown weight is 8.561 and -7.561 respectively, portfolio return is 0.5485, portfolio risk is 1.497 and slope is 0.311. It means that the investor borrowing 756.1% loan of total investing fund from Everest Bank in interest rate 12.22% to invest in Himalayan Bank. If he/she invests in Himalayan Bank he/she is able to get 0.311 units excess return on 1 unit portfolio risk; in other word he/she can get the optimal risky portfolio when CAL (0.311) is tangent to the efficient frontier (0.5485 portfolio return). In 5thportfolio of Himalayan Bank and SBI Bank has shown weight is 3.4094 and -2.4094 respectively, portfolio return is 0.3156, portfolio risk is 0.5855 and slope is 0.3964. It means that the investor borrowing 240.94% loan of total investing fund from SBI Bank in interest rate11.24% to invest in Himalayan Bank. If he/she invests in Himalayan Bank he/she is able to get 0.3964 units excess return on 1 unit portfolio risk; in other word he/she can get the optimal risky portfolio

when CAL (0.3964) is tangent to the efficient frontier (0.3156 portfolio return). In 6th portfolio of Everest Bank and SBI Bank has shown weight is 0.5921 and 0.4079 respectively, portfolio return is 0.3374, portfolio risk is 0.7710 and slope is 0.329. It means that the investor invests to Everest bank and Himalayan Bank 59.21% and 40.79% respectively of his/her total fund. If he/she invests in Everest Bank and SBI Bank, he/she is able to get 0.329 units excess return on 1 unit portfolio risk; in other word he/she can get the optimal risky portfolio when CAL (0.329) is tangent to the efficient frontier (0.3374 portfolio return).

4.8 Correlation between Joint Venture Banks:

The correlation between the return of the two securities plays a significant role in risk reduction by portfolio construction. Correlation between each bank is presented below in table 4.21; details of calculation are show in Appendix.

Table 4.21

Correlation between Joint Venture Banks

Banks	NABIL	Himalayan	Everest	SBI
NABIL	1	0.9640	0.972136	0.967445
Himalayan	0.9640	1	0.963312	0.96466
Everest	0.972136	0.963312	1	0.903351
SBI	0.967445	0.96466	0.903351	1

(Source: Appendix – 25)

The correlation between the return of the two securities plays a significant role in the risk reduction by portfolio construction, if the correlation perfectly positive correlated, stocks would move up and down together and a portfolio consisting of two such stocks would be exactly as risky as the individual stock. Thus, diversification does not to reduce risk if the portfolio consists of perfectly positively correlated stock. And if the correlation is perfectly negative, the stocks would move perfectly together but in exactly opposite directions. In this condition risk can be completely eliminated. Base above the table, NABIL Bank and Everest Bank have highly positive correlated i.e. 0.972136 and the lowest correlation is 0.903351 between SBI Bank and Everest Bank. However, there is neither negative correlation nor perfect correlation seem between individual Bank. The meaning is that each bank is positively correlated from 0.972136 to 0.903351 which indicates while making portfolio some risk can be reduced.

4.9 Measurement of Portfolio Performance:

Risk and return both have to consider when bearing in mind a portfolio performance. There are various methods applied to measure the portfolio performance. For the simplicity of the study, here the Sharpe, Treynor, Jensen's portfolio performance is to be well through out.

(a) Sharpe's portfolio performance

It was derived by William Sharpe. Sharpe's measure divides average portfolio excess return over the sample period by the standard deviation of return over that period. Ranking of each portfolio using the Sharpe measure has been presented in table 4.22.

Table 4.22

Sharpe's Portfolio Performance Measurement (S_p)

S.N.	Portfolio	Sharpe's performance (S_p)	Rank
1.	NABIL and SBI	0.8571	1st
2.	NABIL and Everest	0.7557	2nd
3.	NABIL and Himalayan	0.5722	3rd
4.	SBI and Himalayan	0.5236	4th
5.	SBI and Everest	0.5137	5th
6.	Everest and Himalayan	0.3674	6th

(Source: Appendix – 26)

From the above calculation, portfolio of NABIL Bank and SBI Bank has the highest premium return per unit of total risk and the portfolio of Everest Bank and Himalayan Bank has the lowest risk premium return per unit of total risk. Even though, every portfolio performs better than the market.

(b) Treynor's portfolio performance (T_p)

It was develop by Jack Treynor. Treynor was interested in a measure of performance that would apply to all investors-regardless of their risk performances. Building on developments in capital market theory, he introduced a risk free asset that could be combined with different portfolio, to form a straight portfolio possibility line. He showed that rational risk average investors would always prefer portfolio possibility

lines with lager slopes because such high slope lines would place investor on higher indifference curves. Ranking of each portfolio using the Treynor measure has been presented in table 4.23.

Table 4.23

Treynor's Portfolio Performance (T_p)

S.N.	Portfolio	Treynor's performance (T_p)	Rank
1.	NABIL and SBI	0.7642	1st
2.	NABIL and Himalayan	0.5188	2nd
3.	NABIL and Everest	0.3659	3rd
4.	SBI and Himalayan	0.3231	4th
5.	Himalayan and Everest	0.2768	5th
6.	Everest and SBI	0.2270	6th

(Source: Appendix – 27)

From above calculation of portfolio performance of Treynor, portfolio NABIL and SBI has the highest portfolio's risk premium return per unit of systematic risk and portfolio Everest Bank and SBI Bank has the lowest risk premium return per unit of systematic risk. It means that the portfolio of NABIL Bank and SBI Bank has the best performance and portfolio of Everest and SBI has the worst performance.

(C) Jensen's portfolio performance

Michael Jensen develiped this measure for portfolio performance. This measure is based on CAPM. The aversion of CAPM which is used to compute security's or portfolio's expected rate of return. Ranking of each portfolio using the Jensen's portfolio measure has been presented in table 4.24. Results and interpretation is shown below and deatails of calculation can be seen in Appendix.

Table 4.24

Jensen's portfolio performance

S.N.	Portfolio	β_p	$\acute{\alpha}_p$	Evaluation	$Jp = \frac{\acute{\alpha}p}{\beta p}$	Rank
1.	NABIL and Himalayan	0.30165	0.1538	Under valued	0.50986	2nd
2.	NABIL and Everest	1.05	0.37486	Under valued	0.3570	3rd
3.	NABIL and SBI	0.861	0.6503	Under valued	0.7553	1st
4.	Everest and Himalayan	0.6396	0.17141	Under valued	0.268	5th
5.	SBI and Himalayan	0.5797	0.18214	Under valued	0.3142	4th
6.	Everest and SBI	1.423	0.3104	Under valued	0.21813	6th

(Source: Appendix – 28)

If $\acute{\alpha}_p$ is +ve asset (portfolio) is under valued.

If $\acute{\alpha}_p$ is –ve asset (portfolio) is over valued.

From the above table it is observed of Jensen's portfolio performance that the pricing of portfolio of all the banks under study are under valued. Thus, under pricing situation of portfolio of the banks indicates that all the sample joint venture banks' portfolio demands are very good investment opportunity. The investors can gain from buying the under priced stocks. It is recommended to purchase under valued stock but rational and efficient investment decision – maker need to analyze other dimensions as well to invest from the investment point of view. And portfolio NABIL and SBI has the highest Jensen's alpha risky return per unit of systematic risk i.e.0.7553 and portfolio Everest Bank and SBI Bank has the lowestJensen's alpha risky return per unit of systematic risk i.e.0.21813. It means that the portfolio of NABIL Bank and SBI Bank has the best performance and portfolio of Everest and SBI has the worst performance.

4.10 Environment factors in Nepalese capital market:

Environment is made of difference elements. Such elements directly and indirectly influence the ability to achieve organization goal. These elements can be classified in two groups. They are internal environment element and external environment

element. The investor should deeply study and analysis of Nepalese environment elements before investing.

4.10.1 Internal environment:

An organization has internal environment which includes organization goal&policy, organization structure, human resources, business culture etc. As these elements remain under the control of organization, the management should utilize them in favor of the organization by using their ability, experience and skill. The following factors are clarifies of internal environment.

(a) Organization goals and policy: Goal is desired future state of affairs and policy is guidelines to achieve goal of organization. So, the investor should clearly analysis of goals and policy of organization before investing.

(b) Organizational structure: Organizational structure should be different according to the nature, size and objective. Now-a-days different approaches have been developed in the organization. Organizational structure is framework like this policy, hierarchy, delegation of authority, span of control, departmentalization etc. So, the investor should clearly know about the organizational structure before investing.

(c) Human resources: The human resources are also very important elements of internal environment. Manager and employees should have same norms, values, and same goal, get success. Just opposite of this, if they work for different goals in the same organization conflict takes place among them and all get into troubles. So the investor should understand the relationship between employees and manager.

(d) Business culture: The investor should be analyzed business valued, customs, precedent, belief of organization before investing. This is supposed to be stamina of internal environment of any business organization.

4.10.2 External environment:

The elements of external environment do not remain under the control of organization but they directly affect the organizations. Economic, political legal, social culture and technological environment etc.are external environment.

(a) **Economic environment**: Inflection, interest rate, unemployment etc. are its main elements. As these elements directly affect the business organization, decisions should be taken after having deeply studied and analyzed them.

(b) **Political & Legal environment:** Political philosophy, political system, political organizations, legal system, court, legal administration etc. are included in political and legal environment. These elements also do not remain under the control of organization. So, decisions should be taken after deeply and analysis of this elements.

(c) **Socio-culture environment:** population, pressure group. Reference groups, lifestyle. Social classes, religion, language etc. are included in socio-culture environment. These elements also directly affect in the business organization. So, decisions shouldbe taken only after their deep study and analysis.

(d) **Technological environment:** The level of technology, pace of technology, researches and development budget, technology transfer etc. are included in technological environment. These elements also directly affect in the business. So, the investor should regularly study and analyze technological environment.

4.10 Major Findings of the Study

From the presentation and analysis of data the following points can be listed out as the major finding of the study:

Expected return:

The expected return of NABIL Bank, Himalayan Bank, Everest Bank and SBI Bank are 39.6%, 17.2%, 31.51% and 37% respectively. NABIL Bank has highest expected return and Himalayan Bank has lowest expected return.

Standard Deviation:

The standard deviation of NABIL Bank, Himalayan Bank, Everest Bank and SBI Bank are 110%, 57%, 71.81% and 89.5% respectively. NABIL Bank has highest standard deviation and Himalayan Bank has lowest standard deviation.

Coefficient of Variation:

The coefficient of variation of NABIL Bank, Himalayan Bank, Everest Bank and SBI Bank are 2.778, 3.31, 2.279 and 2.4189 respectively. Himalayan Bank has highest coefficient of variation and Everest Bank has lowest coefficient of variation.

Beta coefficient:

The beta coefficient of NABIL Bank, Himalayan Bank, Everest Bank and SBI Bank are 2.0465, 1.1071, 1.4569, and 1.555 respectively. NABIL Bank has highest beta coefficient and Himalayan bank has lowest beta coefficient.

Systematic risk:

Systematic risk of NABIL Bank, Himalayan Bank, Everest Bank and SBI Bank are 1.015927, 0.297225, 0.51472, and 0.586371 respectively. NABIL Bank has highest systematic risk and Himalayan Bank has lowest systematic risk.

Unsystematic risk:

Unsystematic risk of NABIL Bank, Himalayan Bank, Everest Bank and SBI Bank are 0.194073, 0.027675, 0.0009 and 0.214879 respectively. SBI Bank has highest unsystematic risk and Everest Bank has lowest unsystematic risk.

Capitalization of various sectors:

Considering the total capitalization of various sectors in fiscal year 2010/11. Percentage of commercial Bank, Development Bank, Finance company, Insurance Company, Hotel, Mfg. and processing company, Trading Company, and other company are 46.35%, 5.47%, 4.11%, 1.26%, 3.96%, 0.57%, and 32.57% respectively. Out of total market capitalization of various sectors, the Banking sector covers most of shares i.e. 46.35% and the trading company covers the lowest share i.e. 0.57%.

Market risk and return:

Considering the market risk and return, the exacted return and standard deviation of the overall market are 7.03% and 49.2% respectively. Similarly the coefficient of variation is 6.998.

Overpriced and underpriced:

From the analysis of required rate of return and expected rate of return, it shows the entire all joint venture Bank's common stocks are underpriced.

Correlation Coefficient:

The correlation coefficient between NABIL Bank and Himalayan Bank, NABIL Bank and Everest Bank, NABIL Bank and SBI Bank, Everest Bank and Himalayan Bank, SBI Bank and Himalayan Bank & SBI Bank and Everest Bank are 0.9640, 0.972136, 0.967445, 0.963312, 0.964661 and 0.903351respectively. Between NABIL Bank and

Everest Bank has highest correlation coefficient and between SBI Bank and Everest Bank has lowest correlation coefficient.

Minimum variance portfolio's return:

The portfolio return between NABIL Bank and Himalayan Bank, NABIL Bank and Everest Bank, NABIL Bank and SBI Bank, Everest Bank and Himalayan Bank, SBI Bank and Himalayan Bank & SBI Bank and Everest Bank are 21.79%, 44.56%, 71.94%, 23.85%, 24.87% and 38.45% respectively. Between NABIL Bank and SBI Bank have highest portfolio return & Himalayan Bank and NABIL Bank have lowest portfolio return.

Minimum variance portfolio's risk:

The portfolio risk between NABIL Bank and Himalayan Bank, NABIL Bank and Everest Bank, NABIL Bank and SBI Bank, Everest Bank and Himalayan Bank, SBI Bank and Himalayan Bank & SBI Bank and Everest Bank are 27.355, 50.84%, 76.77%, 48.2%, 35.77% and 62.89% respectively. Between NABIL Bank and SBI Bank have highest portfolio risk and NABIL Bank and Himalayan Bank have lowest portfolio risk.

Optimal risky portfolio's return:

The portfolio return between NABIL Bank and Himalayan Bank, NABIL Bank and Everest Bank, NABIL Bank and SBI Bank, Everest Bank and Himalayan Bank, SBI Bank and Himalayan Bank & SBI Bank and Everest Bank are 23.87%, 45%, 57.7%, 54.85%, 31.56%, and 33.74% respectively. Between NABIL Bank and SBI Bank have highest portfolio return and NABIL Bank and Himalayan Bank have lowest portfolio return.

Optimal risky portfolio's risk:

The portfolio risk between NABIL Bank and Himalayan Bank, NABIL Bank and Everest Bank, NABIL Bank and SBI Bank, Everest Bank and Himalayan Bank, SBI Bank and Himalayan Bank & SBI Bank and Everest Bank are 43.39%, 50.45%, 78.8%, 149.7%, 58.55% and 77.10% respectively. Between Himalayan Bank and Everest Bank have highest portfolio risk & NABIL Bank and Himalayan Bank have lowest portfolio risk.

Optimal risky portfolio's slope:

The optimal risky portfolio's slope between NABIL Bank and Himalayan Bank, NABIL Bank and Everest Bank, NABIL Bank and SBI Bank, Everest Bank and Himalayan Bank, SBI Bank and Himalayan Bank & SBI Bank and Everest Bank are 0.3577, 0.7265, 0.6263, 0.311, 0.3964 and 0.329 respectively. Between NABIL Bank and Everest Bank have highest portfolio slope and Himalayan Bank and Everest Bank have lowest portfolio slope.

Sharpe's portfolio performance:

Considering the Sharpe's portfolio performance measure, the portfolio of NABIL Bank and SBI Bank has the best performance because of the highest risk premium return per unit of total risk i.e. 0.8571 and the portfolio of Everest Bank and Himalayan Bank has the lowest risk premium return per unit of total risk i.e. 0.3674.

Treynor's portfolio performance:

Considering the Treynor's portfolio performance measure the portfolio of NABIL and SBI has the highest portfolio's risk premium return per unit of systematic risk i.e. 0.7642 and portfolio Everest Bank and SBI Bank has the lowest risk premium return per unit of systematic risk i.e. 0.2270.

Jensen's portfolio performance:

Jensen's portfolio performance that the pricing of portfolio of the entire bank's common stocks are under valued.And portfolio NABIL and SBI has the highest Jensen's alpha risky return per unit of systematic risk i.e.0.7553 and portfolio Everest Bank and SBI Bank has the lowest Jensen's alpha risky return per unit of systematic risk i.e.0.21813.

Environment factors:

Environment is made of difference elements. Such elements directly and indirectly influence the ability to achieve organization goal. These elements can be classified in two groups. They are internal environment element and external environment element. The investor should deeply study and analysis of Nepalese environment elements before investing.

CHAPTER – FIVE

SUMMARY, CONCLUSION, AND RECOMMENDATIONS

This chapter summarizes the whole study. It draws the conclusion for the study and forwards recommendation to erase the weakness drawbacks of common stock of concern banks, observed on the basis of findings.

5.1 Summary:

Stock market is the back bone of investment sector of the country. There is only one stock market in Nepal i.e. Nepal Stock Exchange (NEPSE). All the securities (besides government securities) are traded in such stock market. To make share transactions, the company should be first listed in the NEPSE. Banking sector plays vital role in stock market in terms of market capitalization, volume of share traded and amount of share traded.

Common stock is the most risky security and life – blood of the stock market and investment in common stock is very sensitive on the ground of risk. Investment is distinguished from speculation by the time horizon of the investor and often by the risk return characteristics of the investment. The true investor is interested in a good rate of return, earn or a rather consistent basis for a relatively long period of time.

Portfolio is a collection of securities. It simply represents the practices among the investors having their fund in more than on asset. Portfolio management is concerned with efficient management of portfolio investment in financial assets, including shares and debentures of companies. Portfolio analysis considers the determination of future risk and return in holding various blends of individual securities.

The main objective of study is to find out level of portfolio risk and return on common stock of commercial banks' investment. The study is focused on portfolio analysis on common stock of listed four joint venture commercial banks. The research has been designed based on secondary data collected from NEPSE, SEBON and concerned banks by using financial tools. The research is totally based on the

historical data so it is a historical research. It covers the data from the fiscal year 2006/07 to 2010/11. For analysis financial tools like portfolio risk, portfolio return, portfolio performance as well as statistical tools, like mean, standard deviation, variance. Coefficient of variation, covariance, correlation and coefficient of determination are used. The data and results are tabulated and presented in figures as the requirement of the study. This study has been summarized that with the help of risk diversification, an investor can get the better result on his investment in difference sector rather than only one sector.

5.2 Conclusion:

For this study, four commercial banks have taken which are listed in NEPSE. An analysis of portfolio in common stocks of these banks are made in study. They are NABIL Bank, Himalayan Bank, Everest Bank and SBI Bank while analyzing the portfolio a brief review of literature has been conducted. Many people have unrealistically optimistic or pessimistic expectations about the stock market investment that means they are taking fear or unknown. Therefore, the conclusion of this research work may be important information for those who are directly or indirectly concerned with the common stock investment. The data gathered for this purpose are presented in tables, graphs and figures and analysis in made by using appropriate financial and statistical tools; the following conclusion can be outline.

- According to the chapter four of data presentation of common stock investment, this is usually expressed in percentage. NABIL Bank has the highest rate of return i.e. 39.6% and Himalayan Bank has lowest rate of return i.e. 17.2%. Himalayan Bank stock is less risky assets (i.e. S.D. 57%) and NABIL Bank stock is most risky assets (i.e. S.D. 110%) among the four joint venture Banks. According to S.D. the investor should choose Himalayan Bank due to less risky but less expected return, the investor should choose NABIL Bank due to highest return. Thus to remove this difficulty regarding the choice of individual stock, we can use other relative measure of risk that is C.V. According to the C.V., the Everest Bank is best investment alternative due to the least C.V. that is 2.279 one among the four joint venture Banks.The standard deviation and expected return of Everest bank are 31.51% and 71.81% respectively.

- The risk is the composed of systematic risk and unsystematic risk. Among them NABIL Bank's stock is highly risky because it has highest total risk. Himalayan Bank's stock is less risky because it has lowest total risk. But if investor consider systematic risk as a decision factor NABIL Bank is highly risky stock (i.e. 1.0159) among other stocks. Unsystematic risk is called non-market risk or Company-unique risk or company specific risk of diversifiable risk; it is arise from poor management, labor dispute etc, so SBI Bank has higher unsystematic risk (i.e. 0.2148) and Everest Bank has lower unsystematic risk (i.*e*. 0.0009) it indicates that the Everest Bank has strong and believable management and SBI Bank has poor and unbelievable management.

- Regarding the market capitalization of four Joint Venture Banks, NABIL Bank is in the highest position with Rs. 12091.15 million (i.e. 38.99%) and SBI Bank is in the lowest position with Rs. 4935.16 million (i.e. 15.915%).
- Considering the total market capitalization and paid up capital of various sectors in fiscal year 2010/11, commercial banking sector covers most of the share i.e. Rs.111938.05 million capitalization and Rs.41806.19 million paid up capital and Trading sectors covers the lowest share i.e. Rs. 1380.74 million market capitalization and Rs. 83.42 million paid up capital.

- Consider the market risk and return expected return of overall market is 7.03%, which is lowest than the expected return of four Joint Venture Banks. The risk is also found in minimum portion i.e. 49.2% which represent the lower sensitivity on investment in the market.

- Beta is systematic risk and market beta is always 1. Beta coefficient of NABIL Bank is the highest i.e. 2.0465 which is grater than 1. Thus, it indicates that the return of NABIL Bank is more volatile that means every 1% change in market return leads to 2.0465 change in NABIL stock's return. Therefore, stock of NABIL Bank is most aggressive and the stock of Himalayan Bank is also aggressive (i.e. 1.1071) but lower than other three Joint Venture Banks.

- On of the main significant of beta is Capital Assets Pricing Model (CAPM), which describes the relationship between risk and equilibrium return. In this model, risk free rate plus a premium based on systematic risk of security is equilibrium rate of return of the stock. Comparing the expected rate of return and equilibrium return

(required rate of return) there is found of common stock of all the Joint Venture Banks under study are under priced.Thus, under pricing situation of common stock of the banks indicates that all the sample joint venture banks' stock demands are very good investment opportunity. The investors can gain from buying the under priced stocks. It is recommended to purchase under priced stock but rational and efficient investment decision – maker need to analyze other dimensions as well to invest from the investment point of view.

- Diversification of portfolio helps to minimize risk and different diversification techniques have been developed for reducing portfolio's risk. As mentioned in table 4.19 risk is minimized by doing portfolio between joint venture Banks for example before diversification, S.D. of NABIL Bank and Everest Bank were 1.1 and 0.7181 respectively and average risk was 0.909, but after diversification portfolio risk of NABIL and Everest Bank is 0.5084, risk is decrease by 0.4006 which means considerable reduction in risk that previous. Similarly, before diversification S.D. of Himalayan and SBI were 0.57 and 0.895 respectively and average risk was 0.7325, but after diversification portfolio risk of Himalayan and Everest bank is 0.3577, which is decrease by 0.3748, it means that there is considerable reduction risk. We can reduce the risk of portfolio (NABIL Bank and Himalayan Bank), before diversification the risk of NABIL and Himalayan Bank ware 1.1 and 0.57 respectively and average risk was 0.835 but after diversification their portfolio risk become 0.2735 the risk of portfolio is reduced by 0.5615, which is the considerable reduction in risk without losing return. Diversification can only reduce risk but can't increase return. Portfolio return is simply the average of weighted of high return individual's security returns. Hence, average of high return is also high. While creating the portfolio between two assets among the sample Banks, the portfolio between NABIL and SBI Banks give the highest expected return, which is 71.94% where as the portfolio between NABIL bank and Himalayan Bank gives the lowest expected return i.e. 21.79%. Similarly, considering the portfolio risk, the portfolio of NABIL Bank and SBI Bank has the highest risk i.e.76.77% and the portfolio of NABIL Bank and Himalayan Bank has lowest risk i.e. 27.35%.

- An investment opportunity set, our objective is to maximize the slope of CAL (Capital allocation line). This can be attained by assigning optimal proportion of

fund into two risky assets. In this case of two risky assets, the solution for the weights of the optimal risky portfolio, P is given by equation 2.2.5 that in equation of optimal risky portfolio denotes to excess return rather than total return. It can be obtained by subtracting risk-free rate of return from the total expected return of two risky assets. The slope of CAL shows the incremental return required in the total portfolio per incremental risk. Base of optimal risky portfolio,in 3rdportfolio of NABIL Bank and SBI Bank has shown weight is -0.8475 and 1.8475 respectively, portfolio return is 0.577, portfolio risk is 0.788 and slope is 0.6263. It means that the investor borrowing 84.75% loan of total investing fund from NABIL Bank in interest rate 12.50% to invest in SBI bank. If he/she invests in SBI bank, he/she is able to get 0.6263 units excess return on 1unti portfolio risk; in other word he/she can get the optimal risky portfolio when CAL (0.6263) is tangent to the efficient frontier (0.577 portfolio return), which the portfolio is given highest expected rate of return. And in 1st portfolio of NABIL Bank and Himalayan Bank has shown weight is -1.42 and 2.42 respectively, portfolio return is 0.2387, portfolio risk is 0.4339 and slope is 0.3577. It means that the investor borrowing 142% loan of total investing fund from NABIL Bank in 12.5% interest rate to invest in Himalayan Bank. If he/she invests in Himalayan Bank, he/she is able to get 0.3577 units excess return on 1 unit portfolio risk; in other word he/she can get the optimal risky portfolio when CAL (0.3577) is tangent to the efficient frontier (0.2387 portfolio return), which the portfolio is given lowest required rate of return.

- The correlation between the return of the two securities plays a significant role in the risk reduction by portfolio construction, if the correlation perfectly positive correlated, stocks would move up and down together and a portfolio consisting of two such stocks would be exactly as risky as the individual stock. Thus, diversification does not to reduce risk if the portfolio consists of perfectly positively correlated stock. And if the correlation is perfectly negative, the stocks would move perfectly together but in exactly opposite directions. In this condition risk can be completely eliminated. Base above the table, NABIL Bank and Everest Bank have highly positive correlated i.e. 0.972136 and the lowest correlation is 0.903351 between SBI Bank and Everest Bank. However, there is neither negative correlation nor perfect correlation seem between individual Bank. The meaning is

that each bank is positively correlated from 0.972136 to 0.903351 which indicates while making portfolio some risk can be reduced.

- Portfolio performance evaluation measures the financial better position of created portfolio mentioned sample Banks by making comparison among them. According to Sharpe's portfolio performance, portfolio of NABIL Bank and SBI Bank has the highest premium return per unit of total risk and the portfolio of Everest Bank and Himalayan Bank has the lowest risk premium return per unit of total risk. Even though, every portfolio performs better than the market.

- According to Treynor's portfolio performance, portfolio NABIL and SBI has the highest portfolio's risk premium return per unit of systematic risk and portfolio Everest Bank and SBI Bank has the lowest risk premium return per unit of systematic risk. It means that the portfolio of NABIL Bank and SBI Bank has the best performance and portfolio of Everest and SBI has the worst performance.

- According to Jensen's portfolio performance that the pricing of portfolio of all the banks under study are under valued. Thus, under pricing situation of portfolio of the banks indicates that all the sample joint venture banks' portfolio demands are very good investment opportunity. The investors can gain from buying the under priced stocks. It is recommended to purchase under valued stock but rational and efficient investment decision – maker need to analyze other dimensions as well to invest from the investment point of view. And portfolio NABIL and SBI has the highest Jensen's alpha risky return per unit of systematic risk i.e. 0.7553 and portfolio Everest Bank and SBI Bank has the lowest Jensen's alpha risky return per unit of systematic risk i.e. 0.21813. It means that the portfolio of NABIL Bank and SBI Bank has the best performance and portfolio of Everest and SBI has the worst performance.

- Environment is made of difference elements. Such elements directly and indirectly influence the ability to achieve organization goal. These elements can be classified in two groups. They are internal environment element and external environment element. The investor should deeply study and analysis of Nepalese environment elements before investing.

5.3 Recommendations

On the basis of the analysis findings of this study, following recommendations are suggested to overcome the weakness and inefficiency and to improve the present situation of the concern.

- Risk and return play vital role on common stock investment of banking sector, therefore, it is suggested to analyze risk and return with sincerely before investing in this sector. According to the analysis of individual common stock of Joint Venture Bank, investor should invest their money in common stock of Everest Bank due to the lowest C.V (i.e. 2.279) and aggressive type of stock.

- Analysis of the market sensitivity of common stock guides in investing on stock market. It is better to invest on such common stock, which has less beta i.e. defensive stock for that investor who does not eager to take high risk but higher return can't obtain in such investment. Thus, investor should buy the under priced stock when market is rising and sell the over priced securities when market performance is falling. Similarly, the investors should hold that securities when are performing better than the market. This study recommends to purchase the common stock of all sample banks due to the under priced.

- Investors must concern with the systematic risk that is measured by given stock's beta. The systematic risk is only the risk, which is priced at market. According to the study, the stock of NABIL Bank has the highest systematic risk i.e. 101.59% and Himalayan Bank has the lowest systematic risk i.e. 29.72%. Although, there is chance of more return than expected and there is also a chance of heavy loss because stock market investment is risky job. Thus investor must be well aware of this fact and must be able to visualize and analyze about the whole things. To beta the stock market, proper analysis of individual security, industry and overall market is always essential. Similarly, general knowledge about the political, economic, social and technological trend in advantages. Diversifiable risk (unsystematic risk) refers to the risk related only to the individual firm arise out of strikes, production cost labor dispute and other activities unique to an individual

firm. These events occur independently to all firms; therefore, forming a portfolio does eliminate these risks. The stock of SBI Bank has highest unsystematic risk (i.e. 21.488%), so the SBI Bank should control total cost, labor dispute, strikes and other activities to minimize the total risk.

- NEPSE needs to modernize the trading system and effective information channel. It needs to develop different programs for private investors. These programs will contribute to increase investor's rationality as well as market efficiency.

- Investor need to diversify their fund to reduce the risk. Proper construction of portfolio will reduce considerable potential loss, which can be defined in term of the risk but portfolio construction is dynamic and difficult job. Thus, investor should be selected the stocks that have higher return and negative correlation or near to zero correlation between different companies and sector. The portfolio revision is also necessary at certain interval time to get best return at lower risk. According to the study, the portfolio between NABIL Bank and SBI Bank is recommended to construction due to higher return. If investor wants to bear less then they can select NABIL Bank and Himalayan Bank. But remember that there is least return as well.

- The listed companies should operate their activity smoothly. They should publish their annual reports and information timely and correctly which will help to the investors to take the investment decision on their common stocks.

- Government should amend the rules and regulations regarding to 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 time and also need to follow the implementation and supervision of rules and regulation to make sure the objective is achieved.

- The financial institutions and companies should provide the real financial statements. The data provided by NEPSE and the company itself are different in some cases. It creates confusion to potential investors about the actual financial condition of the company. They should publish their annual reports and information timely and accurately, which will help to the investors to take the investment decision on their common stock.

- The stock broker company should be trained their staff about share trading system and they should be aware with investor's right and their service to the investors on time.

- Portfolio management is a dynamic subject matter which changes at a flash. It is ever challenging there should be regular research in portfolio management. Corporate body and individual investor strongly recommended make regular on portfolio managements.

- Environment is made of difference elements. Such elements directly and indirectly influence the ability to achieve organization goal. These elements can be classified in two groups. They are internal environment element and external environment element. The investor should deeply study and analysis of Nepalese environment elements before investing.

- The peace and the potential problem of the country are another burning issue, which affects the economy of the nation adversely. The backbone of every country is its economy. The current challenging issue of the economy is caused due to political instability. Political instability creates huge problem like as strike, lockout and many more black mailing to investor. These above things create a huge problem in economic growth of the country. So, to make a sound and economic growth of any country political stability is needed. Finally, political stability helps to make the economic stage as better one.

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APPENDICES

Fiscal year2010/11

S.N	Name of the Bank	AGM	Cash Dividend (% on paid up value)	Bonus Share (% on paid up value)
1	NABIL Bank	27th	30	-
2	Himalayan Bank	19th	16.8421	20
3	SBI Bank	18th	5	12.5
4	Everest Bank	17th	50	10

Appendix - 1

Annual General Meeting Dividend / Bonus Share Declaration

Fiscal year 2009/10

S.N	Name of the Bank	AGM	Cash Dividend (% on paid up value)	Bonus Share (% on paid up value)
1	NABIL Bank	26th	30	40
2	Himalayan Bank	18th	11.84	25
3	SBI Bank	17th	5	12.5
4	Everest Bank	16th	30	30

Fiscal year 2008/09

S.N	Name of the Bank	AGM	Cash Dividend (% on paid up value)	Bonus Share (% on paid up value)
1	NABIL Bank	25th	35	50
2	Himalayan Bank	17th	12	31.5557
3	SBI Bank	16th	2.11	40
4	Everest Bank	15th	30	30

Fiscal year 2007/08

S.N	Name of the Bank	AGM	Cash Dividend (% on paid up value)	Bonus Share (% on paid up value)
1	NABIL Bank	24th	60	40
2	Himalayan Bank	16th	25	20
3	SBI Bank	15th	-	-
4	Everest Bank	14th	20	30

Fiscal year 2006/07

S.N	Name of the Bank	AGM	Cash Dividend (% on paid up value)	Bonus Share (% on paid up value)
1	NABIL Bank	23th	100	40
2	Himalayan Bank	15th	15	25
3	SBI Bank	14th	12.59	35
4	Everest Bank	13th	10	30

Fiscal year 2005/06

S.N	Name of the Bank	AGM	Cash Dividend (% on paid up value)	Bonus Share (% on paid up value)
1	NABIL Bank	22th	85	-
2	Himalayan Bank	14th	30	5
3	SBI Bank	13th	5	-
4	Everest Bank	12th	25	-

(Sources: www.sebon.gov.np)

Appendix - 2

Single Period Return (R), Expected Return E(r), Standard Deviation (σ) and Coefficient of Variation (C.V) of NABIL Bank:

Fiscal Year	Closing MPS	Dividend	$R_n = \frac{D_t + (P_t - P_{t-1})}{P_{t-1}}$	$R_n - E(r_n)$	$[R_n - E(r_n)]^2$
2005/06	2240	85			
2006/07	5050	2210	2.2410714	1.845151	3.404581
2007/08	5275	2019.6	0.4444752	0.048554	0.002358
2008/09	4899	1227	0.161327	-0.23459	0.055034
2009/10	2384	530.8	-0.405021	-0.80094	0.641508
2010/11	1252	30	-0.462248	-0.85817	0.736454
			$\sum R_n$= 1.98		$\sum [R_n - E(r_n)]^2$ =4.84

We have,

$$Expected\ return\ E(r_n) = \frac{\sum R_n}{n}$$

$$= \frac{1.98}{5}$$

=0.396= i.e. 39.6%

$$\text{Standard Deviation } (\sigma_n) = \sqrt{\frac{\sum [R_n - E(r_n)]^2}{n-1}}$$

$$= \sqrt{\frac{4.84}{5-1}}$$

=1.100 = i.e. 110%

Variance (σ_n^2) = 1.100^2 = 1.21

Coefficient of Variation ($C.V_n$) = $\frac{\sigma_n}{E(r_n)}$= $\frac{1.1}{0.396}$ =2.778

Appendix - 3

Single Period Return (R), Expected Return E(r), Standard Deviation (σ) and Coefficient of Variation (C.V) of Himalayan Bank:

Fiscal Year	Closing MPS	Dividend	$R_H = \frac{D_t + (P_t - P_{t-1})}{P_{t-1}}$	$R_H - E(r_H)$	$[R_H - E(r_H)]^2$
2005/06	1100	118			
2006/07	1760	502.5	1.056818	0.885134	0.783463
2007/08	1980	377	0.339205	0.167521	0.028063
2008/09	1760	269.49	0.024995	-0.14669	0.021518
2009/10	816	155.6	-0.44795	-0.61963	0.383946
2010/11	575	147.442	-0.11465	-0.28633	0.081987
			$\sum R_H$ = 0.85842		$\sum [R_H - E(r_H)]^2$ =1.3

We have,

$$Expected\ return\ E(r_H) = \frac{\sum R_H}{n}$$

$$= \frac{0.858}{5}$$

=0.172 =i.e. 17.2%

$$\text{Standard Deviation } (\sigma_H) = \sqrt{\frac{\sum [R_H - E(r_H)]^2}{n-1}}$$

$$= \sqrt{\frac{1.3}{5-1}}$$

=0.57 =i.e.57%

Variance (σ_H^2) = 0.57^2 = 0.3249

Coefficient of Variation (C.V_H) = $\frac{\sigma_H}{E(r_H)}$= $\frac{0.57}{0.172}$=3.31

Appendix - 4

Single Period Return (R), Expected Return E(r), Standard Deviation (σ) and Coefficient of Variation (C.V) of Everest Bank:

Fiscal Year	Closing MPS	Dividend	$R_E = \frac{D_t + (P_t - P_{t-1})}{P_{t-1}}$	$R_E - E(r_E)$	$[R_E - E(r_E)]^2$
2005/06	1379	25			
2006/07	2430	949.6	1.450761	1.135661	1.289727
2007/08	3132	756.5	0.600206	0.285106	0.081285
2008/09	2455	519	-0.05045	-0.36555	0.133625

2009/10	1630	358.2	-0.19014	-0.50524	0.25527
2010/11	1094	153.03	-0.23495	-0.55005	0.302556
			$\sum R_E = 1.575$		$\sum [R_E - E(r_E)]^2 = 2.0625$

We have,

$$Expected\ return\ E(r_E) = \frac{\sum R_E}{n}$$

$$= \frac{1.575}{5}$$

=0.3151 =i.e. 31.51%

$$\text{Standard Deviation } (\sigma_E) = \sqrt{\frac{\sum [R_E - E(r_E)]^2}{n-1}}$$

$$= \sqrt{\frac{2.0625}{5-1}}$$

=0.7181 =i.e. 71.81%

Variance (σ_E^2) = 0.7181^2 = 0.51562

Coefficient of Variation (C.V_E) = $\frac{\sigma_E}{E(r_E)} = \frac{0.7181}{0.3151} = 2.279$

Appendix - 5

Single Period Return (R), Expected Return E(r), Standard Deviation (σ) and Coefficient of Variation (C.V) of SBI Bank:

Fiscal Year	Closing MPS	Dividend	$R_S = \frac{D_t + (P_t - P_{t-1})}{P_{t-1}}$	$R_S - E(r_S)$	$[R_S - E(r_S)]^2$
2005/06	612	5			
2006/07	1176	541.44	1.806275	1.435815	2.061563
2007/08	1511	-	0.284864	-0.0856	0.007327
2008/09	1900	298.51	0.455003	0.084543	0.007148
2009/10	741	75.625	-0.5702	-0.94066	0.884836
2010/11	565	84.375	-0.1223	-0.49411	0.244145
			$\sum R_S = 1.8523$		$\sum [R_S - E(r_S)]^2 = 3.205$

We have,

Expected return $E(r_S) = \frac{\sum R_S}{n}$

$= \frac{1.8523}{5}$

=0.37 =i.e. 37%

Standard Deviation $(\sigma_S) = \sqrt{\frac{\sum[R_S - E(r_S)]^2}{n-1}}$

$= \sqrt{\frac{3.205}{5-1}}$

=0.895 =i.e. 89.5%

Variance $(\sigma_S^2) = 0.895^2 = 0.80125$

Coefficient of Variation $(C.V_S) = \frac{\sigma_S}{E(r_S)} = \frac{0.895}{0.37} = 2.4189$

Appendix - 6

Calculation of Expected Return, Standard deviation, Variance and Co-efficient of variation of market

Fiscal Year	**NEPSE**	$R_m = \frac{NEPSE_{t+1} - NEPSE_t}{NEPSE_t} \times 100$	$R_m - E(r_m)$	$[R_m - E(R_m)]^2$
2005/06	386.83	-	-	-
2006/07	683.95	0.7681	0.6978	0.486925
2007/08	963.4	0.4086	0.3383	0.114447
2008/09	749.1	-0.222	-0.2923	0.085439
2009/10	477.73	-0.362	-0.4323	0.186883

2010/11	362.85	-0.240	-0.3103	0.096286
Total		$\sum R_m$=0.3515		$\sum[R_m - E(R_m)]^2$= 0.97

We have,

Expected Return of Market $E(r_m)$

$$E(r_m) = \frac{\sum R_m}{n}$$

$$= \frac{0.3515}{5} \quad =0.0703 \quad = \text{i.e. } 7.03\%$$

Standard Deviation of Market (σ_m)

$$(\sigma_m) = \sqrt{\frac{\sum[R_m - E(r_m)]^2}{n-1}}$$

$$= \sqrt{\frac{0.97}{5-1}}$$

$$=0.492$$

Variance of Market (σ_m^2) = 0.492^2 = 0.2425

Coefficient of Variation (C.V.$_m$) = $\frac{\sigma_m}{E(r_m)} = \frac{0.492}{0.0703}$ = 6.998

Appendix - 7

Calculations of Co-variance, Correlation and Beta of NABIL Bank

Fiscal Year	**$R_n - E(r_n)$**	**$R_m - E(r_m)$**	**$[R_n - E(r_n) \times R_m - E(r_m)]$**
2006/07	1.845151	0.6978	1.287546
2007/08	0.048554	0.3383	0.016426
2008/09	-0.23459	-0.2923	0.068571
2009/10	-0.80094	-0.4323	0.346246
2010/11	-0.85817	-0.3103	0.26629
			$\sum[R_n - E(r_n) \times R_m - E(r_m)]$=1.9851

Covariance between NABIL Bank and Market Cov (n,m)

$$Cov(n,m) = \frac{\sum[(R_n - E(r_n) \times (R_m - E(r_m)]}{n-1} = \frac{1.9851}{5-1} = 049627$$

Correlation between NABIL Bank and Market ($\rho_{n,m}$)

$$\boldsymbol{\rho_{n,m}} = \frac{Cov(n,m)}{\sigma_n . \sigma_m} = \frac{0.49627}{1.1 \times 0.492} = 0.91698$$

Beta of NABIL Bank (β_n)

$$\boldsymbol{\beta_n} = \frac{Cov(n,m)}{\sigma_m^2} = \frac{0.49627}{0.2425} = 2.046474$$

Appendix - 8

Calculations of Co-variance, Correlation and Beta of Himalayan Bank

Fiscal Year	$R_H - E(r_H)$	$R_M - E(r_M)$	$[R_H - E(r_H) \times R_M - E(r_M)]$
2006/07	0.885134	0.6978	0.617647
2007/08	0.167521	0.3383	0.056672
2008/09	-0.14669	-0.2923	0.042877
2009/10	-0.61963	-0.4323	0.26787
2010/11	-0.28633	-0.3103	0.08885
			$\sum[R_H - E(r_H) \times R_M - E(r_M)]=1.074$

Covariance between Himalayan Bank and Market Cov $_{(H,M)}$

$$Cov(H,M) = \frac{\sum[(R_H - E(r_H) \times (R_M - E(r_M)]}{n-1} = \frac{1.074}{5-1} = 0.2685$$

Correlation between Himalayan Bank and Market ($\rho_{H,M}$)

$$\boldsymbol{\rho_{H,M}} = \frac{Cov(H,M)}{\sigma_H . \sigma_M} = \frac{0.2685}{0.57 \times 0.492} = 0.5244$$

Beta of Himalayan Bank (β_H)

$$\beta_H = \frac{Cov(H,M)}{\sigma_M^2} = \frac{0.2685}{0.2425} = 1.1071$$

Appendix - 9

Calculations of Co-variance, Correlation and Beta of Everest Bank

Fiscal Year	$R_E - E(r_E)$	$R_M - E(r_M)$	$[R_E - E(r_E) \times R_M - E(r_M)]$
2006/07	1.135661	0.6978	0.792464
2007/08	0.285106	0.3383	0.096451
2008/09	-0.36555	-0.2923	0.10685
2009/10	-0.50524	-0.4323	-0.21842
2010/11	-0.55005	-0.3103	-0.17068
			$\sum[R_E - E(r_E) \times R_M - E(r_M)]=1.3848$

Covariance between Everest Bank and Market Cov $_{(E,M)}$

$$Cov(E,M) = \frac{\sum[(R_E - E(r_E) \times (R_M - E(r_M)]}{n-1} = \frac{1.3848}{5-1} = 0.346215$$

Correlation between Everest Bank and Market ($\rho_{E,M}$)

$$\boldsymbol{\rho_{E,M}} = \frac{Cov(E,M)}{\sigma_E . \sigma_M} = \frac{0.346215}{0.7181 \times 0.492} = 0.9799$$

Beta of Everest Bank (β_E)

$$\beta_E = \frac{Cov(E,M)}{\sigma_M^2} = \frac{0.346215}{0.2425} = 1.45693$$

Appendix - 10

Calculations of Co-variance, Correlation and Beta of SBI Bank

Fiscal Year	**$R_S - E(r_S)$**	**$R_M - E(r_M)$**	**$[R_S - E(r_S) \times R_M - E(r_M)]$**
2006/07	1.435815	0.6978	1.001912
2007/08	-0.0856	0.3383	-0.02896
2008/09	0.084543	-0.2923	-0.02471
2009/10	-0.94066	-0.4323	0.406647
2010/11	-0.49411	-0.3103	0.153322
			$\sum[R_S - E(r_S) \times R_M - E(r_M)]=1.508$

Covariance between SBI Bank and Market Cov $_{(S,M)}$

$$Cov(S,M) = \frac{\sum[(R_S - E(r_S) \times (R_M - E(r_M)]}{n-1} = \frac{1.508}{5-1} = 0.377$$

Correlation between SBI Bank and Market ($\rho_{S,M}$)

$$\boldsymbol{\rho_{S,M}} = \frac{Cov(S,M)}{\sigma_S . \sigma_M} = \frac{0.377}{0.895 \times 0.492} = 0.856276$$

Beta of SNI Bank (β_S)

$$\beta_S = \frac{Cov(S,M)}{\sigma_M^2} = \frac{0.377}{0.2425} = 1.554857$$

Appendix - 11

Systematic and Unsystematic Risk of Individual Bank

Banks	Beta	Variance	Systematic risk	Unsystematic risk
NABIL Bank	2.0465	1.2100	1.015927	0.194073
Himalayan Bank	1.1071	0.3249	0.297225	0.027675
Everest Bank	1.4569	0.51562	0.51472	0.0009
SBI Bank	1.555	0.80125	0.586371	0.214879

Total Risk = Systematic Risk + Unsystematic Risk

$\boldsymbol{\sigma_i^2 = \beta_i^2 \sigma_m^2 + \sigma_{ei}^2}$

Variance of Market (σ_m^2) = 0.2425

Systematic risk of **NABIL** Bank

$\beta_n^2 \sigma_m^2$

$=2.0468^2 \times 0.2425$

`$=1.015927$

Unsystematic Risk of **NABIL** Bank

Total Risk – Systematic Risk

= 1.21 – 1.015927

= 0.194073

Systematic Risk of **Himalayan** Bank

$\beta_H^2 \sigma_m^2$

$= 1.1071^2 \times 0.2425$

$= 0.297225$

Unsystematic Risk of **Himalayan** Bank

Total Risk – Systematic Risk

$= 0.3249 – 0.297225$

$= 0.027675$

Systematic Risk of **Everest** Bank

$\beta_E^2 \sigma_m^2$

$= 1.4569^2 \times 0.2425$

$= 0.51472$

Unsystematic Risk of **Everest** Bank

Total Risk – Systematic Risk

$= 0.51562 - 0.51472$

$=0.0009$

Systematic Risk of **SBI** Bank

$\beta_S^2 \sigma_m^2$

$=1.555^2 \times 0.2425$

$= 0.586371$

Unsystematic Risk of **SBI** Bank

Total Risk – Systematic Risk

$= 0.80125 - 0.586371$

$= 0.214879$

Appendix - 12

Required Rate or Return, Expected Return, & Price Evaluation of Joint Venture Banks

Name of Bank	Beta	Required rate of return		Expected return	Price evaluation
NABIL Bank	2.0465	0.056486	<	0.396	Under-priced
Himalayan Bank	1.1071	0.0688	<	0.172	Under-priced
Everest Bank	1.4569	0.06427	<	0.3151	Under-priced
SBI Bank	1.555	0.06297	<	0.37	Under-priced

Where,
Risk free rare of return (K_{rf}) = 8.35%
Expected rate of return of Market [($E(r_m)$] = 7.03%

Required Rate of Return of NABIL Bank (RRR_N)

$$RRR_N = K_{rf} + [E(r_m) - K_{rf}) \times \beta_N$$

$$= 8.35 + [7.03 - 8.35] \times 2.0465$$

$$= 5.64862\% \quad = 0.056486$$

Required Rate of Return of Himalayan Bank (RRR_H)

$$RRR_H = K_{rf} + [E(r_m) - K_{rf}) \times \beta_H$$

$$= 8.35 + [7.03 - 8.35] \times 1.1071$$

$$= 6.88\% \quad = 0.0688$$

Required Rate of Return of Everest Bank (RRR_E)

$$RRR_E = K_{rf} + [E(r_m) - K_{rf}) \times \beta_E$$

$$= 8.35 + [7.03 - 8.35] \times 1.4569$$

$$= 6.427\% \quad = 0.06427$$

Required Rate of Return of SBI Bank (RRR_S)

$$RRR_S = K_{rf} + [E(r_m) - K_{rf}) \times \beta_S$$

$$= 8.35 + [7.03 - 8.35] \times 1.555$$

= 6.2974% =0.06297

Interest income / Loan & Advance of Joint Venture Banks

Fiscal Year	**2010/11**	**2010/11**	**2010/11**	**2010/11**
Banks	NABIL Bank	Himalayan Bank	Everest Bank	SBI Bank
Interest/Loan & Advance	12.5%	13.12%	12.22%	11.24%

Appendix - 13

Calculation of Portfolio Risk, Return Covariance between two Join Venture Banks (NABIL Bank and Himalayan Bank)

Fiscal Year	$R_N - E(r_N)$	$R_H - E(r_H)$	$[(R_N - E(r_N) \times (R_H - E(r_H)]$
2006/07	1.845151	0.885134	1.633206
2007/08	0.048554	0.167521	0.008134
2008/09	-0.23459	-0.14669	0.034412
2009/10	-0.80094	-0.61963	0.496286
2010/11	-0.85817	-0.28633	0.24572
			$\sum[(R_N - E(r_N) \times (R_H - E(r_H)] = 2.42$

Covariance between NABIL Bank and Himalayan Bank [$Cov_{(N,H)}$]

$$Cov_{(N,H)} = \frac{\sum[(R_N - E(r_N) \times (R_H - E(r_H)]}{n-1} = \frac{2.42}{5-1} = 0.604439$$

Calculation of Minimum Variance Portfolio

$$W_N = \frac{\sigma_H^2 - \rho_{NH} \times \sigma_N \times \sigma_H}{\sigma_N^2 + \sigma_H^2 - 2 \times \rho_{NH} \times \sigma_N \times \sigma_H} \qquad [Cov_{N,H} = \rho_{NH} \times \sigma_N \times \sigma_H]$$

$$= \frac{0.3249 - 0.604439}{1.21 + 0.3249 - 2 \times 0.604439}$$

$$= \frac{-0.27954}{0.326021} = -0.85743$$

Weight of NABIL Bank (W_N) is **-0.85743**

Weigh of Himalayan Bank (W_H) = 1- W_N = 1 – (-0.85743) = **1.85743**

Expected Return of minimum variance portfolio $E(r_P)$

$E(r_p) = W_N.E(R_N) + W_H.E(R_H)$

$E(r_p) = W_N.I_N + W_H.E(R_H)$ $[I_N = \text{Interest rate}]$

= -0.85743 × 0.125 + 1.85743 × 0.172

= 0.2179

Standard Deviation of minimum variance portfolio (σ_p)

$$\sigma_p = \sqrt{W_N^2.\sigma_N^2 + W_H^2.\sigma_H^2 + 2Cov_{NH}.W_N W_H}$$

$=\sqrt{-0.857^2 \times 1.21 + 1.8574^2 \times 0.3249 + 2 \times 0.6044 \times -0.85743 \times 1.85743}$

= 0.2735

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Calculation of Portfolio Risk, Return Covariance between two Join Venture Banks (NABIL Bank and Everest Bank)

Fiscal Year	$R_N - E(r_N)$	$R_E - E(r_E)$	$[(R_N - E(r_N) \times (R_E - E(r_E)]$
2006/07	1.845151	1.135661	2.095466
2007/08	0.048554	0.285106	0.013843
2008/09	-0.23459	-0.36555	0.085754
2009/10	-0.80094	-0.50524	0.404667
2010/11	-0.85817	-0.55005	0.472036
			$\sum[(R_N - E(r_N) \times (R_E - E(r_E)]=3.072$

Covariance between NABIL Bank and Everest Bank [$Cov_{(N,E)}$]

$$Cov_{(N,E)} = \frac{\sum[(R_N - E(r_N) \times (R_E - E(r_E)]}{n-1} = \frac{3.072}{5-1} = 0.7679$$

Calculation of Minimum Variance Portfolio

$$W_N = \frac{\sigma_E^2 - \rho_{NE} \times \sigma_N \times \sigma_E}{\sigma_N^2 + \sigma_E^2 - 2 \times \rho_{NE} \times \sigma_N \times \sigma_E} [\ Cov_{N,E} = \rho_{NE} \times \sigma_N \times \sigma_E]$$

$$= \frac{0.51562 - 0.7679}{1.21 + 0.51562 - 2 \times 0.679}$$

$$= \frac{-0.252322}{0.36762} = -0.6864$$

Weight of NABIL Bank (W_N) is -0.6864

Weigh of Everest Bank (W_E) = 1- W_N = 1 – (-0.6864) = 1.686

Expected Return of minimum variance portfolio $E(r_P)$

$E(r_p) = W_N.E(R_N) + W_E.E(R_E)$

$E(r_p) = W_N..I_N + W_E.E(R_E)[I_N = \text{Interest rate}]$

= -0.6864 × 0.125 + 1.6864 × 0.3151

= 0.4456

Standard Deviation of minimum variance portfolio (σ_p)

$$\sigma_p = \sqrt{W_N^2.\sigma_N^2 + W_E^2.\sigma_E^2 + 2Cov_{NE}.W_N W_E}$$

$$= \sqrt{-0.6864^2 \times 1.21 + 1.6864^2 \times 0.5156 + 2 \times 0.7679 \times -0.686 \times 1.6864}$$

= 0.5084

Appendix – 15

Calculation of Portfolio Risk, Return Covariance between two Join Venture Banks (NABIL Bank and SBI Bank)

Fiscal Year	$R_N - E(r_N)$	$R_S - E(r_S)$	$[(R_N - E(r_N) \times (R_S - E(r_S)]$
2006/07	1.845151	1.435815	2.649
2007/08	0.048554	-0.0856	-0.00416
2008/09	-0.23459	0.084543	-0.0128
2009/10	-0.80094	-0.94066	0.753412
2010/11	-0.85817	-0.49411	0.42403
			$\sum[(R_N - E(r_N) \times (R_S - E(r_S)]=3.809$

Covariance between NABIL Bank and SBI Bank [$Cov_{(N,S)}$]

$$Cov_{(N,S)} = \frac{\sum[(R_N - E(r_N) \times (R_S - E(r_S)]}{n-1} = \frac{3.809}{5-1} = 0.95245$$

Calculation of Minimum Variance Portfolio

$$W_N = \frac{\sigma_S^2 - \rho_{NS} \times \sigma_N \times \sigma_S}{\sigma_N^2 + \sigma_S^2 - 2 \times \rho_{NS} \times \sigma_N \times \sigma_S} [\, Cov_{N,S} = \rho_{NS} \times \sigma_N \times \sigma_S]$$

$$= \frac{0.80125 - 0.95245}{1.21 + 0.80125 - 2 \times 0.95245}$$

$$= \frac{-0.1512}{0.10635} = -1.42172$$

Weight of NABIL Bank (W_N) is -1.42472

Weigh of SBI Bank (W_S) = 1- W_N = 1 – (-1.42472) = 2.42472

Expected Return of minimum variance portfolio $E(r_P)$

$E(r_p) = W_N.E(R_N) + W_S.E(R_S)$

$E(r_p) = W_N.I_N + W_S.E(R_S)[I_N = \text{Interest rate}]$

= -1.42172 × 0.125 + 2.42472 × 0.37

= 0.7194

Standard Deviation of minimum variance portfolio (σ_p)

$$\sigma_p = \sqrt{W_N^2.\sigma_N^2 + W_S^2.\sigma_S^2 + 2Cov_{NS}.W_N W_S}$$

$$= \sqrt{-1.42172^2 \times 1.21 + 2.42472^2 \times 0.80125 + 2 \times 0.95245 \times -1.42172 \times 2.42472}$$

= 0.76766

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Calculation of Portfolio Risk, Return Covariance between two Join Venture Banks (Everest Bank and Himalayan Bank)

Fiscal Year	$R_E - E(r_E)$	$R_H - E(r_H)$	$[(R_E - E(r_E) \times (R_H - E(r_H)]$
2006/07	1.135661	0.885134	1.005212
2007/08	0.285106	0.167521	0.047761
2008/09	-0.36555	-0.14669	0.053623
2009/10	-0.50524	-0.61963	0.313062
2010/11	-0.55005	-0.28633	0.157496
			$\sum[(R_E - E(r_E) \times (R_H - E(r_H)]=1.577$

Covariance between Everest Bank and Himalayan Bank [$Cov_{(E,H)}$]

$$Cov_{(E,H)} = \frac{\sum[(R_E - E(r_E) \times (R_H - E(r_H)]}{n-1} = \frac{1.577}{5-1} = 0.3943$$

Calculation of Minimum Variance Portfolio

$$W_E = \frac{\sigma_H^2 - \rho_{EH} \times \sigma_E \times \sigma_H}{\sigma_E^2 + \sigma_H^2 - 2 \times \rho_{EH} \times \sigma_E \times \sigma_H} \quad [Cov_{E,H} = \rho_{EH} \times \sigma_E \times \sigma_H]$$

$$= \frac{0.3249 - 0.3943}{0.51562 + 0.3249 - 2 \times 0.3943}$$

$$= \frac{-0.06939}{0.05192} = -1.33645$$

Weight of Everest Bank (W_E) is **-1.33645**

Weigh of Himalayan Bank (W_H) = 1- W_E = 1 – (-1.33645) = **2.33645**

Expected Return of minimum variance portfolio $E(r_P)$

$E(r_p) = W_E.E(R_E) + W_H.E(R_H)$

$E(r_p) = W_E.I_E + W_H.E(R_H)$ $[I_E = \text{Interest rate}]$

$= -1.33645 \times 0.1222 + 2.33645 \times 0.172$

$= 0.2385$

Standard Deviation of minimum variance portfolio (σ_p)

$$\sigma_p = \sqrt{W_E^2.\sigma_E^2 + W_H^2.\sigma_H^2 + 2Cov_{EH}.W_E W_H}$$

=

$$\sqrt{-1.33645^2 \times 0.51562 + 2.33645^2 \times 0.3249 + 2 \times 0.3943 \times -1.33645 \times 2.33645}$$

=0.482

Appendix - 17

Calculation of Portfolio Risk, Return Covariance between two Join Venture Banks (SBI Bank and Himalayan Bank)

Fiscal Year	$R_s - E(r_S)$	$R_H - E(r_H)$	$[(R_S - E(r_S)\times(R_H - E(r_H)]$
2006/07	1.435815	0.885134	1.271
2007/08	-0.0856	0.167521	-0.1434
2008/09	0.084543	-0.14669	-0.0124
2009/10	-0.94066	-0.61963	05829
2010/11	-0.49411	-0.28633	0.14148
			$\sum[(R_S - E(r_S)\times(R_H - E(r_H)]=1.9685$

Covariance between SBI Bank and Himalayan Bank [$Cov_{(S,H)}$]

$$Cov_{(S,H)}= \frac{\sum[(R_S - E(r_S)\times(R_H - E(r_H)]}{n-1} = \frac{1.9685}{5-1} = 0.492122$$

Calculation of Minimum Variance Portfolio

$$w_S = \frac{\sigma_H^2 - \rho_{SH}\times\sigma_E\times\sigma_H}{\sigma_S^2+\sigma_H^2-2\times\rho_{SH}\times\sigma_S\times\sigma_H} \quad [\, Cov_{S,H} = \rho_{SH}\times\sigma_S\times\sigma_H]$$

$$= \frac{0.3249-0.492}{0.80125+0.3249-2\times0.492122}$$

$$= \frac{-0.1671}{0.141906} = -1.17754$$

Weight of SBI Bank (W_S) is **-1.17754**

Weigh of Himalayan Bank (W_H) = 1- W_E = 1 – (-1.17754) = **2.17754**

Expected Return of minimum variance portfolio $E(r_P)$

$E(r_p) = W_S.E(R_S) + W_H.E(R_H)$

$E(r_p) = W_S.I_S + W_H.E(R_H)$ $\quad [I_S = \text{Interest rate}]$

$= -1.17754 \times 0.1124 + 2.17754 \times 0.172$

$= 0.2487$

Standard Deviation of minimum variance portfolio (σ_p)

$$\sigma_p = \sqrt{W_S^2.\sigma_S^2 + W_H^2.\sigma_H^2 + 2Cov_{SH}.W_S W_H}$$

$$= \sqrt{-1.17754^2 \times 0.80125 + 2.17754^2 \times 0.3249 + 2 \times 0.492122 \times -1.17754 \times 2.17754}$$

$=0.35777$

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Calculation of Portfolio Risk, Return Covariance between two Join Venture Banks (SBI Bank and Everest Bank)

Fiscal Year	$R_s - E(r_S)$	$R_E - E(r_E)$	$[(R_S - E(r_S)\times(R_E - E(r_E)]$
2006/07	1.435815	1.135661	1.6306
2007/08	-0.0856	0.285106	-0.02441
2008/09	0.084543	-0.36555	-0.0309
2009/10	-0.94066	-0.50524	0.47526
2010/11	-0.49411	-0.55005	0.27179
			$\sum[(R_S - E(r_S)\times(R_E - E(r_E)]=2.32233$

Covariance between SBI Bank and Everest Bank [$Cov_{(S,E)}$]

$$Cov_{(S,E)}= \frac{\sum[(R_S-E(r_S)\times(R_E-E(r_E)]}{n-1} = \frac{2.322334}{5-1} = 0.580583$$

Calculation of Minimum Variance Portfolio

$$W_S = \frac{\sigma_E^2-\rho_{SE}\times\sigma_E\times\sigma_E}{\sigma_S^2+\sigma_E^2-2\times\rho_{SE}\times\sigma_S\times\sigma_E} [\ Cov_{S,E} = \rho_{SE}\times\sigma_S\times\sigma_E]$$

$$= \frac{0.51562-0.58058}{0.80125+0.51562-2\times0.58058}$$

$$= \frac{-0.06526}{0.19072} = -0.3422$$

Weight of SBI Bank (W_S) is **-0.3422**

Weigh of Everest Bank (W_E) = 1- W_S = 1 – (-0.3422) = **1.3422**

Expected Return of minimum variance portfolio $E(r_P)$

$E(r_p) = W_S.E(R_S) + W_E.E(R_E)$

$E(r_p) = W_S.I_S + W_E.E(R_E)$ $[I_S = \text{Interest rate}]$

= -0.3422× 0.1124 + 1.3422 × 0.3151

= 0.3845

Standard Deviation of minimum variance portfolio (σ_p)

$$\sigma_p = \sqrt{W_S^2.\sigma_S^2 + W_E^2.\sigma_E^2 + 2Cov_{SE}.W_S W_E}$$

$=$

$$\sqrt{-0.3422^2 \times 0.80125 + 1.3422^2 \times 0.51562 + 2 \times 0.58058 \times -0.3422 \times 1.3422}$$

= 0.6289

Minimum variance of portfolio Risk, Return and Co-variance between Banks

S.N.	Portfolio	Weight	Co-variance (Cov.)	Portfolio Return $E(r_p)$	Portfolio Risk (σ_p)
1.	NABIL & Himalayan	W_N = -0.8574 W_H = 1.686	0.6044	0.2179	0.2735
2.	NABIL & Everest	W_N = -0.6864 W_E = 1.6864	0.7679	0.4456	0.5084
3.	NABIL &SBI	W_N = -1.4217 W_S = 2.4247	0.9524	0.7194	0.7677
4.	Himalayan & Everest	W_H = 2.3364 W_E = -1.3364	0.3943	0.2385	0.482
5.	Himalayan & SBI	W_H = 2.17754 W_S = -1.1775	0.49212	0.2487	0.3577
6.	Everest & SBI	W_E = 1.3422 W_s = -0.3422	0.5806	0.3845	0.6289

Appendix - 19

Calculation of optimal risky Portfolio

Portfolio between NABIL Bank and Himalayan Bank

Calculation of Weight

$$\mathbf{W_N = \frac{E(R_N)\sigma_H^2 - E(R_H)Cov_{N.H}}{E(R_N)\sigma_H^2 + E(R_H)\sigma_N^2 - [E(R_N) + E(R_H)]Cov_{N,H}}}$$

Where,

E (R_N) = Excess return on NABIL Bank [i.e. E(r_N) – RF]

E (R_H) = Excess return on Himalayan Bank [i.e. E(r_H) – RF]

$$W_N = \frac{0.3125 \times 0.3249 - 0.0885 \times 0.604439}{0.3125 \times 0.3249 + 0.0885 \times 1.21 - [0.3125 + 0.0885]0.604439}$$

$$= \frac{0.04804}{-0.03376}$$

= -1.42

Weight of NABIL Bank is -1.42

Weight of Himalayan Bank is 1 - W_N = 1 – (-1.42) = 2.42

Expected return of optimal risky portfolio E(r_p)

$E(r_p) = W_N.E(R_N) + W_H.E(R_H)$

$E(r_p) = W_N.I_N + W_H.E(R_H)$ $\quad [I_N = \text{Interest rate}]$

= -1.42×0.125 + 2.42×0.172

= 0.2387

Standard Deviation of optimal risky portfolio (σ_p)

$$\sigma_p = \sqrt{W_N^2.\sigma_N^2 + W_H^2.\sigma_H^2 + 2Cov_{NH}.W_N W_H}$$

$$= \sqrt{-1.42^2 \times 1.21 + 2.42^2 \times 0.3249 + 2 \times 0.604439 \times -1.42 \times 2.42}$$

= 0.4339

$$\text{Slope} = \frac{E(rp) - RF}{\sigma_p} = \frac{0.2387 - 0.0835}{0.4339} = 0.3577$$

Appendix - 20

Portfolio between NABIL Bank and Everest Bank

Calculation of Weight

$$\mathbf{W_N = \frac{E(R_N)\sigma_E^2 - E(R_E)Cov_{N.E}}{E(R_N)\sigma_E^2 + E(R_E)\sigma_N^2 - [E(R_N) + E(R_E)]Cov_{N,E}}}$$

Where,

E (R_N) = Excess return on NABIL Bank [i.e. E(r_N) – RF]

E (R_E) = Excess return on Everest Bank [i.e. E(r_E) – RF]

$$= \frac{0.3125 \times 0.51562 - 0.2316 \times 0.7679}{0.3125 \times 0.51562 + 0.2316 \times 1.21 - [0.3125 + 0.2316] \times 0.7679}$$

$$= \frac{-0.0167}{0.02355}$$

= -0.7091

Weight of NABIL Bank is -0.7091

Weight of Everest Bank is $1 - W_N = 1 - (-0.7091) = 1.7091$

Expected return of optimal risky portfolio E(r_p)

$E(r_p) = W_N.E(R_N) + W_E.E(R_E)$

$E(r_p) = W_N..I_N + W_E.E(R_E)[I_N = \text{Interest rate}]$

$= -0.7091 \times 0.125 + 1.7091 \times 0.3151$

$= 0.45$

Standard Deviation of optimal risky portfolio (σ_p)

$$\sigma_p = \sqrt{W_N^2.\sigma_N^2 + W_E^2.\sigma_E^2 + 2Cov_{NE}.W_N W_E}$$

$$= \sqrt{-0.7091^2 \times 1.21 + 1.7091^2 \times 0.51562 + 2 \times 0.7679 \times -0.7091 \times 1.7091}$$

= 0.5045

$$\text{Slope} = \frac{E(rp) - RF}{\sigma_p} = \frac{0.45 - 0.0835}{0.5045} = 0.7265$$

Appendix - 21

Portfolio between NABIL Bank and SBI Bank

Calculation of Weight

$$\mathbf{W_N = \frac{E(R_N)\sigma_S^2 - E(R_S)Cov_{N.S}}{E(R_N)\sigma_S^2 + E(R_S)\sigma_N^2 - [E(R_N) + E(R_S)]Cov_{N,S}}}$$

Where,

E (R_N) = Excess return on NABIL Bank [i.e. E(r_N) – RF]

E (R_S) = Excess return on SBI Bank [i.e. E(r_S) – RF]

$$= \frac{0.3125 \times 0.80125 - 0.2865 \times 0.95245}{0.3125 \times 0.80125 + 0.2865 \times 1.21 - [0.3125 + 0.2865] \times 0.95245}$$

$$= \frac{-0.02249}{0.026537}$$

= -0.84749

Weight of NABIL Bank is -0.84749

Weight of SBI Bank is **1- W_N** = 1 – (-0.84749) = 1.84749

Expected return of optimal risky portfolio $E(r_p)$

$E(r_p) = W_N.E(R_N) + W_S.E(R_S)$

$E(r_p) = W_N.I_N + W_S.E(R_S)[I_N = \text{Interest rate}]$

= -0.84749×0.125 + 1.84749×0.37

= 0.577

Standard Deviation of optimal risky portfolio (σ_p)

$$\sigma_p = \sqrt{W_N^2.\sigma_N^2 + W_S^2.\sigma_S^2 + 2Cov_{NS}.W_N W_S}$$

$$= \sqrt{-0.84749^2 \times 1.21 + 1.84749^2 \times 0.80125 + 2 \times 0.95245 \times -0.84749 \times 1.84749}$$

= 0.788

$$\text{Slope} = \frac{E(rp) - RF}{\sigma_p} = \frac{0.577 - 0.0835}{0.788} = 0.6263$$

Appendix - 22

Portfolio between Everest Bank and Himalayan Bank

Calculation of Weight

$$\mathbf{W_H = \frac{E(R_H)\sigma_E^2 - E(R_E)Cov_{E.H}}{E(R_H)\sigma_E^2 + E(R_E)\sigma_H^2 - [E(R_H) + E(R_E)]Cov_{E.H}}}$$

Where,

E (R_E) = Excess return on Everest Bank [i.e. E(r_E) – RF]

E (R_H) = Excess return on Himalayan Bank [i.e. E(r_H) – RF]

$$= \frac{0.0885 \times 0.51562 - 0.2316 \times 0.3943}{0.0885 \times 0.51562 + 0.2316 \times 0.3249 - [0.0885 + 0.2316] \times 0.3943}$$

$$= \frac{-0.0456875}{-0.00533643}$$

= 8.561

Weight of Himalayan Bank is 8.561

Weight of Everest Bank is **1 -W_H = 1 – 8.561 = -7.561**

Expected return of optimal risky portfolio $E(r_p)$

$E(r_p) = W_E.E(R_E) + W_H.E(R_H)$

$E(r_p) = W_E.I_E + W_H.E(R_H)$ $[I_E = \text{Interest rate}]$

= -7.561×0.1222 +8.561×0.172

= 0.54854

Standard Deviation of optimal risky portfolio (σ_p)

$$\sigma_p = \sqrt{W_E^2.\sigma_E^2 + W_H^2.\sigma_H^2 + 2Cov_{EH}.W_E W_H}$$

$$= \sqrt{-7.561^2 \times 0.51562 + 8.561^2 \times 0.3249 + 2 \times 0.3943 \times -7.561 \times 8.561}$$

= 1.497

$$\text{Slope} = \frac{E(rp) - RF}{\sigma_p} = \frac{0.54854 - 0.0835}{1.497} = 0.311$$

Appendix - 23

Portfolio between SBI Bank and Himalayan Bank

Calculation of Weight

$$\mathbf{W_H = \frac{E(R_H)\sigma_S^2 - E(R_S)Cov_{S.H}}{E(R_H)\sigma_S^2 + E(R_S)\sigma_H^2 - [E(R_H) + E(R_S)]Cov_{S.H}}}$$

Where,

E (R_S) = Excess return on SBI Bank [i.e. $E(r_E)$ – RF]

E (R_H) = Excess return on Himalayan Bank [i.e. $E(r_H)$ – RF]

$$= \frac{0.0885 \times 0.80125 - 0.2865 \times 0.492122}{0.0885 \times 0.80125 + 0.2865 \times 0.3249 - [0.0885 + 0.2865] \times 0.492122}$$

$$= \frac{-0.07008}{-0.020555}$$

= 3.4094

Weight of Himalayan Bank is 3.4094

Weight of SBI Bank is **$1 - W_H = 1 - 3.4094 = -2.4094$**

Expected return of optimal risky portfolio $E(r_p)$

$E(r_p) = W_S.E(R_S) + W_H.E(R_H)$

$E(r_p) = W_S.I_S + W_H.E(R_H)$ $[I_S = \text{Interest rate}]$

$= -2.4094 \times 11.24 + 3.4094 \times 0.172$

$= 0.3156$

Standard Deviation of optimal risky portfolio (σ_p)

$$\sigma_p = \sqrt{W_S^2.\sigma_S^2 + W_H^2.\sigma_H^2 + 2Cov_{SH}.W_S W_H}$$

$$= \sqrt{-2.4094^2 \times 0.80125 + 3.4094^2 \times 0.3249 + 2 \times 0.492122 \times -2.4094 \times 3.4094}$$

$= 0.5855$

$$\text{Slope} = \frac{E(rp) - RF}{\sigma_p} = \frac{0.3156 - 0.0835}{0.5855} = 0.3964$$

Appendix - 24

Portfolio between SBI Bank and Everest Bank

Calculation of Weight

$$\mathbf{W_E = \frac{E(R_E)\sigma_S^2 - E(R_S)Cov_{S.E}}{E(R_E)\sigma_S^2 + E(R_S)\sigma_E^2 - [E(R_E) + E(R_S)]Cov_{S.E}}}$$

Where,

$E(R_S)$ = Excess return on SBI Bank [i.e. $E(r_E) - RF$]

$E(R_E)$ = Excess return on Everest Bank [i.e. $E(r_E) - RF$]

$$= \frac{0.2316 \times 0.80125 - 0.2865 \times 0.580583}{0.2316 \times 0.80125 + 0.2865 \times 0.51562 - [0.2316 + 0.2865] \times 0.580583}$$

$$= \frac{0.01923}{0.03248}$$

$= 0.59205$

Weight of Everest Bank is 0.59205

Weight of SBI Bank is **1 - W_E = 1 – 0.59205 = 0.4079**

Expected return of optimal risky portfolio $E(r_p)$

$E(r_p) = W_S.E(R_S) + W_E.E(R_E)$

$= 0.4079 \times 0.37 + 0.59205 \times 0.3151$

$= 0.3374$

Standard Deviation of optimal risky portfolio (σ_p)

$$\sigma_p = \sqrt{W_S^2.\sigma_S^2 + W_E^2.\sigma_E^2 + 2Cov_{SE}.W_S W_E}$$

$$= \sqrt{0.4079^2 \times 0.80125 + 0.59205^2 \times 0.51562 + 2 \times 0.58058 \times 0.4079 \times 0.59205}$$

$= 0.7710$

$$\text{Slope} = \frac{E(rp) - RF}{\sigma_p} = \frac{0.3374 - 0.0835}{0.7710} = 0.329$$

Optimal risky of portfolio Risk, Return and Co-variance between Banks

S.N.	Portfolio	Weight	Portfolio Return $E(r_p)$	Portfolio Risk (σ_p)	Slope
1.	NABIL & Himalayan	W_N = -1.42 W_H = 2.42	0.2387	0.4339	0.3577
2.	NABIL & Everest	W_N = -0.7091 W_E = 1.7091	0.45	0.5045	0.7265
3.	NABIL &SBI	W_N = -0.8475 W_S = 1.8475	0.577	0.788	0.6263
4.	Himalayan & Everest	W_H = 8.561 W_E = -7.561	0.5485	1.497	0.311

5.	Himalayan & SBI	W_H = 3.4094 W_S = -2.4094	0.3156	0.5855	0.3964
6.	Everest & SBI	W_E = 0.59205 W_s = 0.4079	0.3374	0.7710	0.329

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Calculation of correlation between Banks

Correlation between NABIL Bank and Himalayan Bank (ρ_{NH})

$$\rho_{NH} = \frac{\text{Cov}_{\text{N.H}}}{\sigma_N \times \sigma_H}$$

$$= \frac{0.604439}{1.1 \times 0.57}$$

= 0.9640

Correlation between NABIL Bank and Everest Bank (ρ_{NE})

$$\rho_{NE} = \frac{\text{Cov}_{\text{N.E}}}{\sigma_N \times \sigma_E}$$

$$= \frac{0.7679}{1.1 \times 0.7181}$$

= 0.972136

Correlation between NABIL Bank and SBI Bank (ρ_{NS})

$$\rho_{N.S} = \frac{\text{Cov}_{\text{N.S}}}{\sigma_N \times \sigma_S}$$

$$= \frac{0.95245}{1.1 \times 0.895}$$

= 0.967445

Correlation between Everest Bank and Himalayan Bank (ρ_{EH})

$$\rho_{E.H} = \frac{\text{Cov}_{\text{E.H}}}{\sigma_E \times \sigma_H}$$

$$= \frac{0.3943}{0.7181 \times 0.57}$$

= 0.963312

Correlation between SBI Bank and Himalayan Bank ($\rho_{S.H}$)

$$\rho_{S.H} = \frac{\text{Cov}_{\text{S.H}}}{\sigma_S \times \sigma_H}$$

$$= \frac{0.492122}{0.895 \times 0.57}$$

= 0.964661

Correlation between SBI Bank and Everest Bank ($\rho_{S.E}$)

$$\rho_{S.E} = \frac{\text{Cov}_{\text{S.E}}}{\sigma_S \times \sigma_E}$$

$$= \frac{0.580583}{0.895 \times 0.7181}$$

= 0.903351

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Measurement of Portfolio Performance

(a) Sharpe's portfolio performance measurement

S.N.	Portfolio	$E(r_p)$	$E(R_f)$	σ_p	S_p
1	NABIL and Himalayan	0.2179	0.0614	0.2735	0.5722
2	NABIL and Everest	0.4456	0.0614	0.5084	0.7557
3	NABIL and SBI	0.7194	0.0614	0.7677	0.8571
4	Everest and Himalayan	0.2385	0.0614	0.482	0.3674

5	SBI and Himalayan	0.2487	0.0614	0.3577	0.5236
6	SBI and Everest	0.3845	0.0614	0.6289	0.5137

$$E(R_f) = \frac{R_{f1} + R_{f2} + R_{f3} + R_{f4} + R_{f5}}{N}$$

$$= \frac{3.50 + 5.22 + 6.05 + 7.60 + 8.35}{5}$$

= 6.14 i.e. 0.0614

Sharpe' portfolio performance of portfolio 1st

$$S_p = \frac{E(r_p) - E(R_f)}{\sigma_p} = \frac{0.2179 - 0.0614}{0.2735} = 0.5722$$

Sharpe's portfoio performance of portfolio 2nd

$$S_p = \frac{E(r_p) - E(R_f)}{\sigma_p} = \frac{0.4456 - 0.0614}{0.5084} = 0.7557$$

Sharpe's portfoio performance of portfolio 3rd

$$S_p = \frac{E(r_p) - E(R_f)}{\sigma_p} = \frac{0.7194 - 0.0614}{0.7677} = 0.8571$$

Sharpe's portfoio performance of portfolio 4th

$$S_p = \frac{E(r_p) - E(R_f)}{\sigma_p} = \frac{0.2385 - 0.0614}{0.482} = 0.3674$$

Sharpe's portfoio performance of portfolio 5th

$$S_p = \frac{E(r_p) - E(R_f)}{\sigma_p} = \frac{0.2487 - 0.0614}{0.3577} = 0.5236$$

Sharpe's portfoio performance of portfolio 6th

$$S_p = \frac{E(r_p) - E(R_f)}{\sigma_p} = \frac{0.3845 - 0.0614}{0.6289} = 0.5137$$

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(b) Treynor's portfolio performance measurement (T_p)

S.N.	Portfolio	$E(r_p)$	$E(R_f)$	β_p	$T_p = \frac{E(r_p) - E(R_f)}{\beta_p}$
1	NABIL and Himalayan	0.2179	0.0614	0.30165	0.5188
2	NABIL and Everest	0.4456	0.0614	1.05	0.3659
3	NABIL and SBI	0.7194	0.0614	0.861	0.7642
4	Everest and Himalayan	0.2385	0.0614	0.6396	0.2768
5	SBI and Himalayan	0.2487	0.0614	0.5797	0.3231
6	SBI and Everest	0.3845	0.0614	1.423	0.2270

Calculation of Beta of portfolio NABIL Bank and Himalayan Bank (β_p)

$= W_N \times \beta_N + W_H \times \beta_H$

$= -0.8574 \times 2.0465 + 1.8574 \times 1.1071$

$= 0.30165$

Calculation of Beta of portfolio NABIL Bank and Everest Bank (β_p)

$= W_N \times \beta_N + W_E \times \beta_E$

$= -0.6864 \times 2.0465 + 1.6864 \times 1.4569$

$= 1.05$

Calculation of Beta of portfolio NABIL Bank and SBI Bank (β_p)

$= W_N \times \beta_N + W_S \times \beta_S$

$= -1.4217 \times 2.0465 + 2.4247 \times 1.555$

$= 0.861$

Calculation of Beta of portfolio Everest Bank and Himalayan Bank (β_p)

$= W_E \times \beta_E + W_H \times \beta_H$

$= -1.3364 \times 1.4569 + 2.3364 \times 1.1071$

$= 0.6396$

Calculation of Beta of portfolio SBI Bank and Himalayan Bank (β_p)

$= W_S \times \beta_S + W_H \times \beta_H$

$= -1.1775 \times 1.555 + 2.1775 \times 1.1071$

$= 0.5797$

Calculation of Beta of portfolio Everest Bank and SBI Bank (β_p)

$= W_E \times \beta_E + W_S \times \beta_S$

$= 1.3422 \times 1.4569 + (-0.3422) \times 1.555$

$= 1.423$

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(C)Jensen's portfolio performance measurement (J_p)

S.N.	Portfolio	β_p	$\acute{\alpha}_p$	Evaluation	$Jp = \frac{\acute{\alpha}p}{\beta p}$	Rank
1.	NABIL and Himalayan	0.30165	0.1538	Under valued	0.50986	2nd
2.	NABIL and Everest	1.05	0.37486	Under valued	0.3570	3rd
3.	NABIL and SBI	0.861	0.6503	Under valued	0.7553	1st
4.	Everest and Himalayan	0.6396	0.17141	Under valued	0.268	5th
5.	SBI and Himalayan	0.5797	0.18214	Under valued	0.3142	4th
6.	Everest and SBI	1.423	0.3104	Under valued	0.21813	6th

Calculation of $\acute{\alpha}_p$ of portfolio NABIL Bank and Himalayan Bank

$(\acute{\alpha}_p) = E(r_p) - [R_f + \beta_p[E(r_m) - R_f]$

$= 0.2179 - [0.0614 + 0.30165\{0.0703 - 0.0614\}]$

$= 0.2179 - 0.064084$

$= 0.1538$

Calculation of $\acute{\alpha}_p$ of portfolio NABIL Bank and Everest Bank

$(\acute{\alpha}_p) = E(r_p) - [R_f + \beta_p[E(r_m) - R_f]$

$= 0.4456 - [0.0614 + 1.05\{0.0703 - 0.0614\}]$

$= 0.4456 - 0.070745$

= 0.374855

Calculation of $\acute{\alpha}_p$ of portfolio NABIL Bank and SBI Bank

$(\acute{\alpha}_p) = E(r_p) – [R_f + \beta_p[E(r_m) - R_f]$

= 0.7194 – [0.0614 + 0.861{0.0703 – 0.0614}]

= 0.7194 – 0.0691

= 0.6503

Calculation of $\acute{\alpha}_p$ of portfolio Everest Bank and Himalayan Bank

$(\acute{\alpha}_p) = E(r_p) – [R_f + \beta_p[E(r_m) - R_f]$

= 0.2385 – [0.0614 +0.6396{0.0703 – 0.0614}]

= 0.2385 – 0.0671

= 0.17141

Calculation of $\acute{\alpha}_p$ of portfolio SBI Bank and Himalayan Bank

$(\acute{\alpha}_p) = E(r_p) – [R_f + \beta_p[E(r_m) - R_f]$

= 0.2487 – [0.0614 + 0.5797{0.0703 – 0.0614}]

= 0.2487 –0.06656

= 0.18214

Calculation of $\acute{\alpha}_p$ of portfolio SBI Bank and Everest Bank

$(\acute{\alpha}_p) = E(r_p) – [R_f + \beta_p[E(r_m) - R_f]$

= 0.3845 – [0.0614 **+** 1.423{0.0703 – 0.0614}]

= 0.3845 – 0.0741

= 0.3104