PORTFOLIO ANALYSIS OF NEPALESE COMMERCIAL BANKS

A Thesis

Submitted

By

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I certify that the work in this thesis has not previously been submitted for a degree nor has it been submitted as part of requirements for a degree except as fully acknowledged within the text.

I also certify that the thesis has been written by me. Any help that I have received in my research work and the preparation of the thesis itself has been acknowledged. In addition, I certify that all information sources and literature used are indicated in the reference section of the thesis.

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We, the undersigned, have examined the thesis entitled PORTFOLIO ANALYSIS OF NEPALESE COMMERCIAL BANKS presented by Sushma Kafle candidate for the degree of Master of Business Studies (MBS) and conducted the viva voce examination of the candidate. We hereby certify that the thesis is worthy of acceptance.

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RECOMMENDATION LETTER

It is certified that thesis entitled "PORTFOLIO ANALYSIS OF NEPALESE COMMERCIAL BANKS" submitted by Sushma Kafle is an original piece of research work carried out by the candidate under my supervision. Literary presentation is satisfactory and the thesis is in a form suitable for publication. Work evinces the capacity of the candidate for critical examination and independent judgment. Candidate has put in at least 60 days after registering the proposal. The thesis is forwarded for examination.

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ABBREVIATIONS

A/C	:	Account
ATM	:	Automatic Teller Machine
B.S.	:	Bikram Sambat
BOKL	:	Bank of Kathmandu Limited
C.V.	:	Coefficient of Variation
CRR	:	Cash Reserve Ratio
e.g.	:	For Example
EBL	:	Everest Bank Limited
etc.	:	Etcetera
F.C	:	Foreign Currency
F/Y	:	Fiscal Year
Govt.	:	Government
HBL	:	Himalyan Bank Limited
IBRD	:	International Bank for Reconstruction and Development
IMF	:	International Monetary Fund
N.G.	:	Nepal Government
NBB	:	Nepal Bangladesh Bank Limited
NBL	:	Nepal Bank Limited
NEPSE	:	Nepal Stock Exchange
NIBL	:	Nepal Investment Bank Limited
NICA	:	NIC Asia Bank Limited

NRB	:	Nepal Rastra Bank
NSBI	:	Nepal SBI Bank Limited
P.E.	:	Probable Error
P/L	:	Profit and Loss
PF	:	Provident Fund
RBB	:	Rastriya Banijya Bank
Rs.	:	Rupees
S.D.	:	Standard Deviation
SCBNL:	Standard Chartered Bank Nepal Limited	
T.T.	:	Telegraphic Transfer

ABSTRACTS

Investment portfolio refers to an investment that combines several assets. Investment portfolio is one which the income or profit of the banks depend upon directly. Investment portfolio usually offers the advantage of reducing risk through diversification of risk from risky investment to less risky investment. The objective of portfolio is to develop a portfolio that has the maximum return at whatever level of risk. The investment portfolio is the tool which helps to reduce risk and maximize return. The banks should never invest its funds in those securities; difference may cause a great loss. The bank should accept that type of securities which are commercial, durable, marketable stable, transferable and high market price. Any country depends upon the economic development for developing the country. To strengthen, the economy of any country both the private and public sector should play a great role, which contributing to our nation. The process of the economic development depends upon various factors, however economists are now convinced that capital formation and its proper utilization plays a paramount role for rapid economic development. All the economic activities of each and every country are greatly influenced by the commercial banking business of the country.

Banks are an essential part of the business activities which are established to safe guard people's money and there by using the money in making loans and investments. CBs collects scattered financial resources from the masses and invests them among those engaged in commercial and economical activities of the country. CBs are those financial institutions deal in accepting deposits to persons and institutions and giving loans against securities and it also provide technical and administrative assistance to industries, trade and business enterprises. CBs are defined as a bank is a financial institution, which performs widest range of economic and financial functions of any business firm in the economy. CBs plays vital role for development of a developing country. Banks provides internal resources for developing country's economy. For the fulfillments of the objectives of the study many analysis has been done such as operation of CBs, investment and loan and advance portfolio, risk and return analysis, portfolio risk and return on investment, ratio analysis, trend analysis, portfolio performance test and hypothesis test. For the analysis mainly secondary data are used, which is collected from concerned banks, NRB, NEPSE, SEBON.

CHAPTER I

INTRODUCTION

1.1 Background of the Study

Portfolio investment is the management of portfolio during the investment in financial assets, i.e. process of finding optimal portfolio from lot of financial assets is known as portfolio investment. Portfolio Investment is a tool which helps for proper utilization of resources. “Portfolio investment refers to an investment that combines several assets. The modern portfolio theory explains the relationship between assets risk and return. The theory is founded on the mechanics of measuring the effect of an asset on risk and return of portfolio. Portfolio investment assumes that the mean and variance of returns are the only two factors that the investor cares. Based on this assumption, the rational investor always prefers the highest possible return for a given level of risk or the lowest possible level of risk for a given amount of return. Portfolio, technically known as efficient portfolio, which is also termed as superior portfolio, the efficient portfolios not only do the function of risk and return of individual asset but also the effect of relationship among the asset on the sum total of portfolio risk and return. The portfolio return is straight weighted average of the individual asset. But the portfolio risk is not the weighted average of the variances of return of individual assets. The portfolio risk is affected by the variance of return as well as the covariance between the return of individual assets included in the portfolio and their respective weights (Thapa, 2017).

Investment is a word of many meanings. If new investment concepts evolve and take a root, the whole investment scene could be changed dramatically over the next few years. Everyday usage of the term investment can mean a variety of things, but to the general mass it usually refers to a money commitment of some sort. For example, a commitment of money in investment from an individual’s point of view is very familiar since no rate of return is involved, nor is a financial return or capital growth expected. All investment choices are made at the points of time in respect of personal investment ends and in contemplation of an uncertain future. Because and insofar as investment in securities are revocable as the

investment ends of persons are transient and the environment is fluid, as the reliable bases for reasoned expectations become more and more vague as one conceives of the further distant future, investors in securities will from time to time reappraise and reevaluate their various investment commitments in the light of new information and (perhaps) changed expectations and ends (Thapa, 2017).

Investment choices (decisions) are found to be outcomes of three different but related classes of factors. The first is factual or informational premises. The factual premises of investment decisions are provided by many streams of data which, taken together, represent to an investor the observable environment and the general and particular features of the securities and firms in which he may invest. The second classes of factors entering into investment are as expectation premises. Expectations relating to the outcomes of alternative investment are subjective and hypothetical in any case but their foundations are necessarily provided by the environmental and financial facts available to investors. These limit not only the range of investments, which may be undertaken, but also the expectations of outcomes that may legitimately be entertained. The third and final classes of factors are valuable premises (Bhole, 2015).

For investors generally these comprise the structure of subjective preferences for the size and regularity of the income to be received from, and for the safety and negotiability of, specific investments or combinations of investments, as these are appraised from time to time. When the analysis passes from the stage of description to the higher stage of security selection his frame of reference widens. He now considers not only securities but security holders as well. In the formulation of a program for the acquisition and management of a security portfolio, the first and most basic step is to distinguish clearly between investment and speculation (Kolb, 2007).

Investment means all exchange of financial claims stocks and bonds. It is often raised by the investors to differentiate between the pseudo investment concept of the consumer and the real investment of the businessman. For many years finance and investment have encompassed the three major areas of spending in the aggregate economy as stated in equation. Key to successful investment investing involves examination and analysis of three chronological segments of the business's operation past performance, present condition and future prospects (Shrestha, 2002).

Adequate diversification means assortment of investment commitments in different ways. Those who are riot familiar with the aggressive – defensive approach nevertheless often carry out the theory of hedging against inflation – deflation. Diversification may be geographical

wherever possible because regional or local storms, floods, droughts etc. can cause extensive real estate damage. Vertical and horizontal diversification can also be opted for the same. Vertical diversification occurs when securities of various companies engaged in different phases of production from raw material to finished goods are held in the portfolio (Ghimire, 2017).

On the other hand, horizontal diversification is the holding by an investor of various companies all of which carry oil an activity in the same stage of production. Another way to diversify securities is to classify them according to bonds and stocks and reclassify according to types of bonds and types of stocks. Again, they can also be classified according to the issuers, according to the dividend or invest income dates, according to the products which are made by the firms represented by the securities. An investment is a liquid asset if it can be converted into cash without delay at full market value in any quantity (Francis, 2011).

For an investment to be liquid it must be (1) reversible (2) marketable. The difference between reversible and marketability is that is the process whereby the transaction is reversed or terminated while marketability involves the sale of the investment in the market for cash. To meet emergencies, every investor must have a sound portfolio to be sure for the additional fund, which may be needed for the business opportunities. Whether money rising is to be done by sale or by borrowing it will be easier if the portfolio contains a planned proportion of high – grade and readily saleable investment. The old adage, “If you don’t know where you’re going, any road will do” aptly applies to investing. Whether an investor is an individual or represents an institution, without a clear sense of why investment are being made and how long-run goals are to be achieved, he or she is likely to pursue inefficient approaches that lead to unsatisfactory results. An investor needs a plan that directs his or her efforts, that plan is called an investment policy (Bhalla, 2009).

Investment policy is a combination of philosophy and planning. On the one hand, it expresses the investor’s attitudes towards important investment management issues such as, “why am I investing in the first place?” or “to what extent am I willing to accept the possibility of large losses?” The answers to those questions will vary among investors in accordance with their financial circumstances and temperaments. Investment policy is also a form of long range

strategic planning. It delineates the investor's specific goals and how the investor expects those goals to be realized. In this sense, investment policy comprises the set of guidelines and procedures that direct the long-term management of the investor's assets (Alaxander, 2015).

Essentially, any relatively permanent set of procedures that guide the management of a plan's assets fall under the rubric of investment policy. Majority of the securities available for investment have uncertain outflows and are thus risky. Investors thus always feel complicated to determine which particular risky securities to own. Source of risk can be diversified away by combining the asset with a portfolio of other assets. This reduction in total risk resulting from combining securities into a portfolio is called portfolio effect. In addition, same complication may be felt while selecting the optimal portfolio from a set of possible portfolios. Hence it is often referred to as the portfolio selection problem. Harry M. Markowitz developed one solution to this problem in 1952.

1.1.1 Development of Capital Market in Nepal

Capital market in Nepal is in infancy. Stock investment practices in Nepal developed after the establishment of Biratnagar Jute Mills Limited and Nepal Bank Limited in 1937. Till 1980s, the majority of the share issuing company would belong to the ownership of government. Initial public offering was hardly found in practice and funds were collected through the direct placement of bonds. The prime objective of raising the funds would be the development of the infrastructure and public welfare programs. It has helped flourishing the primary government bond market. On the other hand the shares of Nepal Bank Limited were in existence but limited to the ownership of Ranas. In 1962, government issued treasury bills for the first time to finance the infrastructure development it is followed by the issuance of development bonds in 1964. Trading of government bonds have always felt a scarcity of capital market and in 1964, Industrial Policy was promulgated. This policy has opened the doors for the establishment of an institution named Security Market Centre (SMC) in 1977 with its primary aim of developing the capital market for government securities in the country under the joint effort of Nepal Rastra Bank (NRB) and Nepal Industrial Development Corporation (NIDC). It was converted into Security Exchange Center in 1976. Security Exchange Act (SEA) was approved by legislature and came into existence with effect from

13th April 1984. The former Securities Exchange Center was converted into Nepal Stock Exchange with the major objective to arrange marketability and liquidity to the government and corporate securities. Floor trading through market intermediaries such as brokers and market makers has also evolved. Restoration of democracy following the political movement of 1990 has brought lots of reforms in the financial sector. Liberalization in the real sense was initiated. Nepal launched 'extended structural adjustment program' in 1992 by taking 'extended structural adjustment facility' (ESAF) through first amendment in the SEA. This has led to the establishment of Securities Board (SEBO) and it was given the responsibility of regulating and developing the transaction of securities whereas NEPSE to facilitate the transactions of stock and bonds in the floor through its member intermediaries. NEPSE presently has 27 brokers and 11 issue managers and 2 portfolio managers, i.e., dealer secondary market. Currently there are 108 listed companies (Thapa, 2017).

1.2 Statement of the Problem

Investments are made for positive returns; however, abundances of risk factors may turn returns to negative. Thus, prior to investments in stocks, a sensitive study on the potential investment is required. Price of stocks is market sensitive. Nominal degree of signaling effect will be playing freely in stock market causing a high degree of fluctuation in the stock price. Therefore, market sometimes turns to bullish and sometimes to bearish. Speculative motive of an individual is thus affected by such market characteristics. Apart from this, the dividend policy of the bank including the bonus issue, rights issue and the stock split too affects the price of share.

Returns on the stock are the summation of dividend yield and capital gain yield. However, most of the investors do feel that the higher the value of stock, higher is profitable in the stock investment and vice-versa and dividend at that time is ignored. Thus to make a rational decision on the investment in the assets, its dividend yield should also be considered. Dividend yield is the collective return realized as cash and/or bonus shares.

On the other hand, investment practices of stock investors are very limited in Nepal. Lack of information and knowledge has been the main constraints. Therefore, the chances of being manipulated and exploited by the financial institution and market

intermediaries are in its peak. Thus they tend to avoid the risk and are often reluctant to tie their savings into the long-term commitment. Moreover, common stock investment can be hazardous incase of insufficient knowledge of its behavior. In the mean time there are no separate institutions providing required information to make rational decision that can accelerate the stock investment and market efficiency. Government policy in this regard is found less encouraging.

Combination of assets is the portfolio. Optimal portfolio is the combination which provide the highest possible return for any specified degree of risk or the lowest possible risk for any specified rate of return and the fundamental aspect of portfolio theory is the idea that the risk inherent in any single asset held in a portfolio is different from the risk of that asset held in isolation. But this theory actually may not be applicable in the capital market like Nepal where the market is inefficient.

Since studies on such subject matter are limited and available studies are also not sufficient enough especially in case of different listed commercial banks of NEPSE. The topic entitled "Portfolio Management in Nepal: A Case Study of Listed Commercial Banks in Nepal" has, therefore, been identified as the key problem of the present study.

i. What is the risk and return analysis of sample banks?
ii. What is the risk parameter of sample banks?
iii. What is the true beta and true alpha of sample banks?
iv. What is the investment performance evaluation of sample banks?

1.3 Objectives of the Study

The broad objective of the study is to examine the portfolio management of listed commercial banks in NEPSE. However the objective has been subdivided into following specific objectives:

i. To anlayze the risk and return analysis of sample banks.
ii. To study the risk parameter of sample banks.
iii. To examine the true beta and true alpha of sample banks.
iv. To analyze the investment performance evaluation of sample banks.

1.4 Significance of the Study

Establishment of Nepal Stock Exchange (NEPSE) in 1993 has made numbers of Nepalese passive investors, who would prefer to invest either in gold or bank account or property, aware of stocks. Investors' shares practices can, thus, be said to have actively evolved only after its formation. Up till now, there are more than 100 companies listed in NEPSE for shares trading purposes. Listing of the new companies has increased competition, thereby, increasing the investment sectors too. However, nature of the firms, the trading of shares too varies or investors will have variety of perspective towards the companies.Investing in a single asset is highly risky. Risk of single security can be reduced dramatically by diversifying the investment. However the security's return will be the same whether held in isolation or in a portfolio. Diversification substantially reduces risk with little impact on potential returns.

The present study attempts to address upon the selection of the assets for the construction of portfolio. For better diversification, it is important to match the investment characteristics of various asset categories to the risk and return characteristics in efficient manner that could maximize return and minimize risk. Risk tolerance, return need, time horizon should also be analyzes which vary among different individuals. While allocating the assets for a portfolio, an investor should compare the relationship between the assets. Their realized return, expected return should be taken into account and correlation between the securities provides the possibilities of eliminating some risk without reducing potential returns. The present study also clarifies that that stocks with negative correlation can form the portfolio of the securities that can reduce unsystematic risk up to zero.

1.5 Limitations of the Study

This study concerns only with following companies, hence, not applicable for any other institutions with similar nature of work.

i. Five years data is taken from 2013/14 to 2017/18.
ii. Only 10 banks are selected for sample which does not cover all banks.

iii. Optimal portfolio identified in the present study is merely on sampling basis, thus the optimal portfolio in the real practice may be different than what is taken in the present study.
iv. Dividend yield realized from the right issue has not been considered.
v. Stocks or security refer to common stocks.

1.6 ORGANIZATION OF THE STUDY

The study has been organized into five chapters. They are as follows:

Chapter I: Introduction

This is the introductory chapter, which has covered background of the study, focus of the study, statement of the problem, objectives of the study, significance of the study etc.

Chapter II: Review of Literature

This chapter has included conceptual framework i.e. theoretical analysis and review of related different studies. In this chapter has been also considered that how this present studies are different from previous studies.

Chapter III: Methodology

This chapter has dealt with the research design, population and sample, sources of data, data collection techniques and data analysis tools (financial tools and statistical tools) and methods of analysis and presentations.

Chapter IV: Results

This chapter describes the research methodology employed in the study. It will include secondary data and primary data presentation, data analysis, interpretation, testing of hypothesis and major finding.

Chapter V: Conclusion

The last chapter states the summaries, conclusion of the whole study and recommendations. It also offers several avenues for future research. The exhibits and bibliography are incorporated at the end of the study.

CHAPTER II

LITERATURE REVIEW

This chapter reviews the literatures related to the portfolio management from various textbooks, journals and related studies. Apart from this various masters degree thesis including independent studies carried out by renowned experts and others are also reviewed.

2.1 Conceptual Review

This chapter has included conceptual framework i.e. theoretical analysis and review of related different studies. In this chapter has been also considered that how this present studies are different from previous studies.

2.1.1 Investment

Alaxander Sharpe et al (2015) define the investment as sacrifice of current dollars for future dollars. They have attributed the involvement of time and risk during investment. Sacrifice takes place in the present and is certain. The reward comes later, if at all, and the magnitude is generally uncertain. Shrestha *et al* (2002) write investment as utilization of saving for something that is expected to produce profit or benefits. In the words of investment brings forth visions of profit, risk, speculation, and wealth. They have briefly described the categories and types of investment alternatives. They describes that the basic investment objectives, the expected rate of return, the expected risk, taxes, the investment horizon and investment strategies are the factors to be considered in choosing among investment alternatives.

Alaxander Sharpe et al (2015) make distinction between real investment and financial investment. “Real investments involve some kind of tangible asset, such as land, machinery, or factories. Financial investments involve contracts written on pieces of paper, such as common stocks and bonds.”

They further discussed about the globalization of the investment business and write that the growth in foreign security markets significantly increase international opportunities for U.S. investors. They have conducted a comparative study of distribution of total market value of common stock markets around the world in 1970 and in 1996, which reveal that the total proportion of the world’s common stocks represented by the United States has declined over the last 25 years from almost two-thirds to roughly 45% in 1996.

2.1.2 Return

Return is reward for investment. Historical returns allow the investor to assess the future or unknown returns, which is also called expected return. Expected returns are the ex-ante returns and such predicted return may or may not occur. It has discussed about components of return. They have identified returns is the composition of periodic cash receipts and change in price of asset. Return can be positive or negative .It explain return in terms of single period. They have defined it as holding period return and calculated by comparing the return to the amount initially invested. It has written it as summation of cash payment received due to ownership plus price appreciation divided by the beginning price. This is also a measurement of return for a single period. It has further described the calculation of expected return from arithmetic and geometric mean approach. Geometric mean return is consistent with assumption of reinvesting income when it is received. Due to inherent bias in the arithmetic mean, the geometric mean will always be equal to or less than the arithmetic mean. The arithmetic mean and geometric mean will only be equal when

the holding period returns are constant over the investment horizon. However, Alaxander Sharpe et al (2015) have also agreed and further defined it a tool for measurement of return for investment horizon of one year or less. They have suggested for longer periods, it is better to calculate rate of return as an investment yield. The yield calculation is present value based and this considers the time value of money. Further, return for the future can be determined from the probabilities of different phases of economy, viz., prosperity, recession, depression and recovery. Alaxander Sharpe et al (2015) illustrated the use of probability from the normal distribution concepts. They have defined expected return as summation of the product of probabilities of different stages in an economy and rate or return.

It has calculated the expected return from the average of holding period return on stocks of eight different banks for each year using data of B.S. 2050/51 to B.S. 2055/56. He has identified the common stock of Nepal Bank Limited to be fetching the maximum of return, i.e., 66.99%. He further writes SBI bank as the low yielding security. In addition, his study has revealed that the expected return of banking industry is 60.83%. The portfolio across the industries constructed during the study has identified the combination of the securities of Nepal Grindlays Bank and Bishal Bazar Company the best portfolio with the return of 0.2666 (26.66%). He concluded his study by identifying any significant differences in the portfolio return of banking industry and overall market. Shrestha (2002) finds the return of the Nepal Bangladesh Bank to be the highest. But Nepal Bank Limited is out of the purview of his research. It finds out the BOK the high return yielding security. She has in her thesis tried to make portfolio NBB – HBL and NLL - HBL.

2.1.3 Risk

Risk is the feeling of negative returns. In the words of Cheney and Moses (2013) risk is uncertainty of whether the money investors lend will be returned. They have regarded such risk as bankruptcy risk. According to them, stockholder of the firm should not only consider bankruptcy risk but also the risk that the firm will yield a rate of return below some targeted rate. They have given range, variance, standard deviation, CV and beta as parameters for the measurement of risk. However, variance may have first been suggested as a measure of economic risk by Bhalla (2009). Cheney and Moses (2013) further describe beta as a parameter for the measurement of the systematic risk. Systematic risk has been defined as undiversifiable risk, which is beyond the control of the organization. Apart from this, they describe unsystematic risk as diversifiable risk, which can be reduced through the portfolio effect. Further, beta values for assets generally range between + 0.5 and 2.0. Fisher and Jordan (2000), however, write nearly all betas are positive and most beta lie somewhere between + 0.4 and 1.9. Weston and Copeland (2014) write if the return on the individual investment fluctuates by exactly the same degree as the returns on the returns on the market as a whole, the beta for the security is one. Cheney and Moses further describe that standard deviation contains two parts – diversifiable and non-diversifiable risk. Systematic risk can be diversified away by combining the assets with a portfolio of other assets. Further, they have explained that systematic risk is the ratio between covariance (j,m) and standard deviation of the market. Unsystematic risk has been defined as product of standard deviation of assets and the $(1 - \rho_{jm})$. But Weston and Copeland (2014) has defined that systematic risk is the product of b^2 and Var $(R_{m,t})$ and Unsystematic risk as Var $(\varepsilon_{i,t})$ Elton and Gruber (2011) define systematic risk as portion of total variability in return caused economic, political and sociological changes.

Weston and Copeland described that if the undiversifiable (or systematic) risk in the return of an investment is greater than for the market portfolio, then the beta of the individual investment is greater than one, and its risk adjustment factor is greater than the risk adjustment factor for the market as a whole. The beta for individual security reflects industry characteristics and management policies that determine how returns

fluctuate in relation to variations in overall market returns. If the general economic environment is stable, if industry characteristics remain unchanged and management policies have continuity, the measure of beta will be relatively stable when calculated for different time periods. However, if these conditions of stability do not exist, the value of beta will vary.

Sharpe et al (2015) define risk as divergence of an actual return from an expected return and identified standard deviation as a measurement of such divergence. Clarkes (n.d.) explains standard deviation and the variance are equally acceptable and conceptually equivalent quantitative measures of an asset's total risk.

It measured systematic risk from beta. He concluded SBI stocks, NBB stocks and EBL stocks with negative beta. He has identified the portfolio beta to be 0.5573, calculated from product of individual beta and weights of the market capitalization. This portfolio beta has been used for the hypothesis test regarding the significance difference between the portfolio beta and market beta, which revealed average beta of the banking portfolio, is equal to 1 at 5%, 2% and 1% level of significance. On the contrary, at 10% level of significance the case is opposite. has analyzed the stocks of six finance companies, six insurance companies including Soaltee Hotel and Necon Air in terms of the risk measured through standard deviation, CV and beta. His study has revealed the least CV of Kathmandu Finance Company and has identified this stock as the least volatile. It has used the standard deviation, coefficient of variation and the beta as tools for the measurement of the risk associated in the stocks of five different stocks of commercial banks. She has identified the BOK stocks as the most risky stock with its standard deviation and CV of returns as 1.3949 and 1.2380 respectively. Further her research has shown that the BOK possesses the highest value of beta as 2.3020. Shrestha (2002) carried out risk return analysis of the eight commercial banks where he has computed highest standard deviation for the stocks of

BOK and least standard deviation for the stocks of HBL. Apart from this, his study has identified the negative beta for the stocks of SBI.

Weston and Copeland (2014) describe about the three possible attitudes towards risk, a desire for risk, an aversion to risk and indifference to risk. They further described the utility theory where he has made explanations to the diminishing marginal utility for wealth. According to him, someone with a diminishing marginal utility for wealth will get more pain from a dollar lost than pleasure from a dollar gained. Most investors (as opposed to people who habitually gamble) appear to have diminishing marginal utility for wealth and this directly affects their attitude towards risk. He has written about the indifference curve describing that each points of the indifference curve shows the combination of mean and standard deviation of returns which give a risk averse investor the same total utility.

2.1.4 Diversification of Risk

Risk averse investors will want to diversify: It is advisable to divide goods which are exposed to some small danger into several portions rather than to risk them all together." It points out in his historical review of portfolio theory, Bernoulli is also not the first to appreciate the benefits of diversification. For example, in *The Merchant of Venice*, Act I, Scene I, William Shakespeare has Antonio say:

I thank my fortune for it, My ventures are not in one bottom trusted, Nor to one place; nor is my whole estate, Upon the fortune of this present year. Although this turns out to be a mistaken security, Antonio rests easy at the beginning of the play because he is diversified across ships, places and time.

Cheney and Moses (2013) define that through the portfolio effect the diversifiable risk can be reduced. However, the reduction in the volatility occurs when the returns of the two securities do not move together. They described that such relationship can be described by the correlation coefficient. High negative correlation only results significant decrease in the total risk. Non-diversifiable risk, also referred to as systematic risk, has as its source factors that affect all marketable assets and thus cannot be diversified away. For example, a chance in expectations about the rate of inflation is pervasive; it will have an influence on all marketable assets and cannot be avoided by diversification. It has been found that holding about fifteen shares can eliminate unsystematic risk. It writes in the context of India, a portfolio of forty shares can almost totally eliminate unsystematic risk.

Risk Diversification through Portfolio Construction

Elton and Gruber (2011) described the effect of diversification. They write portfolio with 1 to infinity of assets will have decreasing pattern of the expected portfolio variance. They have supported this interpretation through an artificial example and concluded as more and more securities are added, the average variance on portfolio declines until it approaches the average covariance.

They further write effectiveness of diversification in reducing the risk of a portfolio varies from country to country. The average covariance relative to the variance varies from country to country. Thus in Switzerland and Italy securities have relatively high covariance indicating that stocks tend to move together. On the other hand, the security markets in Belgium and the Netherlands tend to have stocks with relatively low covariance. For these latter security markets, much more of the risk of holding individual securities can be diversified away. Diversification is especially useful in reducing the risk on a portfolio in these markets (Weston and Copeland, 2014).

Simple Diversification

Simple diversification is the random selection of securities that are to be added to a portfolio. Simple diversification reduces a portfolio's total diversifiable risk to zero and only un-diversifiable risk remains (Joshi, 2015).

Clarkes defines simple diversification as not putting all eggs in one basket or spreading the risks. It made sixty different portfolios of each size from randomly selected NYSE stocks and proved the decrease in the un-diversifiable risk with increase in the number the securities in the portfolio. They made the portfolio from randomly selected securities and allocated equal weights. "Spreading the portfolio's assets randomly over two or three times as many stocks cannot be expected to reduce risk any further.

Superfluous Diversification

It refers to the investors spreading himself in so many investments on his portfolio. The investor finds it is impossible to manage the asset on his portfolio because the management of a large number of assets require a knowledge of the liquidity of each investment return, tax liability and thus becomes impossible without specialized knowledge. In this context, Clarkes adds that superfluous diversification usually result in the following portfolio management problems.

i. Impossibility of good portfolio management
ii. Purchase of lackluster performers
iii. High search costs
iv. High transaction costs

He described that although more money is spent to manage a superfluously diversified portfolio; there will most likely to be no concurrent improvement in the portfolio's performance. Thus, superfluous diversification may lower the net return to the portfolio's owners after the portfolio's management expenses are deducted.

Diversification across Industries

Another diversification can be experienced from the combination of the stocks from different industries. The basic principle of diversifying assets across the industries is the losses incurred in one stock can be compensated through the gain realized from the profitable stocks. It has made an empirical research on random and across industry diversification of portfolios containing 8, 16, 32, and 128 NYSE listed common stocks where they have concluded that diversifying across industries is not better than simple diversification and increasing the number of different assets held in the portfolio above eight does not significantly reduce the portfolio's risk (Weston and Copeland, 2014).

Simple Diversification across Quality Rating Categories

Alexander, J. et al. (2015) explains the effects of simple diversification across stocks that have the same Standard & Poor's quality ratings. Their study consists of six diversified portfolios each containing 20 equally weighted common stocks that all have identical quality ratings. Their empirical study supported the economic theory, which suggest that risk-averse investors should require higher average rates of return in order to induce them to assume higher levels of risk. Further their study revealed simple diversification yields significant risk reductions within homogeneous quality rating categories against the risk reductions within the heterogeneous samples. They concluded their study, as the highest quality portfolio of randomly diversified stocks was able to achieve lower levels of risk than the simply diversified portfolios of lower-quality stocks. This result reflected the fact that default risk (as measured by the quality ratings) is part of total risk. Their findings suggested that portfolio managers could reduce portfolio risk to levels lower than those attainable with simple diversification by not diversifying across lower-quality assets.

Markowitz Diversification

The basic concepts of portfolio theory came to me one afternoon in the library while reading John Burr Williams' *The Theory of Investment Value*". As precocious as Williams was (providing the first derivation of the "Gordon growth formula," the Modigliani-Miller capital structure irrelevancy theorem, and strongly advocated the dividend discount model), Williams had very little to say about the effects of risk on valuation because he believed that all risk could be diversified away. It defined combining assets which are less than perfectly positively correlated can reduce portfolio risk without sacrificing portfolio returns. In 1955, Markowitz made as an elaboration of the ideas in Portfolio Selection in his doctoral thesis.

Although the Markowitz paradigm for portfolio selection was unquestionably one of the great innovations in financial theory, it left the investor with awesome obstacles to its practical application. The identification of efficient portfolios from a universe of only 50 securities involves a total of 1,225 calculations: 50 expected returns, 50 variances and 1,125 covariance between e ach pair of securities: for 500 stocks, the calculations run up to nearly 125,000. On a state-of-the-art IBM computer of the late 1950s, the identification of the efficient frontier from a universe of just 100 securities took 33 minutes and, in 1990 dollars, cost at least $300 in computer time (Thapa, 2017).

Markowitz's dissertation, which appeared as a book published in 1959, provides that the returns on most securities are correlated. If the Standard & Poor's index rose substantially, we would expect United States Steel (Common) to rise. If the Standard & Poor's index rose, substantially, we would also expect Sweets Company of America (Common) to rise. For this reason, it is more than likely that United States Steel will do well when Sweets Company does well.

Markowitz's paper is the first mathematical formalization of the idea of diversification of investments: the financial version of "the whole is greater than the sum of its parts": through diversification, risk can be reduced (but not generally eliminated) without changing expected portfolio return. The decision to hold a security should not be made simply comparing its expected return and variance to others, but rather the decision to hold any security would defend on what other securities the investor wants to hold. Securities could not be properly evaluated in isolation, but only as a group. This perspective was clearly missing from Weston and Copeland (2014) and in even as late as the revised version in 1962, received scant comment.

Clarkes writes that Markowitz diversification can lower risk below the undiversifiable level if the securities analyst can find securities whose rates of return have low enough correlations. Markowitz portfolio analysis is essentially a mathematics problem requiring that many different equations be solved simultaneously. This can be done on a large scale only by using a computer program, which does what is called "quadratic programming". Quadratic programming minimizes the portfolio's risk at each level of average return for the portfolio.

Mean-Variance Indifference Curves

Indifference curves represent the investor's risk-return preferences. Through indifference curves, it is possible for an investor to determine the various combinations of expected returns and risks that provide a constant utility. The curves can be drawn on a two dimensional figure, where the horizontal axis indicates risk as measured by standard deviation (denoted by σ_p) and the vertical axis indicates reward as measured by expected return (denoted by r_p). The sets of mean-variance indifference curves are literally a theory of choice. The only assumptions necessary to draw the indifference curves for risk-averse investors are

i. People prefer more wealth to less
ii. They have diminishing marginal utility of wealth

These assumptions, if valid, imply that all decision makers are risk averse and will require higher return to accept greater risk. Indifference curves cannot intersect. “A risk averse investor will find any portfolio that is lying on an indifference curve that is “farther north-west” to be more desirable (that is, to provide greater utility) than any portfolio lying on an indifference curve that is “not as far northwest”. Last, he further describes that an investor has an infinite number of indifference curves (Poudel *et al*, 2019)

2.1.5 Security Market Line or CAPM Equation

Sharpe, Treynor, Mossin and Lintner originally developed Security Market Line or the CAPM Equation. SML shows the picture of market equilibrium. Weston and Copeland (2014) explain SML provides a unique relationship between undiversifiable risk (measured by β) and expected return. Capital Assets Pricing Model is an equilibrium theory of how to price and measure risk. Logic of the security market line is that the required return on any investment is the risk-free return plus a risk-adjusted factor. They have given the model for the risk adjustment factor as the product of risk premium required for the market return and the riskiness of the individual investment.

It has defined that if the rate of change in the risk free rate and market rate of return is the same, then the slope of the SML remains the constant, and however, the slope does not remain constant if the rate of change differs.

It writes that the changes in expected inflation do not change the slope of the Security Market Line (SML). Rather they cause parallel shifts in the SML. It assumes equilibrium where required rate of return is equal to the expected rate of return. Further the model defines disequilibrium condition appears when:

i. Expected Rate of Return > Required Rate of Return = Under priced

ii. Expected Rate of Return < Required Rate of Return = Overpriced

Livingston, (2004). evaluates stocks of the companies, viz., National Finance Company, Citizen Investment Trust, Himalaya Finance Company, Kathmandu Finance Company, Universal Finance Company, Capital Market Limited and People's Finance Limited are under priced. Shrestha (2002) has also made research to identify whether the stocks of SBI, NBB, SCB, HBL, NIB, EBL, BOK and NABIL are correctly priced or not. He concludes all the stocks are under priced.

Efficient Frontier

Collections of possible portfolios are the attainable sets. Cheney and Moses (2013) define at any given level of risk or return, however there is one portfolio that provides the highest (lowest) level of expected return or risk. This set of portfolio that dominates all other portfolios in the attainable set is referred to as the efficient frontier. They further add once the investor has determined the expected returns and standard deviations for each of the assets and the correlation coefficients between the assets, then the portfolios on the efficient frontier can be identified. Estimation of the efficient frontier requires quadratic programming that will simultaneously estimate the minimum portfolio risk at each level of expected return (Livingston, 2004).

It writes when only common stocks are considered as components of portfolios on the efficient frontier, a sample size of several hundred randomly selected securities will provide an estimate of the efficient frontier not significantly different from the frontier obtained by using the entire universe of common stocks. (Livingston, 2004).in this context, write for the convex figure of efficient frontier infinite number of possibilities must be considered.

Capital Market Line

The efficient frontier that can be constructed without borrowing or lending is convex towards the E(r) axis in risk-return space. However, if borrowing and lending

opportunities are included in the analysis, linear set of investment opportunities called the capital market line (CML) emerges. It writes the CML is the locus of the portfolios that wealth-seeking risk-averse investors will find more desirable than any other portfolios. Fisher and Jordon (2000) describe that all investors will end up with portfolios somewhere along the CML and all efficient portfolios would lie along CML. However, not all securities or portfolios lie along the CML. From the derivation of the efficient frontier we know that all portfolios, except those that are efficient, lie below the CML. Observing the CML tells us something about the market price of risk.

Investment Performance Evaluation

Alexander, J. et al. (2015). devised an index of portfolio performance. His model is generally accepted as single parameter portfolio performance index and can be calculated from the both risk and return statistics. This technique ranks the stocks from its excess return-to-beta ratio. If stocks are ranked by excess return to beta (from its highest to lowest), the ranking represents the desirability of any stock's inclusion in a portfolio.

It conceived an index of portfolio performance that is based on systematic risk, as measured by portfolios' beta coefficients. It has developed another performance measure by modifying the characteristic regression line. His performance measure is a one-parameter investment performance measure. The basic random variables in Jensen's model are risk premiums.

2.2 Review of Previous Studies

The following section tries to present the most important research works that have been carried out in the area of investment companies.

2.2.1 Review of Journals Articles

Detemple, Garica and Rindisbcher, (2014). *A Monte Carlo Method for Optimal Portfolio,* published on February. In this paper, a comprehensive approach has been developed for the calculation of optimal portfolios in asset allocation problems with complete markets. The major benefit of their method, which relies on Monte Carlo simulation, is its flexibility. Indeed, the approach permits. The paper has also derived a number of economic results that can be used as guidelines for sound asset allocation rules. Naturally, the performance of these rules was dependent upon empirical sophistication of the underlying model of financial market. Clearly, they did not suggest that the model investigated here are adequate in that respect, although they appear more realistic that the specifications examined in the prior literature. But they have proposed great generality offers that can be easily adapted to address the asset allocation problem for a large class of financial market

models.

Shrestha (2015). *Portfolio management in commercial banks;* The portfolio management becomes very important both for the individuals and institutional investors. Investor would like to select better mix of investment assets subject on these aspects like, higher return that is comparable with alternatives according to the risk class of investor. Good liquidity with adequate safety on investment, maximum tax concession, economic efficient and effective mixes. For fulfilling those aspects, following strategies are adopted. Regarding the commercial banks, they are very eager to provide such services but above mentioned problems, very limited opportunities are available to the banks for exercising the portfolio management. The survival of bank depends upon its own financial health and various activities. In order to develop and expand the portfolio management activities successfully the investment management methodology of portfolio manager should reflects high standards and give their clients the benefits of global strengths, local insights and product philosophy. With the discipline and systematic approval to the selection of appropriate countries, financial assets and management of various risks the portfolio manager could enhance the opportunity for each investor to earn supervisor returns over time. The Nepalese banks having greater

network and access to national and international capital market have to go for portfolio management activities for the increment of their fee based income as well as to enrich the client base and contribute to the national economy.

Rai (2016). *Portfolio behavior of commercial banks in Nepal,* has made remarkable efforts to examine various portfolio behavior of commercial bank in Nepal such as investment portfolio, liability portfolio, assets portfolio etc. In the study, investment of commercial banks when analyzed individually were observed in Nepalese domestic banks invest in government securities, national saving bond, debentures and company's shares. On the basis of this study, the author found that the supply of bank credit was expected to depend on total deposit, lending rate, bank rate, lagged variables and dummy variables; similarly demand of bank credit was assure to be affected by national income, lending rate, Treasury bill rate and other variables. The resources of commercial banks were expected to be related with variables like total deposits, cash reserve requirement, bank rate and lending rate. These are the findings of the study. The relationship of banks portfolio variables as found to be best explained by log linear equations. Demand of deposit for commercial banks in Nepal is positively affected by GDP from non agriculture and the deposit rate and the lending rate of interest. The investment of commercial banks on government securities has been observed to be affected by total deposit; cash reserve requirement, treasury bill rates and lending rates. The investment of commercial banks on shares and securities is normal. The loan loss ratio has been found to increase with low recovery of loan.

Markowitz and Perold, (2017) *Portfolio Analysis with Factors and Scenarios"*. Mainly, there are two findings in their study i.e. (i) how the scenario model can be extended to yield more meaningful estimates of covariance amongst security returns, and (ii) how the well known computational advantages of the multifactor model can also be realized for a scenario, or mixed scenario and factor model. These developments should greatly enhance the practicability of the scenario approach for large scale portfolio analysis.

Malla, (2017). *Credit Portfolio Management in Nepalese Commercial Banks*, Credit portfolio management is a key function for banks (and other financial institutions, including insurers and institutional investors) with large, multifaceted portfolios of credit, often including

illiquid loans. After global financial crisis of 2007-2008, the credit portfolio management function has become most crucial functions of the bank and financial institutions. The Basel III, third installment of Basel accord was developed after crisis to strengthen bank capital requirements by increasing bank liquidity and decreasing bank leverage that encourages banks to measure credit risk of bank's portfolios. The Basel committee also raises an issue concerning the application of the risk weights used in the capital adequacy framework to determine exposure to risk assets for the purpose of determining large credit exposure (Morris, 2001). The portfolio management of the Nepalese banking sector has been improved remarkably during last 10 years due to the strict regulation of Nepal Rastra Bank. This journal will try to describe the present credit portfolio management practice of Nepalese commercial banks by using qualitative and quantitative methods. In this study, concentration of banks for credit portfolio management has been studied by analyzing security wise loan, product wise loan and sector wise concentration of loan where the researcher has found assorted outcomes. This research also aims to provide some suggestions to overcome with problems associated with credit portfolio.

2.2.2 Review of Previous Theses

Basnet (2014), conducted a thesis on *Portfolio management of joint venture banks in Nepal is based on* study of four joint venture banks. They are Nepal Bangladesh bank ltd, standard chartered bank, Himalayan bank ltd and Everest bank ltd. The general objective of this study is to identify the situation of portfolio management of joint venture banks in Nepal. The major findings of this study are the selected bank on ratios of Everest bank ltd. Are more consistent among the four joint venture banks. SCBNL is not investing its fund in NRB bond after 2013 and no government securities after 2013. HBL is not investing its fund in NRB bond after 2013 and investing very high amount of fund in government securities. NBBL is investing very high amount of its fund in government securities. EBL is not investing its fund in NRB bond after 2013 but investing its high amount of its fund on government securities. SCBNL is providing very high amount of its loans and advances to the private sector. It has also given the second priority to the foreign bills purchase and discount. HBL is providing very high amount of its loans and advances to the private sector in increasing trends. It has also given the second priority to the foreign bills purchase and discount. NBBL is providing very high amount of its loans and advances to the private sector. It has also given the second priority to the government securities by providing very low amount of loans to the foreign bills purchase and discount.

Giri (2015) conducted a thesis on *Investment portfolio analysis of joint venture banks* has been done in 2015. The study based on five joint venture banks and they are: SCBNL, HBL, NBBL, EBL & Nabil. The general study of the present study is to identify the current situation of the investment portfolio of joint venture banks in Nepal. The major findings are SCBNL and HBL have better position. NBBL and Nabil have a low position in the industry. But EBL has a very low position in the industry because of having lowest mean return on shareholders' fund resulting from the negative return in the fiscal years from 2009/10 to 2014/15. SCBNL has the highest mean return and EBL has the lowest return. Except EBL all other four banks i.e. NBBL, NABIL, HBL & SCBNL have good performance. Among other joint venture banks SCBNL has the highest return and EBL has mean return than industry average. SCBNL and EBL mobilizes the funds in investment title is higher than the standard ratio. NABIL, SCBNL & HBL are investing low amount of deposits on loans and advances which is lower than industry average and NBBL and EBL have invested high amount of deposits on loans and advances title which is higher than industry average. SCBNL has highest EPS and EBL has lowest EPS. Similarly, HBL has also above mean EPS than industry average and that of NBBL is lower than industry average. Himalayan Bank has the lowest beta coefficient among the five joint venture banks which means that the systematic risk of Himalayan bank is the lowest among the JVBs. The portfolio return of NBBL is 94%. This return is the average capital gain yield and dividend yield.

Parajuli (2016) conduct a *A study on portfolio analysis of commercial banks in Nepal* with the objective of evaluate financial performance of commercial banks of Nepal and examine the existing situation of portfolio management of Nepalese commercial bank. The major findings of his study are as follow the industrial mean ratio of investment to total deposit is 21.86%. The only EBL has a greater ratio above industrial mean ratio i.e 24.77▪21.8. But other banks have lower investment to total deposit ratio than industrial mean ratio. It shows that EBL has effective mobilization its deposit on investment to generate the return. Among four commercial banks HBL has invested its more funds on govt. securities (i.e. risk free assets) and lesser fund on share and debenture (i.e risky assets). All banks have invested more than 83% amount in government securities. Only BOKL has invested its 0.63% on non-resident sector. None of the banks have invested any amount on NRB bond. All of the selected commercial banks are granting very high amount its loan and advances to private

sector. NIBL and HBL have given second priority to government enterprise and EBL and BOKL give second priority to foreign bills purchase and discount. EBL and BOKL have granted very low less than 1% loan and advance to government enterprise. BOKL stock has the highest expected return i.e. 8.34% and HBL has the lowest expected return i.e -8.82%. NIBL has also negative return i.e -7.71%. The market expected return is 6.47%. The risk of the BOKL is the highest i.e 57.14% and HBL has the lowest risk i.e 15.26%. NIBL and EBL have risk 19.41% and 36.03% respectively. The market risk is 15.68%. In conclusion we can say that higher the risk higher the return and vice versa.

Chhetri (2017), in his thesis entitled *Portfolio Analysis on Common Stock Investment of Joint Venture Banks in Nepal*. His research based on five joint venture banks (NABIL, NBBL, SCBL, HBL, and EBL), was to identify the current situation of investment portfolio of joint venture banks in Neal. His main objectives are as follows evaluate the common stocks of JV Banks in terms of risk and return and perform sector wise comparison on the basis of market capitalization and estimate an optimal portfolio among common stock investment of JVBs and analyze comparative risks and returns position of these sectors. The major findings are as follows considering the market risk and return, the expected return and S.D. of overall market is 5.55% and 28.67 respectively. Similarly, the coefficient of variation of the market is 5.1659. From the analysis of required rate of return and expected rate of return, it has become clear that NABIL, SCBL, HBL and EBL‘s common stocks are under priced and NBBL and SBI‘s stocks are overpriced.While creating the portfolio between the two assets of all the sample banks, the optimal portfolio of NBBL and EBL gives the maximum expected return that is 62.37% where as, the portfolio of NABIL and EBL gives the lowest expected return i.e. 3.37%. Considering the portfolio risk, the portfolio of HBL and SBI has maximum S.D. that is 75.16 but the portfolio of HBL and NBBL has the lowest S.D. that is 35.79%. Correlation between NABIL and HBL is found highest between mentioned banks under the study and the correlation of SCBL and NBBL is the lowest correlation. However, all the banks are positively correlated but they are neither perfectly correlated nor negatively correlated. Considering the Sharpe‘s performance measure, the portfolio of HBL and NBBL has the best performance because of the highest risk premium return per unit of total risk and portfolio of SCBL and SBI is worst due to the lowest risk premium.

Chaudhary (2018), in his thesis entitled *A Study on Investment Portfolio of Listed Commercial Banks with Reference to NABIL, NIBL, NSBL and EBL*. His main objectives are as follows to analyze the risk and return of selected commercial banks on investment using portfolio concept and to analyze the investment portfolio of commercial banks. To forecast and examine the trend of investment and to provide complementary measures based on analysis. Based on the analysis of the various data remarkable findings are drawn up. The major findings are as follows return on share and debenture of CBs show wide fluctuation caused mainly due to volatility of share price in the market and changes in dividend paid by CBs to some extent. NABIL has more return from government securities and loan and advance. NABIL is the bank which shows better performance on their investment strategies. NABIL is successful in effective mobilization of its overall resources among four CBs. Similarly NIBL and EBL imitate moderate performance in utilization of overall resources and NSBL is the weakest. Bank to mobilize its total resources in various investment assets among four CBs. The profitability position of NABIL is the highest whereas NSBL has the lowest position. Government Securities and loan and advance with share and debenture, the CBs can reduce total risk at minimum level and increase profit at higher level. Such assets are very useful to make portfolio combination so that combining stock into portfolio reduces risk. The study shows that the portfolio return has fluctuating trend during the study period.

2.3 RESEARCH GAP

Most of researches were based on past secondary data. Major theses focused on the trend analysis of government securities, mutual fund and share debenture. Some researcher had attempted to analyze the primary data classifying them into the category of institutional and individual group, but had not tried to analyze the primary data based on their income bracket, profession who he or she belonged to. Further no one's research work studied the ownership pattern of the government securities, which is a crucial matter of public debt. It shows the interest of various investors on specific types of government securities. Besides, most of the researcher had analyzed the trend and issue system of government securities on lump sum, but because of specific nature of particular securities, it has to be analyzed separately. Hence, reviewing the related literature in this regard, and considering the several gaps as above, this research has attempted to analyze the government securities system and practices in Nepal obtaining recent data to find out the objectives of this research work. The job conducting research and preparing report is difficult in itself especially to the unprofessional person like a

student. This research has tried to make this thesis as a complete outcome of the research on mentioned topic form the best of my effort and knowledge. It aims to prove that research is an original one should be the foundation for the future researchers to know about the problem and prospect of mutual fund companies of Nepal on investment. Thus it is not totally new concept. Many researchers have done research on this aspect. Portfolio investment refers to an investment that combines the several assets. Commercial banks cannot utilize its whole fund raised through deposit and borrowing into loans and advance. To fulfill the gap between borrowing and lending banks rather goes for investment. From the above study the researcher found the gap that researcher has failed to analyze the financial performance of commercial banks in terms of investment strategies. Hence this research will fulfill the prevailing the research gap by calculating the portfolio risk, return and market price of different companies and estimating the optimal portfolio on the basis of all relevant data and information of the latest five fiscal year of five commercial banks. Furthermore, the investment portfolio performance has also been evaluated with using sharpe index of portfolio performance measure. Overall this study will focus on financial indicators that may or may not affect the financial performance of commercial banks in consideration with portfolio management.

CHAPTER III

METHODOLOGY

This chapter describes the methodology employed in the present study. The research methodology consists of research design, data collection procedure, data processing procedures and techniques. The study is more analytical and empirical. It covers quantitative methodology using statistical and financial tools.

3.1 Research Design

To meet the stated objectives of the study, descriptive cum analytical research design has been adopted. According to which all the historical closing stock prices of the banks, percentage of cash and stock dividend, NEPSE index for the seven years (1997 to 2019) including the market capitalization of the banks for 2003 are enumerated. Then following the sampling procedures, appropriate samples, i.e., nine banks are selected to describe the expected returns, risk associated with the stocks and optimal portfolios constructed through the combination of different stocks at different weights. A complete list of the returns, standard deviation of returns, coefficient of variation, covariance, correlation, and beta for the stocks are prepared, utilizing various tools and techniques. List of information gathered are analyzed and critical evaluation are made.

3.2 Population and Sample

There are 27 commercial banks operate in Nepal which is the population of the study and out of them 10 commercial banks are selected which is EBL, BOKL, HBL,

NABIL, NBB, NIC, NIB, SBI, SCBNL and PRVU for convenient sample method which is the sample of the study.

3.3 Nature and Type of Data

Secondary data has been extensively collected and utilized to accomplish this study. The study, according to the research question, is conducted on the basis of the quantitative data. Further, qualitative data is also collected to enrich the study.

3.4 Sources of Data

To complete the study, a substantial amount of information from secondary sources, published and/or unpublished written documents, books, journals, dissertations etc. available in the libraries, and in private collections are collected.

3.5 Data Collection Procedure

Different tools and techniques were adopted while collecting the data for this study. Collected secondary information was analyzed during the course of the deskwork. However, during the desk study, an information gap was found. This gap was fulfilled by the discussion with the thesis advisor and finance experts of the security board and the NEPSE. Information collected from different sources were systematized, arranged in order, and analyzed to identify the optimal portfolio. Data processing comprised the activities like tabulating data, avoiding repetition, verification of data, and arranging them in a logical order, which eventually helped during the course of data analysis. Detailed calculations have been carried out to identify the conclusive results; various financial as well as statistical tools are used.

3.6 Data Analysis Tools

The study has been carried out on the basis of the historical data analyzed from the financial as well as statistical tools.

3.6.1 Single Period Rate of Return (R_j)

It is the summation of the dividend yield and the capital gain yield.

Symbolically,

$$R = \frac{P_t - P_{t-1} + D_t}{P_{t-1}}$$

where,

R = Actual Rate of Return on Common Stock at time t

P_t = Price of Stock at time t

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

D_t = Dividend per share including cash and stock dividend

Model for Dividend

D_t = cash dividend + stock dividend % x next year's MPS

3.6.2 Expected Rate of Return of Common Stock [$E(R_j)$]

It is the average of the single period return over the periods.

Symbolically,

$$E(R_j) = \frac{\sum R_j}{N}$$

where,

$E(R_j)$ = Expected Rate of Return on Stock

$\sum R_j$ = Summation of the Annual Return

N = Number of observations (year)

3.6.3 Standard Deviation (σ_j)

It is a measure of dispersion and explains the variability of return around its mean. It is the square root of variance and the value denotes the percentage of risk associated to returns of the stock.

Symbolically,

$$\sigma_j = \left[\frac{\sum \{R_j - E(R_j)\}^2}{N - 1} \right]^{1/2}$$

3.6.4 Coefficient of Variation (CV_j)

It gives us the value of the risk per unit of return.

Symbolically,

$$CV_j = \frac{\sigma_j}{E(R_j)}$$

3.6.5 Covariance (Cov_{ij})

It is a measure of how returns on assets move together. It is the product of two different deviations divided by the number of observations.

Symbolically,

$$Cov_{ij} = \frac{\sum\{R_i - E(R_i)\}\{R_j - E(R_j)\}}{N - 1}$$

3.6.6 Correlation (ρ_{ij})

It measures the intensity or magnitude of linear relationship between the two variable series. The correlation coefficient will always lie between +1.0 and –1.0.

Symbolically,

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

3.6.7 Beta Coefficient (β)

It is a measure for systematic risk. It gives us the value of slope of the SML.

Symbolically,

$$\beta = \frac{N \sum X Y - \sum X \sum Y}{N \sum Y^2 - (\sum Y)^2}$$

X = Annual Returns of Common Stocks

Y = NEPSE Index

3.6.8 Alpha (α)

It gives the value of y-intercept in SML. It is a measure for unsystematic risk.

Symbolically,

$$\alpha = \frac{\sum X}{N} - \beta \frac{\sum Y}{N}$$

3.6.9 Systematic Risk

It gives us the portion of risk, which cannot be diversified away. It is also called undiversifiable risk.

Symbolically,

Systematic Risk = $\beta^2 \times \sigma^2_m$

or,

Systematic Risk = $\rho^2_{ij} \times \sigma^2_j$

3.6.10 Unsystematic Risk

It gives us the portion of risk, which can be diversified away. It is also called diversifiable risk.

Symbolically,

Unsystematic Risk = σ_j – Systematic Risk

or,

Unsystematic Risk = $(1- \rho^2_{ij}) \sigma^2_j$

3.8.11 Coefficient of Determination (ρ^2_{ij})

The coefficient of determination between the two variables series is a measure of linear relationship between them and indicates the amount of one variables series is a measure of linear relationship between them and indicates the amount of one variable which is associates with or accounted for another in the dependent variable that is accounted for by the independent variable. Moreover, it gives the ratio of the explained variance to the total variance and it is given by square of the correlation i.e., $\rho^2_{ij.}$

Symbolically,

$$\rho^2_{ij} = \frac{\text{Explained Variance}}{\text{Total Variance}}$$

3.6.12 Standard deviation of Random Error Term

The value of standard deviation of random error term gives us the value of sampling or estimation errors.

Symbolically,

$$\textit{Standard deviation of Random Error Term} = \left[\frac{(\sum X^2 - \alpha \, x \sum X) - \beta \, x \sum XY}{N - 2} \right]^{1/2}$$

3.8.13 Standard Error of Beta

We know that true beta cannot be calculated. It can only be estimated. The standard error helps in identifying the range of true beta. It attempts to indicate the extent of estimation errors in the estimated beta.

Symbolically,

$$\textbf{Standard Error of Beta} = \frac{\textit{Standard deviation of Random Error Term}}{\left[\sum Y^2 - \frac{(\sum Y)^2}{} \right]^{1/2}}$$

3.6.14 Standard Error of Alpha

Similarly, the true alpha also cannot be determined. Its value too can only be estimated. Standard error of alpha provides an indication of the magnitude of the possible sampling error that has been made in estimating alpha.

Symbolically,

$$\text{Standard Error of Alpha} = \frac{\textit{Standard deviation of Random Error Term}}{\left[\sum Y^2 - \frac{(\sum Y)^2}{N} \right]^{1/2}}$$

3.6.15 Investment Performance Evaluation

Investment performance evaluation provides the investor with a solution to select the stocks with high return at low degree of risk. In the present study, three such evaluation tools have been utilized to evaluate the stocks in terms of their performance, which are as follows:

3.6.15.1Sharpe's Performance Measure:

Sharpe's performance measure defines a single parameter portfolio performance index that is calculated from both the risk and return statistics.

Symbolically,

$$S_p = \frac{\text{Risk Premium}}{\text{Total Risk}} = \frac{R - R_f}{\sigma_i}$$

where,

R = Average Return

R_f = Risk-free Rate of Return

3.6.15.2Treynor's Performance Measure:

John Treynor's performance measure defines index of portfolio performance that is based on systematic risk, as measured by portfolios' beta coefficients.

Symbolically,

$$T_p = \frac{\text{Risk Premium}}{\text{Systematic Risk Index}} = \frac{R - R_f}{\beta}$$

3.6.15.3 Jensen's Performance Measure:

Jensen's performance measure is modification in the characteristic regression line and it is a one-parameter investment performance measure. The basic random variables in Jensen's model are risk premiums.

Symbolically,

$$J_p = \alpha$$

β

where,

$$\alpha = R - \{R_f + (R_m - R_f)\,\beta\}$$

3.8.16 Rank Correlation (R)

The degree of relationship between two variables with respect to their respective ranks is known as "Rank Correlation Coefficient". It is also known as Spearman's rank correlation coefficient.

Symbolically,

$$R = 1 - \frac{6 \sum d^2}{n(n^2-1)}$$

where,

$d = R_1 - R_2$
R_1 = Rank by the first characteristics
R_2 = Rank by the second characteristics
n = number of pair of observations

3.8.16 Security Market Line (SML)

It shows relationship between the measure of systematic risk, β, and the required return of an asset. It describes that required return of an asset is a function of the return on the risk-free asset, the risk premium in the market and the asset's beta.

Symbolically,

$$R_j = R_f + (R_m - R_f)\,\beta$$

where,

R_m = Market Rate of Return

3.6.17 Capital Market Line (CML)

Capital market line represents the market equilibrium trade off between risk and return. CML assists the investors to borrow and lend at the risk less rate, R_f. Further, the CML provides the risk averse investors with opportunities to choose the optimal portfolios from the combinations of the risk less assets and the risky portfolios. Perhaps the most important aspect of the capital market line is that it describes the market price of risk. Market price of risk is the market rate of exchange between risk and return in equilibrium. It is also called market equilibrium price of risk. Market price of risk often spoken as price of risk provides marginal rate of substitution for each investor in his or her rate of exchange between return and risk.

Symbolically,

$$Rp = Rf + \left[\frac{Rm - Rf}{\sigma_m} \right] \sigma_p$$

where,

Rp = Expected Rate of Return for Portfolios along the CML, that is, Combinations of R_f and R_m

σ_m = Standard Deviation of Return on the Market Portfolio

σ_p = Standard Deviation of Portfolios along the CML

$\left[\frac{Rm - Rf}{\sigma_m} \right]$ = Slope of CML or Market Price of Risk

3.6.18 Portfolio Return (Rp)

It is the weighted average returns of the stocks in the portfolio of two or more securities.

Symbolically,

$R_p = w_1R_1 + \ldots\ldots + w_nR_n$

where,

R_p = Expected return of the portfolio

w_1 = weight of stock 1

R_1 = Expected Return of stock 1

w_n = weight of nth stock

R_n =Expected Return of stock n

3.8.19 Portfolio Standard Deviation (σ_p)

It is the combined standard deviation of the standard deviation of the individual stocks return in the portfolio of two or more securities.

Symbolically,

$\sigma_p = (w^2_1\sigma^2_1+\ldots\ldots+w^2_n\ \sigma^2_n + 2\ w_1\ w_2\ \rho_{12}\ \sigma_1\sigma_2 +\ldots\ldots+2\ w_{n-1}\ w_n\ \rho_{n-1,\,n}\ \sigma_{n-1}\ \sigma_n)^{1/2}$

where,

σ_p = Standard deviation of the portfolio returns of stock 1 to n

σ^2_1 = Variance of returns of stock1

σ^2_n = Variance of returns of nth stock

ρ_{12} = Correlation between returns of stock 1 and 2

$\rho_{n-1, n}$ = Correlation between returns of stock n-1 and stock n.

3.6.20 Cut off Rate (C)

The cut off rate gives the number securities that can be added to construct the optimal portfolio.

Symbolically,

$$C = \frac{\sigma^2_m \sum \frac{(R_j - R_f)\,\beta_j}{\sigma^2_{ei}}}{1 + \sigma^2_m \sum (\beta_j / \sigma^2_{ei})}$$

where,

σ^2_{ei} = Unsystematic Risk

3.8.20 T – test

In the present study two hypotheses for T – test has been set. For the first hypothesis, test of significance of difference of means has been applied to test whether there is any significant difference between the portfolio return of the common stock of the banks and the market return.

Test Statistics (t)

$$t = \frac{\bar{x}_1 - \bar{x}_2}{\left[S^2 \left(\frac{1}{n_1} + \frac{1}{n_2} \right) \right]^{1/2}}$$

$$S^2 = \frac{n_1 s_1 + n_2 s_2}{n_1 + n_2 - 2}$$

where,

t = Student's test statistics

$\bar{x}_1$ = Arithmetic mean of first sample

$\bar{x}_2$ = Arithmetic mean of second sample

n_1 = First sample size

n_2 = Second sample size

For the second hypothesis, test of significance for a single mean has been applied to test whether there is any significant difference between the portfolio beta of insurance companies and the market beta or vice – versa.

Test Statistics (t)

$$t = \frac{\bar{x} - \mu}{}$$

$$\frac{S}{\sqrt{n}}$$

where,

$\overline{x_1}$ = Arithmetic mean of sample statistics

μ = Arithmetic mean of population parameter

S = Estimated standard deviation of population parameter

$$S = \left[\frac{n}{n-1} s^2 \right]^{1/2}$$

$$s^2 = \frac{\sum (X - \overline{X})^2}{n-1}$$

where,

s^2 = Estimated variance of sample

Decisive Criteria:

If ^{t}Calculated value $\leq$ ^{t}Tabulated value, accept the null hypotheses or vice-versa.

3.6.22 F- Test

The hypothesis for testing any significant difference in the returns of the banks is carried out through F-test.

Test Statistics

Under Ho, the one-way ANOVA F-statistic is

$$F = \frac{MSC}{MSE}$$

where,

$$MSC = \text{mean sum of squares of variation between samples} = \frac{SSC}{k-1}$$

$$MSE = \text{mean sum of squares of variation within samples (errors)} = \frac{SSE}{n-k}$$

$$SSC = \frac{\sum T_j^2}{n_r} - \text{correction factor}$$

k = Number of elements in column

T_j^2 =Sum of squares of the sample totals = $(\sum X_1)^2+(\sum X_2)^2 \ldots \ldots +(\sum X_k)^2$

n_r = Number of elements in row

SSE = SST - SSC

SST = Row sum of squares – Correction factor

Row sum of squares= $\sum X_1^2+\sum X_2^2 \ldots \ldots +\sum X_k^2$

$$\text{Correction Factor} = \frac{T^2}{\quad}$$

n

T = Grand Total = $\sum X_1 + \sum X_2 \ldots \ldots + \sum X_k$

n = Total number of observations

Decisive Criteria:

If ^{F}Calculated value $\leq$ ^{Fr}Tabulated value, accept the null hypotheses or vice-versa.

CHAPTER IV

RESULTS

This chapter deals with the critical analysis and detailed interpretation of collected data. Most of the data are presented in a tabular form with appropriate figures where necessary. In addition, proper statistical test for inference is also carried out.

4.1 Analysis of Risk and Return

Return is potential result of investment. Risk accompanies return. Risk refers to variability of possible return around the expected return of an investment. Some investment posses such variability quite small whereas some can have high. More the variability or fluctuation more will be the risk and vice-versa. Thus, prior to investment, a rational investor should always measure risk. Standard deviation and coefficient of variation serve as statistical tools to measure risk associated to the returns of stocks.

TABLE 1: Risk and Return Parameters

S.N.	Stock	Expected Return [$E(R_j)$]	Variance (σ^2)	SD (σ)	CV	Covariance	Correlation (ρ)
1	EBL	0.57	0.91	0.95	1.67	0.35	0.9477
2	BOK	0.89	2.95	1.72	1.93	0.66	0.9844
3	HBL	0.62	0.44	0.67	1.08	0.18	0.7205
4	NABIL	0.39	0.35	0.59	1.54	0.22	0.9522
5	NBB	0.97	2.20	1.48	1.53	0.56	0.9632
6	NIC	-0.13	0.03	0.18	-1.40	0.05	0.7338
7	NIB	0.22	0.29	0.54	2.46	0.20	0.9392

8	SBI	0.30	0.87	0.93	3.05	0.03	0.0937
9	SCB	0.55	0.52	0.72	1.30	0.20	0.7201
10	Pravu	0.53	0.58	0.66	1.51	0.19	0.760
MARKET		0.1073	0.1541	0.39	3.66	0.18	0.7503

Sources: Appendix

Table 1 shows different statistical parameters of banks' stock return. The returns realized from stocks of NBB dominate returns from all stocks. It means NBB stock is profitable among the stocks. However, there exists a conflict between the stocks of NBB and BOK while comparing both securities in terms of standard deviation since standard deviation of returns of BOK is the highest amongst all. This case has denied the universal phenomenon of higher the risk higher the return. The value 1.7169 (171.69%) represents dispersion of the returns around the mean return. It refers total risk inherent in the stocks of BOK. Coefficient of variation reveals risk per unit of return and provides better possible value for risk. BOK stocks possess the highest value of CV. Thus, BOK stocks are the most risky stock.

On the contrary, NIC stocks are the least preferred stocks to investors since it fetch investor negative return. Therefore, standard deviation and CV is also the least. From the comparison of three parameters what can be concluded is the stocks of NIB, SBI and SCB are the best for the risk averter whereas the risk taker will prefer to hold the stocks of EBL, BOK, HBL, NABIL and NBB. Since NIC stock realizes negative return, it may not be feasible to any rational investor.

Covariance presented in table 1 is the covariance of each stocks return with market. Since all values of covariance is positive. It indicates securities' return tend to move in the same direction where the market is moving. Positive covariance implies positive correlation. Therefore, correlation of stocks' return with market is positive in case of all companies.

4.2 Risk Parameters

Forces that contribute to variations in return – price or dividend (interest) - constitute elements of risk. Some influences are external to the firm, cannot be controlled, and affect large numbers of securities. Other influences are internal to the firm and are controllable to a large degree. In investment, those forces that are uncontrollable, external, and board in their effect are called sources of systematic risk. Conversely, controllable, internal factors somewhat peculiar to industries and/or firms are referred to as sources of unsystematic risk.

Beta measures non-diversifiable risk. Beta shows how the price of a security responds to the market forces. Stocks having betas of less than 1 will be less responsive to changing returns in the market, and therefore are considered less risky and vice-versa.

TABLE 2: Risk Parameters

S.N.	Stock	Alpha (α)	Beta (β)	Systematic Risk	Unsystematic Risk	Coefficient of Determination (ρ^2)
1	EBL	0.3231	2.3011	0.8160	0.0926	0.8980
2	BOK	0.4280	4.3056	2.8568	0.0910	0.9691
3	HBL	0.4934	1.1801	0.2146	0.2280	0.5190
4	NABIL	0.2356	1.4392	0.3192	0.0328	0.9067
5	NBB	0.5791	3.6433	2.0454	0.1592	0.9278
6	NIC	-0.1663	0.3382	0.0176	0.0151	0.5384
7	NIB	0.0811	1.2944	0.2582	0.0344	0.8821
8	SBI	0.2762	0.2220	0.0076	0.8575	0.0088
9	SCB	0.4076	1.3272	0.2714	0.2520	0.5186
10	Pravu	0.3578	1.3015	0.2568	0.2358	0.5897

Sources: Appendix

Table 2 *inter alias* provides us the estimated value of beta coefficient of different stocks. NIC and SBI stocks are expected to possess the volatility less than the market in contrast to the stocks of the rest banks since their beta is higher than 1. They can therefore be termed as defensive assets whereas other stock are expected to possess high volatility than the market and can be termed as aggressive assets. It is also a parameter used for measurement of systematic risk inherent in the stocks. Beta of BOK is the highest and represents that stocks are 3.30563 times (4.30563-1) more volatile than the market. Similarly the table also gives us the portion of systematic risk and unsystematic risk in the total risk, i.e., variance. BOK leads in this case too recording 2.8568 as portion of the systematic risk while the portion of unsystematic risk is relatively lower, i.e., 0.0910. It is observed that NIC stocks carry the lowest portion of such risk. On the other hand, SBI stocks carry the highest portion of unsystematic risk, i.e., 0.8575 whereas, unsystematic risk in NIC stocks is the lowest.

Coefficient of determination computed in the above table shows how much of the movements in the banks' returns are explained by movements in the returns on index. With the value of 0.9691, it can be explained that 96.91% of the movements in the return on BOK during the five-year is attributed to movements in the return on the market. While 3.09% (1-0.9691=0.0309) of the movements in the stocks cannot be attributed to movement in the market. Therefore, 3.09% of the risk can be diversified away with optimal portfolio construction.

4.3 Estimation of True Beta and True Alpha

Security's true historical beta cannot be observed but can be estimated. Thus, even if security's "true" beta remained the same forever, its estimated value, obtained in the manner shown in table 2, would still change from time to time because of mistakes (known as sampling errors) in estimating it.

TABLE 3: True Beta and True Alpha

S.N.	STOCK	SD of Random Error Term	SE of Beta	SE of Alpha	True Beta		True Alpha	
					High	Low	High	Low
1	**EBL**	0.3537	0.4506	0.1654	2.7517	1.8505	0.4885	0.1577
2	**BOK**	0.3480	0.4433	0.1627	4.7489	3.8623	0.5907	0.2653
3	**HBL**	0.5491	0.6995	0.2568	1.8796	0.4806	0.7502	0.2366
4	**NABIL**	0.2016	0.2568	0.0943	1.6960	1.1824	0.3299	0.1413
5	**NBB**	0.4587	0.5843	0.2145	4.2276	3.0590	0.7936	0.3646
6	**NIC**	0.1415	0.1803	0.0662	0.5185	0.1579	-0.1001	-0.2325
7	**NIB**	0.2140	0.2726	0.1001	1.5670	1.0218	0.1812	-0.0190
8	**SBI**	1.0703	1.3633	0.5005	1.5853	-1.1413	0.7767	-0.2243
9	**SCB**	0.5837	0.7435	0.2729	2.0707	0.5837	0.6805	0.1347
10	**Pravu**	0.5897	0.8456	0.3564	1.8975	0.5897	0.7894	0.1458

Sources: Appendix

Standard error of beta shown in the table 3 attempts to indicate the extent of estimation errors. The beta of different stock has confidence range between values presented in the table 3 representing the true values of the beta. However, the chances are roughly two out of three that the 'true' beta a standard error, plus or minus, of the estimated beta. Thus, BOK's beta is likely to be larger than 3.86 and smaller than 4.75, and not exactly 4.3056.

While the value of the alpha representing the y-intercept provides the return of the stocks at zero percentage risk. Alpha of NBB is the highest in compare to the alpha of other eight different stocks. It refers to NBB's expected yearly return as 0.5791 (57.91%) when the market earns nothing. The value is the least as well as negative in the case of NIC bank. As in the case of beta coefficient, the standard error of the alpha provides an indication of the magnitude of the possible sampling error that has been made in estimating alpha.

4.4 Correlation Coefficient between the Returns of Stocks

Investing wealth in more than one security can reduce risk. However, the extent of benefits of portfolio diversification depends on correlation between returns of securities.

TABLE 4: Correlation between the stocks

R	EBL	BOK	HBL	NABIL	NBB	NIC	NIB	SBI	SCB	Pravu
EBL	1	0.9603	0.8269	0.934	0.9699	0.8613	0.9202	-0.1395	0.808	0.8588
BOK		1	0.668	0.9029	0.9756	0.7039	0.9824	-0.0741	0.6971	0.7895
HBL			1	0.8487	0.7831	0.9909	0.5898	-0.0637	0.6935	07689
NABIL				1	0.9262	0.876	0.8181	0.2004	0.7723	0.8546
NBB					1	0.7947	0.9592	-0.1138	0.6504	0.8879
NIC						1	0.6148	-0.0394	0.7827	0.6258
NIB							1	-0.208	0.5854	0.45689
SBI								1	0.0478	0.01256
SCB									1	0.8978
Pravu										1

Sources: Appendix

Table 4 shows the correlation of the stocks with each other. Stocks possess positive correlation with each other except the SBI. Correlation of SBI bank's stocks is negative with most of the stocks. However, we can observe a low degree of positive correlation in the case of SBI stocks with NABIL and SCB.

Because of low degree of negative correlation with the rest banks, the risk associated with the SBI stocks can be diversified away by combining it with other stocks. The negative value describes the behavior of its returns in compare to returns of other banks. When returns of other banks' stock increases, the returns of the SBI bank decreases and the vice-versa.

We can also observe moderate degree of positive correlation between BOK-HBL, BOK-SCB, HBL-NIB, HBL-SCB, NBB-SCB, NIC-NIB, and NIB-SCB. It means that the proportion of positive increase in returns of either stock may be closer to proportionate change in returns of other stocks.

4.5 Investment Performance Evaluation

Selection of the best investment opportunity has always been a challenge to investors. A risk averse investor will always seek some risk measurement tool to make the best utilization of fund. William F. Sharpe, Jack Treynor and Dr. Michael C. Jensen have developed an evaluation tool and the test of which has been carried out in the present study.

TABLE 5: Investment Performance Evaluation

S.N.	STOCK	R	σ	β	α	Sp	Rank	Tp	Rank	Jp	Rank
1	EBL	0.57	0.95	2.3011	0.3844	0.5486	5	0.2272	6	0.1670	6
2	BOK	0.89	1.72	4.3056	0.5837	0.4909	6	0.1958	7	0.1356	7
3	HBL	0.62	0.67	1.1801	0.5019	0.8611	1	0.4855	2	0.4253	2
4	NABIL	0.39	0.59	1.4392	0.2563	0.5780	4	0.2383	5	0.1781	5
5	NBB	0.97	1.48	3.6433	0.7036	0.6216	3	0.2533	4	0.1931	4
6	NIC	-0.13	0.18	0.3382	-0.1975	-0.9790	9	-0.5237	9	-0.5839	9
7	NIB	0.22	0.54	1.2944	0.0950	0.3197	7	0.1336	8	0.0734	8
8	SBI	0.30	0.93	0.2220	0.2395	0.2719	8	1.1393	1	1.0791	1
9	SCB	0.55	0.72	1.3272	0.4230	0.6951	2	0.3789	3	0.3187	3
10	Pravu	0.54	0.78	1.4568	0.3568	0.6897	10	0.5689	10	0.6589	10

Sources: Appendix

Sharpe's performance measure has ranked HBL stock first and NIC stock the last; however, Treynor's and Jensen's measure has evaluated SBI stock with first rank and NIC stock with the last.

4.5.1 Rank Correlation (R)

From the above investment performance evaluation, the ranks provided by Trenynor's measure is commensurate to the ranks of Jenson's measure in contrast to Sharpe's, which can further be illustrated through correlation between their ranks.

Between Sharpe's and Treynor's Ranks = 0.5333

Between Treynor's and Jenson's Ranks = 1

Between Sharpe's and Treynor's Ranks = 0.5333

Treynor's and Jenson's Ranks provides the perfectly positive correlation since they have the identical ranks for the securities in contrast to Sharpe.

4.6 Security Market Line (SML)

Security market line helps distinguish whether the stocks are overpriced or under priced. It shows relationship between the measures of systematic risk, β_j, and the required return, R_j, of an asset. The line slopes upward and confirms that investors are risk averse: the higher the risk (βj), the higher the required return.

The SML equation is developed as

$$Rj = Rf + (Rm - Rf)\,\beta_j$$

$$= 0.0471 + (0.1073 - 0.0471)\,\beta_j$$

$$= 0.0471 + 0.0602\,\beta_j$$

where,

Rj = *Required Rate of Return*

Rf = *Risk Free Rate of Return*

TABLE 6: Evaluation of Stock Price

Banks	Expected Return	Beta	Reqd. Rate of Return	Evaluation
EBL	0.5715	2.3011	0.1856	Under priced
BOK	0.8894	4.3056	0.3063	Under priced
HBL	0.6176	1.1801	0.1181	Under priced
NABIL	0.3851	1.4392	0.1337	Under priced
NBB	0.9684	3.6433	0.2664	Under priced
NIC	-0.1296	0.3382	0.0675	Overpriced
NIB	0.2195	1.2944	0.1250	Under priced
SBI	0.3045	0.2220	0.0605	Under priced
SCB	0.5549	1.3272	0.1270	Under priced
Pravu	0.4568`	1.5897	0.2568	Under Price

Sources: Appendix

Table 6 shows the positive relationship between the risk and the return indicating higher the tolerance for risk, higher is the return and vice versa. Criteria for rating the securities overpriced and under priced are defined by the CAPM. Using the model, the above table also depicts except NIC stocks all the stocks in the market are under priced since their expected return is higher than the required. The main reason behind the fact is that its risk adjustment factor is less than the risk adjustment factor for the market as a whole. Therefore, an active investor can take a long position in NIC stocks whereas he finds short position the best for the under priced stocks.

4.7 Capital Market Line (CML)

CML assists in identifying the efficient portfolio that is perfectly correlated with the market portfolio since they all fall on the CML. In the present study, calculation presented in Appendix 9 has been carried out for the formulation of the CML.

The data analyzed in the appendix has been put in the equation of the CML prescribed by the CAPM.

$$Rp = Rf + \left[\frac{Rm - Rf}{\sigma_m} \right] \sigma_p$$

$$Rp = 0.0471 + \left[\frac{0.1043 - 0.0471}{0.3925} \right] \sigma_p$$

$$= 0.0471 + 0.1457\, \sigma_p$$

From the use of CML, the required return only for those efficient portfolios that are perfectly correlated with the market portfolio can be determined since they fall on the CML. CML provides the highest expected return for each level of risk and represents the market equilibrium trade off between risk and return. It assists investors to borrow and lend at the risk less rate, R_f. Thus in equilibrium, all risk-averse investors will choose their optimal portfolios from combinations of the risk less asset and the risky portfolio. The most important aspect of the Capital Market Line is that it describes the market price of risk or risk premium, which is used by all individuals who make

decisions in the face of uncertainty. Risk premium in the present study has been identified as 0.1457.

4.8 Portfolio Opportunity Sets at Different Risk Level

Optimal portfolio is the combination of assets where the investor can minimize his risk level without losing any percentages in the return. It can further be explained as minimum variance portfolio among the several portfolio opportunity sets.

4.8.1 Portfolio Opportunity Sets at 57% Return

The following table gives us different points as portfolios, which are, selected purely on random sampling basis, where the investor can realize 57% return at different standard deviations.

TABLE 7: Attainable Set for 57% Return

S.N.	WEIGHTS									Pravu	σ_P	R_P
	EBL	BOK	HBL	NABIL	NBB	NIC	NIB	SBI	SCB			
1	1.00	-	-	-	-	-	-	-	-	-	0.95	0.57
2	-	-	0.80	0.20	-	-	-	-	-	0.45	0.64	0.57
3	0.75	-	-	-	-	-	-	-	0.25	0.11	0.87	0.57
4	0.80	-	-	-	-	-	-	-	0.20	-	0.88	0.57
5	0.85	-	-	-	-	-	-	-	0.15	-	0.90	0.57
6	0.90	-	-	-	-	-	-	-	0.10	0.92	0.92	0.57
7	0.95	-	-	-	-	-	-	-	0.05	-	0.94	0.57
8	-	0.01	0.75	0.24	-	-	-	-	-	-	0.64	0.57
9	-	0.25	0.25	0.50	-	-	-	-	-	-	0.84	0.57
10	-	-	0.75	0.24	0.01	-	-	-	-		0.64	0.57
11	0.95	-	-	-	-	-	-	0.01	0.04		0.93	0.57
12	0.75	0.01	-	-	-	-	-	-	0.24		0.88	0.57
13	0.95	0.01	-	-	-	-	-	-	0.04		0.95	0.57
14	-	0.10	0.05	0.65	0.20	-	-	-	-	-	0.86	0.57
15	-	0.05	0.55	0.35	0.05	-	-	-	-		0.69	0.57
16	-	-	0.65	0.20	0.10	0.05	-	-	-	-	0.67	0.57
17	-	-	0.20	0.10	0.45	0.25	-	-	-	-	0.87	0.57
18	0.85	0.05	-	-	-	-	-	0.05	0.05	-	0.92	0.57
19	0.05	0.05	0.05	-	-	-	-	-	0.85	-	0.60	0.57
20	0.15	0.05	0.05	-	-	-	-	-	0.75	-	0.63	0.57
21	-	0.05	0.50	0.20	0.15	0.10	-	-	-	-	0.80	0.57
22	-	-	0.10	0.05	0.50	0.20	0.15	-	-	-	0.93	0.57
23	0.10	0.05	0.50	0.20	-	-	-	-	0.15	0.11	0.68	0.57
24	0.03	0.30	0.25	-	-	-	0.20	0.12	0.10	-	0.82	0.57
25	-	0.18	0.12	0.20	0.26	0.14	0.08	0.02	-	-	0.92	0.57
26	0.08	0.02	0.18	0.12	0.20	-	-	0.26	0.14	-	0.68	0.57
27	0.18	0.12	0.20	0.26	0.14	0.08	-	-	0.02	-	0.85	0.57

28	0.20	0.15	-	0.14	0.10	0.05	0.04	0.02	0.30	0.25	0.87	0.57

Sources: Appendix

In the table 7, we can see with 100% fund investment in EBL, one can realize the return of 0.57 (57%) but he requires risk tolerance of 0.95 (95%). However, combining EBL stock with others, the standard deviation can be reduced to minimum of 0.60. It seems absolutely impossible, but the present study has shown that combining EBL stock with other three stocks of different companies with weights of 0.05 in EBL, 0.05 in BOK, 0.05 in HBL, and 0.85 in SCB, it is possible. However, there may still exist numerous chances of reducing the total risk below this level at the same rate of return. Since the given portfolios are merely selected on random sampling basis and other portfolios at different weights can be developed which may reduce the standard deviation below 0.60 (60%). It is thus what can be concluded is the investor is not suggested to invest merely in EBL stock for realizing the return of 57%, he can realize the same rate of return at different portfolios and the optimal portfolio may be the portfolio presented in the serial number 19. If the construction of this portfolio is not possible, he may refer to portfolio 20, 8 or 10 since these possess the second and the third lowest standard deviation among the 28 portfolios.

4.8.2 Portfolio Opportunity Sets at 89% Return

An investor can realize this rate of return, at 100% of his fund invested in the BOK stocks. Following table gives us some portfolios fetching the same return at different standard deviation.

TABLE 8: Attainable Set for 89% Return

S.N.	BOK	HBL	NABIL	NBB	NIC	σ_P	R_P

1	1.00	-	-	-	-	1.72	0.89
2	-	-	0.05	0.90	0.05	1.37	0.89
3	0.20	0.10	0.05	0.65	-	1.38	0.89

Sources: Appendix

Samples of only three portfolios realizing the return of 89% are detected from the 747 portfolios constructed in Appendix 10. Table 8 shows that standard deviation can be reduced from 1.72 (172%) to 1.38 (138%) by constructing portfolio including the stocks of four different banks. The standard deviation can be further reduced to 1.37 (137%), but this portfolio does not include BOK stocks. Thus, an investor holding BOK stocks can take short position for the BOK stocks and can take long position on the stocks of NABIL, NBB and NIC to attain the same rate of return.

4.8.3 Portfolio Opportunity Sets at 62% Return

Attainable sets for the investors at 0.62 (62%) returns are presented in the following table.

TABLE 9: Attainable Set for 62% Return

S.N.	EBL	BOK	HBL	NABIL	NBB	NIC	NIB	SBI	SCB	Pravu	σ_P	R_P
1	-		1.00	-	-	-	-	-	-	-	0.67	0.62
2	0.85	0.15	-	-	-	-	-	-	-	-	1.06	0.62
3	-		-	0.60	0.40	-	-	-	-	-	0.93	0.62
4	-	0.05	0.90	0.05	-	-	-	-	-	-	0.69	0.62
5	0.05	0.05	0.85	0.05	-	-	-	-	-	-	0.70	0.62
6	-	0.05	0.75	0.15	0.05	-	-	-	-	-	0.71	0.62
7	-	0.05	0.65	0.20	0.10	-	-	-	-	-	0.74	0.62
8	0.75	0.15	0.05	-	-	-	-	-	0.05	0.25	1.01	0.62
9	0.05	0.05	0.75	-	-	-	-	-	0.15	0.10	0.67	0.62
10	0.20	0.10	0.45	-	-	-	-	-	0.25	0.08	0.73	0.62
11	0.05	0.50	-	-	-	-	0.20	0.15	0.10	0.44	1.06	0.62
12	0.25	0.20	0.15	-	-	-	-	0.05	0.35	-	0.86	0.62
13	0.35	0.25	0.20	-	-	-	-	0.15	0.05	-	0.89	0.62
14	0.50	0.20	0.15	0.10	-	-	-	-	0.05	-	1.01	0.62
15	0.03	0.30	0.25	0.20	0.12	0.10	-	-	-	-	0.97	0.62
16	0.02	0.30	0.20	0.15	0.14	0.10	-	0.05	0.04	0.06	0.96	0.62

Sources: Appendix

In the present study, sixteen portfolios yielding return of 0.62 (62%) returns are identified. Each portfolio contains different levels of risk measured through standard deviation. But in these 16 portfolios, the diversification in the risk could not be detected since the sample size for the attainment of 0.62 (62%) return is not adequate. But what can be concluded is the investor holding one of the 14 different portfolios can revise his portfolio as per portfolio number 1 or 9. But it seems that the investors choice for the portfolio 9 seems better than portfolio 1, since the unpredictable and uncertain future may result the unforeseen losses to the bank, which may take the investor along with it.

4.8.4 Portfolio Opportunity Sets at 39% Return.

This level of return can be earned from 100% investment in NABIL bank, which carries volatility of 0.59 (59%) but this rate of volatility can be reduced to 0.52 (52%) by combining it with the stocks of other five different banks and making the portfolio of six assets. Detail is presented below.

TABLE 10: Attainable Set for 39% Return

S.N.	EBL	BOK	HBL	NABIL	NBB	NIC	NIB	SBI	SCB	Pravu	σ_P	R_P
1	-	-	-	1.00	-	-	-	-	-	-	0.59	0.39
2	-	-	-	-	-	-	-	0.65	0.35	0.31	0.67	0.39
3	-	-	-	-	0.20	0.10	0.05	0.65	-	-	0.66	0.39
4	-	-	-	0.25	0.20	0.15	0.05	0.35	-	-	0.58	0.39
5	0.15	0.05	-	-	-	-	0.35	0.25	0.20	0.19	0.56	0.39
6	-	-	-	0.12	0.10	0.03	0.30	0.25	0.20	0.18	0.52	0.39
8	0.03	0.30	-	-	-	0.25	0.20	0.12	0.10	0.09	0.73	0.39
9	-	0.02	0.18	0.12	0.20	0.26	0.14	0.08	-	-	0.61	0.39

Sources: Appendix

Table 10 provides us nine portfolios assigned different weights to the assets. In order to attain the return of 0.39 (39%), a rational investor will certainly try to manage his fund to the best of his knowledge. He may find the other portfolio more feasible than the portfolio identified in the present study as an optimal portfolio since there are other infinite portfolio options available to the investor.

The investor can construct the portfolio 5 or 6 since these portfolios too provides the investor the same rate of return which is possible from cent percent of fund investment in NABIL. Comparatively the amount of risk is lower than the investment merely made in the stocks of NABIL bank.

4.8.5 Portfolio Opportunity Sets at 22% Return

Attainable sets for the investors at 0.22 (22%) returns are presented in the following table.

TABLE 11: Attainable Set for 22% Return

S.N.	HBL	NABIL	NBB	NIC	NIB	SBI	SCB	σ_P	R_P
1	-	-	-	-	1.00	-	-	0.54	0.22
2	-	-	-	-	0.95	0.05	-	0.51	0.22
3	-	-	-	0.05	0.85	0.05	0.05	0.48	0.22
4	0.12	0.10	0.03	0.30	0.25	0.20	-	0.37	0.22

Sources: Appendix

NIB stocks derive return of 0.22 (22%) if 100 % investment is made in it. But this stock carries volatility of 0.54 (54%). However, this risk level can be minimized making portfolio of NIB and SBI, where the risk level has gone down to 0.51 (51%). Further, this level can also be minimized, to 0.48 (48%) by combining these two stocks with NIC and SCB at the weights of 0.05, 0.85, 0.05, and 0.05 with NIC, NIB, SBI and SCB respectively. But, the optimal portfolio to earn 22% return can be the portfolio 4 presented in the table 11.

4.8.6 Portfolio Opportunity Sets at 30% Return

Following table gives us the different opportunity sets to earn return of 30% at different percentages of investment in the stocks of various banks.

TABLE 12: Attainable Set for 30% Return

S.N.	EBL	BOK	HBL	NABIL	NBB	NIC	NIB	SBI	SCB	Pravu	σ_P	R_P
1	-	-	-	-	-	-	-	1.00	-	-	0.93	0.30
2	-	-	-	-	-	-	0.05	0.95	-	-	0.88	0.30
3	-	-	-	-	-	-	0.04	0.95	0.01	-	0.88	0.30

4	-	-	-	0.35	0.05	0.05	0.55	-	-	-	0.56	0.30
5	-	-	-	-	-	0.10	0.05	0.65	0.20	-	0.63	0.30
6	0.10	-	-	-	-	0.05	0.50	0.20	0.15	0.09	0.50	0.30
7	0.05	0.04	0.02	0.30	-	0.20	0.15	0.14	0.10	0.07	0.48	0.30

Sources: Appendix

Optimal portfolio to earn 0.30 (30%) return is the portfolio 7 presented in the table 12 since this portfolio fetches return of 30% at 0.48 (48%) standard deviation, which is the lowest among the seven portfolios. The maximum risk tolerance of 0.93 (93%) is required to the investor if he or she utilizes the fund fully on the stocks of SBI bank. Portfolio 7 consists of the stocks of eight different companies, however, in real world portfolio identical to the portfolio 7 may not be feasible to construct. In such situation, there will still be other lots of portfolios where the investor can divert the fund. In the above table there are other five portfolios where the investor can enjoy the same return at lower risk than what is produced by the portfolio 1.

4.8.7 Portfolio Opportunity Sets at 55% Return

This level of return can be realized from 100% investment in SCB, which carries volatility of 0.72 (72%) but this rate of volatility can be reduced to 0.59 (59%) by combining it with the stocks of other four different banks and making the portfolio of five assets. Detail is presented below.

TABLE 13: Attainable Set for 55% Return

S.N.	EBL	BOK	HBL	NABIL	NBB	NIC	NIB	SBI	SCB	Pravu	σ_P	R_P
1	-	-	-	-	-	-	-	-	1.00	-	0.72	0.55
2	-	-	0.70	0.30	-	-	-	-	-	-	0.62	0.55
3	0.05	-	-	-	-	-	-	-	0.95	0.75	0.73	0.55
4	0.10	-	-	-	-	-	-	-	0.90	0.56	0.73	0.55
5	0.15	-	-	-	-	-	-	-	0.85	0.45	0.74	0.55
6	0.20	-	-	-	-	-	-	-	0.80	0.25	0.74	0.55
7	0.24	-	-	-	-	-	-	0.01	0.75	0.10	0.74	0.55
8	0.05	0.05	0.55	0.35	-	-	-	-	-	-	0.67	0.55
9	-	-	0.45	0.25	0.20	0.10	-	-	-		0.72	0.55
10	-	-	-	-	0.50	0.20	0.15	0.10	0.05	-	0.88	0.55
11	0.50	0.20	-	-	-	-	0.15	0.10	0.05	-	0.92	0.55
12	0.10	0.05	0.50	-	-	-	-	0.20	0.15	0.09	0.59	0.55
13	0.15	0.05	0.35	0.25	-	-	-	-	0.20	0.18	0.69	0.55
14	0.20	0.15	0.05	0.35	-	-	-	-	0.25	0.20	0.82	0.55
15	0.10	0.03	0.30	0.25	0.20	0.12	-	-	-	-	0.77	0.55
16	0.20	0.12	0.10	0.03	0.30	0.25	-	-	-	-	0.94	0.55
17	-	0.25	0.20	0.12	0.10	0.03	0.30	-	-	-	0.90	0.55
18	0.20	0.26	0.14	-	-	0.08	0.02	0.18	0.12	0.10	0.80	0.55
19	0.14	0.08	0.02	0.18	0.12	-	-	0.20	0.26	0.15	0.73	0.55
20	0.20	0.15	0.14	0.10	-	0.05	0.04	0.02	0.30	0.19	0.78	0.55

Sources: Appendix

The present study has identified 20 attainable sets at 0.55 (55%) return. All the attainable sets are not suitable to an investor. All these portfolios carry different levels of risks. The table provides the most risky portfolio to be portfolio 16 since the investor will experience 94 % of deviation in the returns from the mean. Similarly the

table provides us portfolio 12 with the lowest degree of risk, i.e., 0.59 (59%). Among the twenty portfolios this portfolio is optimal portfolio since the investor will be benefited from the same return at the lowest risk tolerance.

4.8.9 Portfolio Opportunity Sets of Uncorrelated Assets

Portfolio standard deviation, σ (Rp), is a function of correlation, ρxy, between risky assets. When the correlation between assets is perfectly positive, i.e., ρxy = +1, the portfolio risk is the weighted average of the risk of the assets in the portfolio and the portfolios plot along a straight line. There is a proportionate trade-off between risk and return. When the assets are uncorrelated and the relationship between σ (Rp) and w is nonlinear. Finally when the assets are perfectly inversely correlated, ρxy = -1, risk can be completely diversified away. However, in the present study none of these three cases are available, i.e., there does not exist any perfectly positive, perfectly negative and zero correlation between any two assets. During the course of study, it is identified that the general shape of the portfolio opportunity set, of the assets without perfect correlation, is convex to the Y-axis. Test of which has been presented below.

The correlation between NIB and SBI bank is –0.208. This value is the lowest negative correlation in the present study. In table 14, at different weights, twenty-one portfolios have been developed and their standard deviation and the expected rate of return are calculated.

TABLE 14: Attainable Sets between NIB and SBI at Different Weights.

S.N.	W (NIB)	W (SBI)	σ_p	R_p
1	1.00	-	0.54	0.22
2	0.95	0.05	0.51	0.22
3	0.90	0.10	0.48	0.23

4	0.85	0.15	0.45	0.23
5	0.80	0.20	0.43	0.24
6	0.75	0.25	0.42	0.24
7	0.70	0.30	0.42	0.24
8	0.65	0.35	0.43	0.25
9	0.60	0.40	0.44	0.25
10	0.55	0.45	0.46	0.26
11	0.50	0.50	0.49	0.26
12	0.45	0.55	0.52	0.26
13	0.40	0.60	0.55	0.27
14	0.35	0.65	0.59	0.27
15	0.30	0.70	0.64	0.28
16	0.25	0.75	0.68	0.28
17	0.20	0.80	0.73	0.28
18	0.15	0.85	0.78	0.29
19	0.10	0.90	0.83	0.29
20	0.05	0.95	0.88	0.30
21	-	1.00	0.93	0.30

Sources: Appendix

While plotting the values calculated in the above table we find the curved line convex to the R_p. Since the values of standard deviation and expected return have been rounded off, we find portfolio 6 or 7 the minimum variance portfolio with mean return of 0.24 (24%) at standard deviation of 0.42 (42%).

Another study has also been made between SBI stocks and SCB stocks. The correlation between these two assets is 0.0478. This value is almost closure to zero.

TABLE 15: Attainable Sets between SBI and SCB at Different Weights.

S.N.	W(SBI)	W(SCB)	σ_p	R_p
1	1.00	-	0.89	0.31
2	0.95	0.05	0.84	0.33
3	0.90	0.10	0.80	0.34
4	0.85	0.15	0.76	0.35
5	0.80	0.20	0.73	0.36
6	0.75	0.25	0.70	0.38
7	0.70	0.30	0.67	0.39
8	0.65	0.35	0.64	0.40
9	0.60	0.40	0.62	0.41
10	0.55	0.45	0.60	0.43
11	0.50	0.50	0.59	0.44
12	0.45	0.55	0.59	0.45
13	0.40	0.60	0.58	0.46
14	0.35	0.65	0.59	0.48
15	0.30	0.70	0.60	0.49
16	0.25	0.75	0.62	0.50
17	0.20	0.80	0.64	0.51
18	0.15	0.85	0.66	0.53
19	0.10	0.90	0.69	0.54
20	0.05	0.95	0.72	0.55
21	-	1.00	0.73	0.55

Sources: Appendix

In table 15, the minimum standard deviation is 0.58 (58%); at this risk level the mean return is found to be 0.46 (46%). This is the optimal portfolio between SBI and SBC stocks.

4.8.10 The Single Index Model

Single index model provides that the desirability of any stock is directly related to its excess return-to-beta ratio. If the stocks are ranked by excess return to beta (Treynor's performance measure), the ranking represents the desirability if any stock's inclusion in a portfolio. The number of stocks selected depends on a unique cutoff rate such that all stocks with higher return to beta ratios will be included and all the stocks with lower ratios excluded.

The use of single index model provides the following portfolio return and standard deviation, which is the optimal portfolio in the present study.

TABLE 16: Optimal Portfolio Set

Stocks	R_j	W_j
W(SBI)	30.45	0.03
W(HBL)	61.76	0.68
W(SCB)	55.49	0.29
R_p		**58.98**
σ_p		**61.65**

Sources: Appendix

Therefore, any investor seeking the optimal portfolio for management of his funds requires selecting SBI stocks, HBL stocks and SCB stocks with 3%, 68% and 29% of his fund invested in the respective stocks. The return he can derive is 58.98% whereas he requires bearing risk of 61.65%.

4.9 Test of Hypothesis

4.9.1 Testing of Hypothesis – I (T-Test)

Hypothesis based on the test of significance for difference between portfolio return and market return.

Null Hypothesis (Ho): $R_m = E(R)_j$, i.e., there is no significant difference between the portfolio return and market return. In other words, average return on the shares of commercial banks is equal to market portfolio return.

Alternate Hypothesis (H1): $R_m \neq E(R)_j$, i.e., there is significant difference between the portfolio return and market return. In other words, average return on the shares of commercial banks is not equal to market portfolio return.

Test Statistics

$$t = \frac{x_1 - x_2}{\sqrt{S^2 (1/n_1 + 1/n_2)}}$$

where,

x_1 = *Average Return of the Portfolio of Banking industry = 0.1272*

x_2 = *Average Return of Market Portfolio = 0.1073*

$n_1 = n_2$ = *Number of Observations = 5*

S^2 = *Estimated Standard Deviation of Population*

$$S^2 = \frac{n_1 s_1 + n_2 s_2}{n_1 + n_2 - 2} = 0.5254$$

s_1 = *Standard Deviation of the Returns of Banking Industry = 0.4481*

s_2 = *Standard Deviation of the Market Returns = 0.3925*

$$t = \frac{0.1272 - 0.1073}{\sqrt{0.5254\,(1/5 + 1/5)}}$$

$$= 0.04348$$

The tabulated value of t for 8 degree of freedom at 5% level of significance is 2.306.

Decision:

Since the calculated value of t is less than the tabulated value, the null hypothesis is accepted. It refers that there is no significant difference between portfolio return and market return.

4.9.2 Testing of Hypothesis – II (T-Test)

Hypothesis based on the test of significance for difference between portfolio beta and market beta.

Null Hypothesis (Ho): $b_p = \mu$ or $b_p = 1$, i.e., average beta of the bank portfolio is equal to 1. In other words there is no significance difference between the portfolio beta of the banks and the market beta.

Alternate Hypothesis (H_1): $b_p \neq \mu$ or $b_p \neq 1$, i.e., average beta of the bank portfolio is not equal to 1. In other words there is significance difference between the portfolio beta of the banks and the market beta.

Test Statistics

$$t = \frac{x - \mu}{\frac{S}{\sqrt{n}}}$$

$$t = \frac{x - 1}{\frac{S}{\sqrt{n}}}$$

where,

$x = b_p$*= Weighted average of beta of the banks = 1.5561*

μ *= Market beta = 1*

S = Estimated population standard deviation = 1.5005

n = Sample size = 9

$$t = \frac{1.5561 - 1}{\frac{1.5005}{\sqrt{9}}}$$

$$= 1.1118$$

The tabulated value of t for 8 degree of freedom at 5% level of significance is 2.306.

Decision:

Since the calculated value of t is less than the tabulated value, the null hypothesis is accepted. It refers that there is no significant difference between the portfolio beta and the market beta. In other words, the portfolio beta is also equivalent to 1.

4.9.3 Testing of Hypothesis – III (F-Test)

Hypothesis based on the test of significance in average returns per annum the banks.

F test is carried out by classifying the banks in three categories. Market capitalization of the banks has been taken as base for classification, which is as follows:

TABLE 17: Classification of Stocks

Stocks	Market Capitalization	Category
EBL	1,171,288,950.00	Second
BOK	917,890,182.00	Third

HBL	3,586,440,000.00	First
NABIL	3,608,813,250.00	First
NBB	1,296,000,000.00	Second
NIC	900,000,000.00	Third
NIB	1,881,328,545.00	Second
SBI	1,100,718,720.00	Second
SCB	5,568,600,320.00	First
Pravu	9,589,405,125.00	First

Source: Trading Reports of NEPSE

Null Hypothesis (Ho): $\mu_1 = \mu_2 = \mu_3$, there is no significant difference in the average returns of the bank.

Alternative Hypothesis (H_1): $\mu_1 \neq \mu_2 \neq \mu_3$, there is significant difference in the average returns of the bank.

TABLE 18: One Way ANOVA

Source of Variation	**Sum of Square**	**Degree of Freedom**	**Mean of Square**	**F Ratio**
Between Returns	SSC = 632.11	K-1 = 2	MSC = SSC/K-1= 316.05	F = MSC/MSE
				= 0.05
Within Returns	SSE = 70762.25	N-K = 12	MSE = SSE/N-K = 5896.85	

Source: Appendix

Calculated F value (2,12) = 0.05

Tabulated $F_{0.05}$ (2,12) = 3.89

Decision:

Since the calculated value of F is less than the tabulated value, Null Hypothesis is accepted. Hence it is concluded that there is no significant difference in the average returns of the banks.

4.10 Findings

This chapter focuses on the findings and discusses about the findings. The study findings are presented under sub headings such as the investment, risk and return analysis, optimal portfolios. Excess of income over consumption is saving. Investment is the productive utilization of saving. Investment in the real sense implies the meaning of financial investment, which involves contracts written on pieces of paper, such as common stocks and bonds. Investment involves risk since investment fetch potential return, which can be negative or positive. Thus investment in single asset is extremely volatile. Construction of portfolio can diversify such volatility to some extent. Return refers to potential benefits derived from the investment. Risk and return move together. Rate of return in the market continuously fluctuates. No one can guess what turn the rate of return will take in the future. Thus, an investor should always be conscious of magnitudes of such changes. The greater the variability in the possible return greater is the value of variance. Reason behind the maximum of the variance in the return of BOK stock and NBB stock is also the same. Changes in the capital gains and dividend against the previous year in such asset seems fluctuating excessively, the value has sometimes been observed positive sometimes negative. Fluctuations in the capital gain are merely due to changes in the closing prices of the stock. BOK stocks value has been observed maximum of Rs. 998 in 2000, whereas NBB stock stood at Rs. 1502. In the same year, it is observed that BOK has paid 20% and NBB has paid 100% of stock dividend resulting the total dividend including cash

and stock as Rs. 268.43 and Rs. 1100 respectively. But in the following year, the closing price of BOK has decreased to Rs. 850 and the total dividend amounted to nil. In the case of NBB, the closing price in 2001 has decreased to Rs. 1100 and the total dividend to Rs. 260. Thus the return in stocks cannot be predicted. Returns of all stocks are positively correlated with the market; thus, in the market they all move in the same direction with the market except in the case of SBI bank. Its correlation value is almost zero and it is, therefore, uncorrelated with the market.

Systematic risks are undiversifiable. Beta is a measure for systematic risk. It shows how the price of security responds to the market forces. Market beta is always equal to 1. Stocks having betas of less than 1 are less responsive to the market and they are called defensive assets. In the study, the stocks of NIC bank and SBI bank are found to be the defensive amongst the banks. On the other hand stocks having beta of more than 1 are considered to be highly responsive to the market and they are termed as aggressive assets. They study has identified all assets to be aggressive except the stocks of NIC and SBI bank. The coefficient of determination shows the movements in the banks return being explained by market. The coefficient of determination is also serves as a measure for systematic risk. Higher the value of coefficient of determination higher will be the value of systematic risk. BOK stocks have the highest value of the coefficient of determination and it gives us indication of maximum of the systematic risk.

True beta cannot be calculated. Its value can only be estimated. But estimation involves errors, called sampling errors. Such error term in the present study has been identified from the standard deviation of random error term. This value is the maximum in the returns of SBI bank stocks. Using the standard error of random error term the standard error of beta as well as alpha has been identified which indicates the magnitude of the possible sampling error that has been made in estimating beta and alpha. The range of the true beta and alpha has been calculated by adjusting the

standard error in the estimated beta and estimated alpha. The value of true beta is highest in BOK stocks.

Reduction in the risk through the construction of portfolio is possible if there exists high degree negative correlation between the returns of the stocks. But the present study could not detect high degree of negative correlation. Majority of the returns in shares are positively correlated and the returns of SBI stocks are however identified negatively correlated with most of the stocks except SCB and NIC. The risk associated to SBI bank can be diversified away by combining it with the stocks of other banks. The present study has evaluated the stocks of the banks in terms of risk and return associated to the stocks. Using the tools developed by Shapre, Treynor and Jensen, the stocks are evaluated. SBI stocks are ranked the first since the ranking criteria supplied by Treynor and Jensen supported SBI bank. Treynor's criteria interprets risk premium per unit of systematic risk and ratio of alpha to beta is explained by the Jensen's evaluation tool. Sharpe's tool defines risk premium per unit level of risk and the value is the highest in HBL stock. This tool thus ranks HBL stock the first. Rank correlation between the Treynor's rank and Jenson's rank is the perfectly positive, i.e., 1. SML and CML are the heart of CAPM. SML creates benchmark to evaluate whether the stocks are overpriced or under priced. Further it explains the required rate of return on all securities whether they are efficient. However, CML is used for determining the required return only for those efficient portfolios that are perfectly correlated with the market portfolio because they fall on the CML. Risk premium in the market as supplied by the SML is 0.0602, whereas, equilibrium price of risk or market price of risk as per CML is 0.1457 which describes that marginal rate of substitution for each investor in his or her rate of exchange between return and risk is 14.57%. In other words, it is the price of risk. Optimal portfolio to most of the investor varies with their attitude towards the tolerance of risk level. But majority of the risk averse investors find minimum variance portfolio yielding optimal satisfaction.

The minimum variance portfolio to earn 57% of return is the portfolio constructed from the stocks of EBL, BOK, HBL and SCB. But there can be numerous other portfolios yielding same rate of return at less portfolio standard deviation than the one that is identified in the present study. Minimum variance portfolio to earn 89% return is the portfolio constructed from the stocks of NABIL, NBB and NIC. Similarly, the portfolio made up of the stocks of six different banks viz., NABIL, NBB, NIC, NIB, SBI, SCB provides 39% of return at lowest level of risk. Unsystematic risk can be diversified away by combining the stock with stocks of other banks. Four attainable sets for return of 22% have been detected, which provides us the optimal portfolio as the portfolio constructed from the stocks of six banks, viz., HBL, NABIL, NBB, NIC, NIB, SBI The standard deviation is the lowest at this portfolio, i.e., 0.37. The return from cent percentage of investment in the SBI bank is 0.30 at standard deviation of 0.93. Since the stock posses negative correlation with most of the other bank's return, therefore, it can be predicted that the risk level can be minimized to a greater extent by combining it with other stocks. The optimal portfolio to earn the desired return is the portfolio from the stocks of EBL, BOK, HBL, NABIL, NIC, NIB, SBI and SCB where the standard deviation is recorded 0.48. Last but not least, the 20 different portfolio yielding 55% of return has been identified. The minimum variance portfolio among these is detected only one, which is formed from the stocks of five banks, viz., EBL, BOK, HBL, SBI and SCB. The general shape of portfolio opportunity set of the assets without perfect correlation is convex to the Y-axis. The correlation that exists between the returns of NIB and SBI stocks is near to 0, the shape of the opportunity set is also convex and optimal portfolio constructed from these two stocks is the one with weights of 0.75 to NIB and 0.25 to SBI. In addition, the same risk and return can be observed from the portfolio with weights of 0.70 to NIB and 0.30 to SBI. Similarly, the correlation between the SBI and SCB is also closure to 0 and the shape of opportunity set is also convex to the Y-axis and the optimal portfolio has been identified as the portfolio constructed from the stocks of SBI with 0.40 and SCB with 0.60 weights.

Single Index Model of Sharpe has, however, identified only three stocks are applicable for the construction of the optimal portfolio. Using the model, the stocks of SBI, HBL and SCB are identified the best stocks for the construction of the optimal portfolio, and the return derived from the same is 58.98% with standard deviation of the returns of 61.65%. The research hypothesis has shown that there is no significant difference between the portfolio return and market return. Similarly another hypothesis has shown that there is no significant difference between the portfolio beta and market beta. In addition, the last but not least hypothesis, shows that there is no significant difference in the annual returns of the three categories of the banks, classified on the basis of their market capitalization where the first category includes HBL, NABIL and SCB, the second category includes EBL, NBB, NIB and SBI, the third category includes BOK and NIC.

CHAPTER V

CONCLUSIONS

5.1 Discussion

The present has been conducted to examine the portfolio management in listed commercial banks in NEPSE from the investor's point of view. Apart from this the study also illustrates and describes the different parameters of risk and optimal portfolios at different returns.

Savings unless invested yield nothing. But investment requires prudence with the investor. An active investor must foresee the risk associated to every investment since risk always accompanies the return from the investment. Variance and standard deviation are the major risk parameters. The expected return of NBB is the highest, which refer that it yields maximum to the investor if the investor invests only in NBB. But the variance and standard deviation is also considerably high in compare to the returns of the other stocks. Market yields return of 10.73% and it involves variability of 39% in returns. In compare to market NBB is very profitable to invest but suitable only to the risk seekers. The correlation of the stocks with market shows the intensity or magnitude of their linear relationship, which implies the direction of the stock return and the market return movement. The positive correlation provides that stocks return move in the direction where the market moves.

Measurement of risk is not limited to calculation of standard deviation and coefficient of variation. It can further be described through the calculation beta. Beta is the measure for systematic risk and this risk is also called undiversifiable risk. The value

of beta is high with the stock of BOK and the portion of systematic risk is also the maximum with the same. SBI stocks recorded the lowest beta and the systematic risk associated with it is also the lowest. Unsystematic risks are diversifiable. They can be diversified from construction of portfolio. SBI stocks possess the highest value of unsystematic risk, whereas, it is lowest with NIC stocks. Coefficient of determination too serves as a measure for systematic risk. Its value is highest with the stocks of BOK, i.e., 0.9691 (96.91%). It implies that 96.91% of BOK's risk is explained by the market. It can be termed as market risk, which is undiversifiable.

5.2 Conclusions

Sampling errors or estimation errors does not disclose the true figure of any parameters. Such that the estimated alpha and beta too do not give us the value of true beta. True alpha and beta are affected standard errors and the standard errors are computed using standard deviation of random error term. Using standard error, only the range of true alpha and beta can be identified. Correlation coefficient lies between +1 and –1. Most of bank's stock returns posses positive correlation with each other. But in the case of SBI bank, its correlation existed with the returns of the other banks are negative and closure to zero. The portfolio constructed from SBI bank and other banks take shape convex to the y-axis. In the present study, such characteristics of portfolio opportunity set have been tried to explain from the portfolio made up of SBI-NIB and SBI-SCB.

Investment performance evaluation for the selection of the best investment opportunity is explained by the tools developed by Sharpe, Treynor and Jensen. Sharpe's evaluation criteria has ranked the stocks of HBL the first and NIC the last whereas, Treynor's and Jensen's criteria has ranked SBI stock the first and NIC the last.

Security Market Line and Capital Market Line is product of CAPM. SML assists in distinguishing the overpriced and under priced stocks. In the present study it is identified that NIC banks stocks are overpriced stock and rest of the bank's stock are under priced. CML provides the investor linear efficient portfolio set at unlimited borrowing and lending at risk free rate. Construction of linear efficient portfolio requires construction of the efficient frontier, but it requires the investor to consider n assets in his or her portfolios where n can take on values of 5, 10, 100, 500, 1000, and so on. However, this has been a limitation of the present study. The slope of this line gives us the value of price of risk or market price of risk. Each of the portfolios on the CML is perfectly diversified; these portfolios have an expected return above the risk-free rate proportional to their own total risk.

Optimal portfolio to most of the investor could be the one, which yields them same rate of return at minimum level of risk. In search of optimal portfolio, 747 portfolios at different weights are constructed. To earn 57% rate of return, a portfolio has been identified as an optimal one constructed from the stocks of EBL, BOK, HBL and SCB. Optimal portfolio at 89% return is identified as a portfolio constructed from the stocks of NABIL, NBB and NIC. Because of limited sample size, no portfolio could be detected at 62% return that would reduce risk from combination of various stocks. This rate of return can be deduced from sole investment in the HBL or creating portfolio from the combination of stocks of EBL, BOK, HBL and SCB. Optimal portfolio to realize return of 39% has been identified from the portfolio of the stocks of NABIL, NBB, NIC, NIB, SBI and SCB. Portfolio of the stocks of HBL, NABIL, NBB, NIC, NIB and SBI is identified as an optimal portfolio to yield return of 22%. Similarly, the portfolio of EBL, BOK, HBL, NABIL, NIC, NIB, SBI and SCB yield return of 30% at minimum portfolio standard deviation. The portfolio of stocks of EBL, BOK, HBL, SBI and SCB resulted the return of 55% at the lowest degree of standard deviation. However, the research has shown that the optimal portfolio is the portfolio constructed by using the Sharpe's single index model which has identified portfolio of the stocks of SBI, HBL and SCB with 3%, 68% and 29% investment of funds respectively.

Research hypothesis has shown that there is no significant difference between portfolio return and market return. Similarly another hypothesis has also tested that there is no significant difference between portfolio beta and market beta. Apart from this, the last but not least hypothesis has shown that there is not any significance difference in annual returns of the three categories of the banks, classified on the basis of their market capitalization where the first category has included HBL, NABIL and SCB, the second category included EBL, NBB, NIB and SBI, the third category included BOK and NIC.

5.3 Implications

Despite better performance and lucrative cash flows of the firm, an investor should make a rational decision prior to fund utilization. The present study though unfolded many options to make best utilization of fund but application of the same may not be feasible in the real practice. Following recommendations have, therefore, been provided.

i. NIC stock is the least fluctuating stock. It implies that it carries nominal level of risk but the return is negative. Thus, investor is suggested to invest in the security other than NIC bank. Among the remaining eight banks, the volatility measured by the standard deviation is lowest with the NIB, and if the investor finds himself the risk averter, he can have more of his funds invested in the stocks of NIB. On the contrary, if the investor's preference towards risk is very high, he or she prefers rest seven banks to NIB assets for his fund investment.

ii. The present study has been limited to the identification of optimal portfolio out of the 747 portfolios. Using the stocks of nine banks, other numerous portfolios can be constructed and the optimal portfolio better than what is identified from the present study can be detected.

The occurrence of the following series of episodes and events at national and international level has had adverse impact upon the overall economy in general.

i. These national and international events have caused lots of negative impacts upon overall business sector. Consequently, we can observe that the price of stock in the case of most of the banks have decreased to some extent in 2001. Therefore, an investor is cautioned to take necessary measures to overcome such unforeseen contingencies.

ii. The prolonged disputes on renewal of Nepal-India Trade Treaty finally reached to the point of consensus eliminating the uncertainties to the export based industries and trade with India. Nevertheless, the renewal of the treaty has brought tough challenges for Nepalese products in the days ahead. The amendment in the protocol of trade treaty has laid down various provisions of safeguards including quantitative restriction on four exportable Nepalese products, namely vegetable ghee, acrylic yarn, copper products and Zinc oxide.

iii. Such new safeguard provisions may put mammoth threat to Nepal's export based industries, causing adverse impact upon the sustainable growth and development of banking sector too. Thus investor is suggested to have study upon the credit extended by the banks to such sectors prior to investment.

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APPENDIX

Banks	Year	MPS	ROA	ROE	P/E ratio	DER	STDR	LTDR
NABIL	2008	5163	2.3	30.72	45.53	14.24	32.71	76.15
	2009	5087	2.6	33.93	43.19	13.02	31.14	75.35
	2010	3642	2.40	30.27	28.45	12.58	33.96	75.22
	2011	1818	2.40	29.02	17.72	11.73	29.30	73.96
	2012	1304	2.80	30.25	16.21	10.59	30.15	72.96
	2013	1585	3.25	32.78	19.08	9.95	30.21	72.20
	2014	2175	2.66	27.97	33.38	10.42	32.11	72.03
	2015	2223	2.06	22.73	33.37	11.23	29.81	74.69
	2016	2127	2.53	25.61	39.55	9.98	31.17	74.07
	2017	1883	2.66	27.87	28.31	10.43	30.49	73
NIBL	2008	2090	1.82	25.94	42.3	13.47	27.20	75.53
	2009	1919	1.79	23.05	37.1	12.56	26.87	74.22
	2010	1047	1.70	27.6	13.4	11.50	26.88	73.51
	2011	610	2.20	22.8	10.5	10.31	26.59	72.62
	2012	513	2.02	17.17	18.5	9.87	28.08	74.10
	2013	648	2.62	27.27	17	9.42	27.82	71.59
	2014	872	2.25	24.46	23.6	9.87	31.19	72.91
	2015	832	1.88	20.01	22.8	9.64	29.31	73.71
	2016	872	1.94	15.67	35.5	6.97	27.99	73.52
	2017	747	2.14	20.92	23.48	9.15	29.01	73.4
SCBNL	2008	6365	2.46	32.85	51.77	12.37	37.10	75.37

	2009	6420	2.56	33.58	54.64	12.30	34.01	74.69
	2010	4645	2.70	32.22	42.23	10.93	41.55	74.97
	2011	2540	2.55	30.43	25.9	10.91	43.03	75.59
	2012	1800	2.80	28.35	24.78	9.11	44.53	74.90
	2013	1810	2.67	26.37	27.7	8.88	46.33	75.60
	2014	2310	2.51	26.27	42.75	9.48	42.03	74.72
	2015	2371	1.98	21.69	33.86	9.91	40.61	75.39
	2016	2772	2.01	17.18	78.33	7.66	41.15	75.15
	2017	2213	2.39	23.97	41.48	9.00	42.74	75
HBL	2008	1860	1.30	25.31	31.56	13.40	32.03	76.03
	2009	1870	1.63	24.13	28.43	11.60	28.13	73.81
	2010	1288	1.93	14.79	25.66	11.42	29.13	73.81
	2011	696	1.47	22.35	12.88	10.70	28.73	73.24
	2012	614	2.03	20.69	16.35	10.74	28.50	73.20
	2013	677	1.54	17.8	20.47	10.54	28.81	73.58
	2014	821	1.30	15.76	28.43	11.10	28.25	73.88
	2015	877	1.34	15.98	24.36	10.90	29.23	74.13
	2016	1157	1.94	21.93	34.86	10.32	29.10	73.96
	2017	829	1.63	18.43	24.89	10.72	28.98	74
SBI	2008	1344	1.50	17.64	53.34	11.15	28.48	77.27
	2009	1706	1.70	18.58	52.52	17.05	36.97	79.17

	2010	1321	1.23	18.95	31.26	14.52	40.72	79.16
	2011	653	1.09	16.13	22.74	15.01	40.24	79.20
	2012	600	0.83	15.01	27.69	17.16	36.81	78.74
	2013	743	1.19	20.31	25.95	16.06	37.96	78.75
	2014	1065	1.51	22.85	36.75	12.47	25.51	74.49
	2015	1084	1.80	21.51	25.46	9.50	26.32	73.17
	2016	1381	2.00	22.16	54.68	10.35	34.13	77.49
	2017	974	1.46	20.37	34.10	13.10	30.82	74.9
EBL	2008	2781	1.69	23.48	34.11	13.13	29.61	73.87
	2009	2794	1.95	28.99	24.55	15.75	31.42	76.68
	2010	2043	2.01	29.95	16.27	14.00	29.36	75.38
	2011	1362	2.01	29.91	13.15	13.85	29.89	75.22
	2012	1064	1.95	26.1	11.67	12.36	30.55	74.10
	2013	1312	2.24	30.47	17.32	12.62	31.79	74.24
	2014	2111	2.20	28.39	30.58	11.91	29.44	73.29
	2015	2376	2.20	28.39	30.58	11.91	29.44	73.29
	2016	2753	1.53	20.32	51.31	12.38	30.43	74.06
	2017	1923	1.90	25.62	27.61	12.53	30.83	72.4
NBBL	2008	776	6.35	-27.2	12.49	-5.29	44.65	96.62
	2009	641	18.04	19.41	2.41	9.76	33.75	69.32
	2010	273	8.15	47.87	4.83	4.87	28.08	66.50
	2011	264	3.58	-6.13	5.83	5.22	28.80	68.42
	2012	194	4.01	27.4	3.00	5.83	25.50	69.09
	2013		3.57	21.78	7.74		24.15	66.99

		211				5.10		
	2014	500	2.40	18.06	18.95	6.51	25.55	67.98
	2015	605	2.06	16.64	15.23	7.07	24.04	70.35
	2016	685	2.57	19.83	21.81	6.73	29.32	71.91
	2017	439	2.91	20.74	13.34	6.24	24.57	68.7
PRVU	2008	387	6.05	16.75	12.83	11.03	25.83	72.36
	2009	396	3.92	37.76	11.41	8.64	26.04	70.29
	2010	305	3.32	27.83	9.08	7.38	23.02	70.59
	2011	221	1.67	12.66	10.58	6.61	22.58	70.03
	2012	137	0.96	12.66	9.93	8.67	22.12	71.77
	2013	109	1.43	9.23	11.47	9.93	22.22	71.40
	2014	136	1.55	14.01	10.69	8.60	21.68	69.66
	2015	159	1.16	11.75	16.97	9.11	22.06	72.04
	2016	155	1.96	19.33	13.08	8.72	23.19	71.02
	2017	139	1.41	13.4	12.42	9.00	21.96	71.2
BOKL	2008	953	0.68	7.31	24.19	9.75	23.03	72.56
	2009	853	0.70	7.24	50.41	9.29	22.42	72.21
	2010	351	0.35	4.13	56.9	10.66	21.48	73.06
	2011	208	0.05	0.5	42.54	10.41	20.66	74.11
	2012	120	0.16	1.44	69.41	8.43	20.85	71.39
	2013	155	0.49	5.31	33.96	9.83	21.68	72.55
	2014	390	1.12	14.05	31.4	11.59	22.04	73.68
	2015	570	1.96	15.43	25.4	11.22	22.07	72.44
	2016	622	1.60	16.82	27.15	10.13	21.78	72.75

	2017	371	1.06	10.61	37.46	10.24	21.86	72.4
NICA	2008	918	1.16	12.82	61.47	10.01	23.39	72.27
	2009	853	1.41	16.06	31.76	10.41	23.49	72.49
	2010	584	1.55	17.72	19.31	10.49	22.50	72.80
	2011	367	1.23	11.34	16.98	8.26	21.33	72.40
	2012	254	1.10	11.59	14.09	9.57	22.56	72.50
	2013	251	1.03	10.97	14.31	9.63	22.15	72.60
	2014	398	1.10	11.51	29.68	9.46	22.25	72.67
	2015	458	1.06	11.8	23.41	10.41	22.19	73.31
	2016	432	1.01	18.11	26.37	9.53	22.48	72.63
	2017	359	1.06	12.8	21.57	9.72	23.06	73.1

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CHAPTER I

INTRODUCTION

1.1 Background of the Study

Portfolio investment is the management of portfolio during the investment in financial assets, i.e. process of finding optimal portfolio from lot of financial assets is known as portfolio investment. Portfolio Investment is a tool which helps for proper utilization of resources. “Portfolio investment refers to an investment that combines several assets. The modern portfolio theory explains the relationship between assets risk and return. The theory is founded on the mechanics of measuring the effect of an asset on risk and return of portfolio. Portfolio investment assumes that the mean and variance of returns are the only two factors that the investor cares. Based on this assumption, the rational investor always prefers the highest possible return for a given level of risk or the lowest possible level of risk for a given amount of return. Portfolio, technically known as efficient portfolio, which is also termed as superior portfolio, the efficient portfolios not only do the function of risk and return of individual asset but also the effect of relationship among the asset on the sum total of portfolio risk and return. The portfolio return is straight weighted average of the individual asset. But the portfolio risk is not the weighted average of the variances of return of individual assets. The portfolio risk is affected by the variance of return as well as the covariance between the return of individual assets included in the portfolio and their respective weights (Thapa, 2017).

Investment is a word of many meanings. If new investment concepts evolve and take a root, the whole investment scene could be changed dramatically over the next few years. Everyday usage of the term investment can mean a variety of things, but to the general mass it usually refers to a money commitment of some sort. For example, a commitment of money in investment from an individual’s point of view is very familiar since no rate of return is involved, nor is a financial return or capital growth expected. All investment choices are made at the points of time in respect of personal investment ends and in contemplation of an uncertain future. Because and insofar as investment in securities are revocable as the

investment ends of persons are transient and the environment is fluid, as the reliable bases for reasoned expectations become more and more vague as one conceives of the further distant future, investors in securities will from time to time reappraise and reevaluate their various investment commitments in the light of new information and (perhaps) changed expectations and ends (Thapa, 2017).

Investment choices (decisions) are found to be outcomes of three different but related classes of factors. The first is factual or informational premises. The factual premises of investment decisions are provided by many streams of data which, taken together, represent to an investor the observable environment and the general and particular features of the securities and firms in which he may invest. The second classes of factors entering into investment are as expectation premises. Expectations relating to the outcomes of alternative investment are subjective and hypothetical in any case but their foundations are necessarily provided by the environmental and financial facts available to investors. These limit not only the range of investments, which may be undertaken, but also the expectations of outcomes that may legitimately be entertained. The third and final classes of factors are valuable premises (Bhole, 2015).

1.2 Statement of the Problem

Investments are made for positive returns; however, abundances of risk factors may turn returns to negative. Thus, prior to investments in stocks, a sensitive study on the potential investment is required. Price of stocks is market sensitive. Nominal degree of signaling effect will be playing freely in stock market causing a high degree of fluctuation in the stock price. Therefore, market sometimes turns to bullish and sometimes to bearish. Speculative motive of an individual is thus affected by such market characteristics. Apart from this, the dividend policy of the bank including the bonus issue, rights issue and the stock split too affects the price of share.

Returns on the stock are the summation of dividend yield and capital gain yield. However, most of the investors do feel that the higher the value of stock, higher is profitable in the stock investment and vice-versa and dividend at that time is ignored. Thus to make a rational decision on the investment in the assets, its dividend yield should also be considered. Dividend yield is the collective return realized as cash and/or bonus shares.

On the other hand, investment practices of stock investors are very limited in Nepal. Lack of information and knowledge has been the main constraints. Therefore, the chances of being manipulated and exploited by the financial institution and market intermediaries are in its peak. Thus they tend to avoid the risk and are often reluctant

to tie their savings into the long-term commitment. Moreover, common stock investment can be hazardous incase of insufficient knowledge of its behavior. In the mean time there are no separate institutions providing required information to make rational decision that can accelerate the stock investment and market efficiency. Government policy in this regard is found less encouraging. The problem of the study will be follows.

v. What is the risk and return analysis of sample banks?
vi. What is the risk parameter of sample banks?
vii. What is the true beta and true alpha of sample banks?
viii. What is the investment performance evaluation of sample banks?

1.3 Objectives of the Study

The broad objective of the study is to examine the portfolio management of listed commercial banks in NEPSE. However the objective has been subdivided into following specific objectives will be follows:

v. To anlayze the risk and return analysis of sample banks.
vi. To study the risk parameter of sample banks.
vii. To examine the true beta and true alpha of sample banks.
viii. To analyze the investment performance evaluation of sample banks.

1.4 Significance of the Study

Establishment of Nepal Stock Exchange (NEPSE) in 1993 has made numbers of Nepalese passive investors, who would prefer to invest either in gold or bank account or property, aware of stocks. Investors' shares practices can, thus, be said to have actively evolved only after its formation. Up till now, there are more than 100 companies listed in NEPSE for shares trading purposes. Listing of the new companies has increased competition, thereby, increasing the investment sectors too. However, nature of the firms, the trading of shares too varies or investors will have variety of perspective towards the companies. Investing in a single asset is highly risky. Risk of single security can be reduced dramatically by diversifying the

investment. However the security's return will be the same whether held in isolation or in a portfolio. Diversification substantially reduces risk with little impact on potential returns.

The present study attempts to address upon the selection of the assets for the construction of portfolio. For better diversification, it is important to match the investment characteristics of various asset categories to the risk and return characteristics in efficient manner that could maximize return and minimize risk. Risk tolerance, return need, time horizon should also be analyzes which vary among different individuals. While allocating the assets for a portfolio, an investor should compare the relationship between the assets. Their realized return, expected return should be taken into account and correlation between the securities provides the possibilities of eliminating some risk without reducing potential returns. The present study also clarifies that that stocks with negative correlation can form the portfolio of the securities that can reduce unsystematic risk up to zero.

1.5 Literature Review

This chapter reviews the literatures related to the portfolio management from various textbooks, journals and related studies. Apart from this various masters degree thesis including independent studies carried out by renowned experts and others are also reviewed.

1.5.1 Conceptual Review

This chapter has included conceptual framework i.e. theoretical analysis and review of related different studies. In this chapter has been also considered that how this present studies are different from previous studies.

Investment: Alaxander Sharpe et al (2015) define the investment as sacrifice of current dollars for future dollars. They have attributed the involvement of time and risk during

investment. Sacrifice takes place in the present and is certain. The reward comes later, if at all, and the magnitude is generally uncertain. Shrestha *et al* (2002) write investment as utilization of saving for something that is expected to produce profit or benefits. In the words of investment brings forth visions of profit, risk, speculation, and wealth. They have briefly described the categories and types of investment alternatives. They describes that the basic investment objectives, the expected rate of return, the expected risk, taxes, the investment horizon and investment strategies are the factors to be considered in choosing among investment alternatives.

Alaxander Sharpe et al (2015) make distinction between real investment and financial investment. "Real investments involve some kind of tangible asset, such as land, machinery, or factories. Financial investments involve contracts written on pieces of paper, such as common stocks and bonds."

They further discussed about the globalization of the investment business and write that the growth in foreign security markets significantly increase international opportunities for U.S. investors. They have conducted a comparative study of distribution of total market value of common stock markets around the world in 1970 and in 1996, which reveal that the total proportion of the world's common stocks represented by the United States has declined over the last 25 years from almost two-thirds to roughly 45% in 1996.

Return: Return is reward for investment. Historical returns allow the investor to assess the future or unknown returns, which is also called expected return. Expected returns are the ex-ante returns and such predicted return may or may not occur. It has discussed about components of return. They have identified returns is the composition of periodic cash receipts and change in price of asset. Return can be positive or negative .It explain return in terms of single period. They have defined it as holding period return and calculated by comparing the return to the amount initially invested. It has written it as summation of cash payment received due to ownership plus price appreciation divided by the beginning price. This is also a measurement of return for a single period. It has further described the calculation of expected return from arithmetic and geometric mean approach. Geometric mean return is consistent with assumption of reinvesting income when it is received. Due to inherent bias in the arithmetic mean, the geometric mean will always be equal to or less than the arithmetic mean. The arithmetic mean and geometric mean will only be equal when the holding period returns are constant over the investment horizon. However, Alaxander Sharpe et al (2015) have also agreed and further defined it a tool for measurement of return for investment horizon of one year or less. They have suggested for longer periods, it is better to calculate rate of return as an

investment yield. The yield calculation is present value based and this considers the time value of money. Further, return for the future can be determined from the probabilities of different phases of economy, viz., prosperity, recession, depression and recovery. Alaxander Sharpe et al (2015) illustrated the use of probability from the normal distribution concepts. They have defined expected return as summation of the product of probabilities of different stages in an economy and rate or return. It has calculated the expected return from the average of holding period return on stocks of eight different banks for each year using data of B.S. 2050/51 to B.S. 2055/56. He has identified the common stock of Nepal Bank Limited to be fetching the maximum of return, i.e., 66.99%. He further writes SBI bank as the low yielding security. In addition, his study has revealed that the expected return of banking industry is 60.83%.

Risk: Risk is the feeling of negative returns. In the words of Cheney and Moses (2013) risk is uncertainty of whether the money investors lend will be returned. They have regarded such risk as bankruptcy risk. According to them, stockholder of the firm should not only consider bankruptcy risk but also the risk that the firm will yield a rate of return below some targeted rate. They have given range, variance, standard deviation, CV and beta as parameters for the measurement of risk. However, variance may have first been suggested as a measure of economic risk by Bhalla (2009). Cheney and Moses (2013) further describe beta as a parameter for the measurement of the systematic risk. Systematic risk has been defined as undiversifiable risk, which is beyond the control of the organization. Apart from this, they describe unsystematic risk as diversifiable risk, which can be reduced through the portfolio effect. Further, beta values for assets generally range between + 0.5 and 2.0. Fisher and Jordan (2000), however, write nearly all betas are positive and most beta lie somewhere between + 0.4 and 1.9. Weston and Copeland (2014) write if the return on the individual investment fluctuates by exactly the same degree as the returns on the returns on the market as a whole, the beta for the security is one. Cheney and Moses further describe that standard deviation contains two parts – diversifiable and non-diversifiable risk. Systematic risk can be diversified away by

combining the assets with a portfolio of other assets. Further, they have explained that systematic risk is the ratio between covariance (j,m) and standard deviation of the market. Unsystematic risk has been defined as product of standard deviation of assets and the $(1 - \rho_{jm})$. But Weston and Copeland (2014) has defined that systematic risk is the product of b^2 and Var $(R_{m,t})$ and Unsystematic risk as Var $(\varepsilon_{i,t})$ Elton and Gruber (2011) define systematic risk as portion of total variability in return caused economic, political and sociological changes.

1.6 Methodology

This chapter describes the methodology employed in the present study. The research methodology consists of research design, data collection procedure, data processing procedures and techniques. The study is more analytical and empirical. It covers quantitative methodology using statistical and financial tools.

1.6.1 Research Design

To meet the stated objectives of the study, descriptive cum analytical research design has been adopted. According to which all the historical closing stock prices of the banks, percentage of cash and stock dividend, NEPSE index for the seven years (1997 to 2019) including the market capitalization of the banks for 2003 are enumerated. Then following the sampling procedures, appropriate samples, i.e., nine banks are selected to describe the expected returns, risk associated with the stocks and optimal portfolios constructed through the combination of different stocks at different

weights. A complete list of the returns, standard deviation of returns, coefficient of variation, covariance, correlation, and beta for the stocks are prepared, utilizing various tools and techniques. List of information gathered are analyzed and critical evaluation are made.

1.6.2 Population and Sample

There are 27 commercial banks operate in Nepal which is the population of the study and out of them 10 commercial banks are selected which is EBL, BOKL, HBL, NABIL, NBB, NIC, NIB, SBI, SCBNL and PRVU for convenient sample method which is the sample of the study.

1.6.3 Nature and Type of Data

Secondary data has been extensively collected and utilized to accomplish this study. The study, according to the research question, is conducted on the basis of the quantitative data. Further, qualitative data is also collected to enrich the study.

1.6.4 Sources of Data

To complete the study, a substantial amount of information from secondary sources, published and/or unpublished written documents, books, journals, dissertations etc. available in the libraries, and in private collections are collected.

1.6.5 Data Collection Procedure

Different tools and techniques were adopted while collecting the data for this study. Collected secondary information was analyzed during the course of the deskwork.

However, during the desk study, an information gap was found. This gap was fulfilled by the discussion with the thesis advisor and finance experts of the security board and the NEPSE. Information collected from different sources were systematized, arranged in order, and analyzed to identify the optimal portfolio. Data processing comprised the activities like tabulating data, avoiding repetition, verification of data, and arranging them in a logical order, which eventually helped during the course of data analysis. Detailed calculations have been carried out to identify the conclusive results; various financial as well as statistical tools are used.

1.6.6 Data Analysis Tools

The study has been carried out on the basis of the historical data analyzed from the financial as well as statistical tools.

1.7 Limitations of the Study

This study concerns only with following companies, hence, not applicable for any other institutions with similar nature of work. The limitations of the study weill be follows:

vi. Five years data is taken from 2013/14 to 2017/18.
vii. Only 10 banks are selected for sample which does not cover all banks.
viii. Optimal portfolio identified in the present study is merely on sampling basis, thus the optimal portfolio in the real practice may be different than what is taken in the present study.
ix. Dividend yield realized from the right issue has not been considered.
x. Stocks or security refer to common stocks.

1.8 ORGANIZATION OF THE STUDY

The study has been organized into five chapters. They are as follows:

Chapter I: Introduction

This is the introductory chapter, which has covered background of the study, focus of the study, statement of the problem, objectives of the study, significance of the study etc.

Chapter II: Review of Literature

This chapter has included conceptual framework i.e. theoretical analysis and review of related different studies. In this chapter has been also considered that how this present studies are different from previous studies.

Chapter III: Methodology

This chapter has dealt with the research design, population and sample, sources of data, data collection techniques and data analysis tools (financial tools and statistical tools) and methods of analysis and presentations.

Chapter IV: Results

This chapter describes the research methodology employed in the study. It will include secondary data and primary data presentation, data analysis, interpretation, testing of hypothesis and major finding.

Chapter V: Conclusion

The last chapter states the summaries, conclusion of the whole study and recommendations. It also offers several avenues for future research. The exhibits and bibliography are incorporated at the end of the study.

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