IMPACT OF INTEREST RATE AND INFLATION RATE ON NEPSE INDEX

A Dissertation submitted to the Office of the Dean, Faculty of Management in partial fulfillment of the requirements for the Degree of Masters of Business Studies

by

Rabi Prajapati

Roll No: 3/074

Symbol No.: 7333/18

T.U. Registration No.: 7-2-271-255-2013

People's Campus

Kathmandu

June, 2021

IMPACT OF INTEREST RATE AND INFLATION RATE ON NEPSE INDEX

A Dissertation submitted to the Office of the Dean, Faculty of Management, in partial fulfillment of the requirements for the Degree of Masters of Business Studies

by

Rabi Prajapati

Roll No: 3/074

Symbol No.: 7333/18

T.U. Registration No.: 7-2-271-255-2013

People's Campus

Kathmandu

June, 2021

Certification of Authorship

I hereby corroborate that I have researched and submitted the final draft of dissertation entitled “Impact of Interest rate and Inflation Rate on NEPSE Index”. The work of this dissertation has not been submitted previously for the purpose of conferral of any degrees nor has it been proposed and presented as part of requirements for any other academic purposes.

The assistance and cooperation that I have received during this research work has been acknowledged. In addition, I declare that all information sources and literature used are cited in the reference section of the dissertation.

Rabi Prajapati

30-06-2021

30-06-2021

Report of Research Committee

Mr. Rabi Prajapati has defended research proposal entitled "Impact of Interest Rate and Inflation Rate on NEPSE Index" successfully. The research committee has registered the dissertation for further progress. It is recommended to carry out the work as per suggestions and guidance of supervisor Mr. Madhusudan Gautam and submit the dissertation for evaluation and viva voce examination.

Dissertation Proposal Defended Date:

Supervisor

Madhsudan Gautam **Dissertation Submitted Date:**

Supervisor

Gopal Krishna Shrestha, Phd **Dissertation Viva Voce Date:**

Head of Research Committee

Approval Sheet

We have examined the dissertation entitled "Impact of Interest Rate and Inflation Rate on NEPSE Index" presented by Mr. Rabi Prajapati for the degree of Masters of Business Studies. We hereby certify that the dissertation is acceptable for the award of degree.

Dissertation Supervisor

Internal Examiner

External Examiner

Chairperson Research Committee

Acknowledgements

This study entitled “Impact of Interest Rate and Inflation Rate on NEPSE Index” has been prepared for partial fulfillment of requirements for the degree of Masters of Business Studies. It is directed towards determining the impact of interest rate and inflation rate on NEPSE Index. This would not have been possible without the kind support and help of many individuals. Therefore, I would like to acknowledge with gratitude to all of them. It is a genuine pleasure to express my deep sense of thanks and gratitude towards Mr. Madhusudhan Gautam and Mr. Bikash Shrestha for giving me the responsibility to prepare this report along with their guidance, valuable advice, continuous encouragement, and motivational support.

I would like to express grateful thanks to all the individual and institution that have provided me the necessary information for this study. My thanks also go to all well-wishers for their valuable comments, understanding and encouragement when it was required. I greatly thank my parents for their endless love. With this help and support, I have been able to complete this work. I would like to take the responsibility of any possible mistakes that may have occurred in the report. I would be delighted to welcome readers for their suggestion and recommendation to improve the report.

Rabi Prajapati

June, 2021

Table of Contents

List of Tables

List of Figures

Abbreviations

ANOVA : Analysis of Variance

APT : Arbitrage Pricing Theory

ARDL : Autoregressive Distributed Lag

COVID : Corona virus Disease

CPI : Consumer Price Index

EMH : Efficient Market Hypothesis

FIR : Fixed Interest rate

IFR : Inflation Rate

LIR : Lending Interest Rate

NEPSE : Nepal Stock Exchange Ltd

NRB : Nepal Rastra Bank

OLS : Ordinary Least Square

PPP : Purchasing Power Parity

SIR : Saving Interest Rate

SPSS : Statistical package for the Social Sciences

STD : Standard

VAR : Vector Auto regression

Abstract

Stock index, inflation rate and interest rate are three crucial factors of economic growth of a country. Stock Price is affected by various factors of the long as well as short run. Two of the most important factors affecting the index of the stock are the inflation rate prevailing in the market and the interest rate of a bank or financial institutions. This study aims to find out the positive or negative impact or the relationship between the stock index and inflation as well as the stock index and interest rate of Nepal. This study aims to examine the factors that influence the NEPSE Index. In the study, two variables are taken as independent variable: interest rate and inflation rate. NEPSE index is taken as dependent variable. Interest rates are divided into three parts, saving interest rate, fixed interest rate and lending interest rate. Data collection is done with the help of different websites of NRB, NEPSE and others. The research design embraced in the study consists of descriptive and causal research design. Various tools used for data analysis were mean, median, standard deviation, correlation and regression analysis etc. The findings revealed that saving interest rate, fixed interest rate, lending interest has significant negative relationship with NEPSE Index however inflation has an insignificant relationship with the NEPSE index. Interest rate and inflation rate were not only the factors that affects stock index. There is large role of news, rumors, insider trading, cornering, politics and speculation that influence the stock index. These types of variables are hard to be quantified and applied in the model.

Keywords: NEPSE index, inflation rate, saving interest rate, fixed interest rate, lending interest rate.

CHAPTER I

INTRODUCTION

1.1 Background of the study

Stock index, inflation and interest rate are three crucial factors of economic growth of a country. The impacts of interest rate and inflation on stock index provide important implications for monitory policy, risk management practices, financial securities valuation and government policy towards financial markets. Interest rate and inflation are the important economic factors affecting the common stocks. Interest rate has a direct effect on financial market, an increase in interest rate leads investing decisions to make a change in the structure of investment, generally from capital market to fixed income securities (Karki, 2018).

Variability in interest rates and inflation rate directly generates a momentum to the money market from capital market. The stocks are sensitive to interest rates and inflation rates, as the changes in interest rates and inflation rates are inversely related to stocks (Cassel, 1918). Numbers of macroeconomic indicators which influence stock index have been analyzed in past and recent empirical literature. Most of the previous studies only focused on the stock market as a whole ignoring the effects of these variables on different sectors of the economy, while this is significant but investor must understand that different sectors of the economy react differently to changes in macroeconomic variables.

It cannot set a specific relationship of interest rate and inflation rate with stock prices of banking industry unless the empirical analysis is done. Thus in this research, it intends to shed some light on the existing relationship of interest rate, inflation rate and stock index, based on empirical evidence. Interest rate is one of the important macroeconomic variables, which is directly related to economic growth. Generally, interest rate is considered as the cost of capital, means the price paid for the use of money for a period of time. From the point of view of a borrower, interest rate is the cost of borrowing money (borrowing rate). Interest rate is the fee charged for lending money (lending rate) from a lender's point of view. Good investors always look for investing in an efficient market. In an inefficient market few people are able to generate extra ordinary profit

causes of confidence losses of general people about the market (Shrestha & Subedi, 2014).

In such cases, if the rate of interest paid by banks to depositors increases, people switch their funds from share market to bank. This will lead to decrease the demand of share and to decrease the price of share and vice versa. On the other way, when rate of interest paid by bank to depositors increases, the lending interest rate also increases and leads to decrease of the investments in the economy which is also another reason of decreasing share price and vice versa (Laichena & Obwogi, 2015). So, theoretically there is inverse relationship between share price and interest rate. Higher interest rate resulting from tightening monetary policy usually has negative effects on stock market returns. This is due to the fact that higher interest rate reduces the value of equity as indicated by the dividend discount model and consequently, makes fixed income securities more attractive as an alternative to holding stocks As a result, this may reduce the propensity of investors to borrow and invest in stocks and also, raises the cost of doing business and hence affects profit margin. On the other hand, lower interest rates resulting from expansionary monetary policy also boost stock market.

Another variable that affects the stock index is inflation rate. Inflation is a general and progressive increase in prices. In inflation everything gets more valuable except money. Inflation is a case where value of money goes down and price rises. Inflation rate is the change of price as indicated by the price index calculated on annual or monthly basis (Karki, 2018). The rate of inflation measures the annual percentage increase in prices the most usual measure is that of retail prices. The government publishes an index of consumer prices each month, and the rate of inflation is the percentage increase in that index over the previous twelve months.

Increase in Inflation is not good for the economy. It should be less. A rapid increase in inflation also affects negatively the performance of the stock market. Growing inflation considered as a bad news by the investors because it depicts bad economic conditions in the country and investors feel insecure about their investment in the stock market. They expect tight monetary policy in future by the Fed to control inflation which in turn control money supply and firms suffer to get finance from banks due to higher cost of

borrowing with tight credit terms. In case of decreasing inflation rate, it depicts good economic conditions and attracts investors to invest in the stock market (Shrestha & Subedi, 2014).

This study is directed towards examining the interest rate and inflation rate affecting the stock market. The main focus of this study concerns on providing the relationship of these variables. The study will be conducted to test the results empirically. Therefore it can be said that interest rate and inflation rate undoubtedly affects the stock market. This study examines whether stock market return is influenced by changes in interest rates and inflation rates.

The overall development of the economy is a function of how well the stock market performs and empirical evidences have proved that development of capital market is indispensable for economic growth. It is through this segment that the country's exposure to the outer world is most readily felt. The relationship of economy and stock price has always been a subject matter of controversial debate (Malkiel, 1989). The pricing implication has come into attention since the publication of seminal work of Markowitz - the mean-variance portfolio theory. Since then, the stock prices volatility has received a great attention from both academicians and practitioners as it can be used as a measure of risk in financial markets. Establishing the empirical link between volatility and macroeconomic variable has proven to be very challenging. Some studies find strong evidence that stock volatility increases during economic recessions. It seems that pricing volatility does not follow any pattern and not affected by economic variable. In some cases, it is closely related with macroeconomic variables and in some cases macroeconomic variables have no impact upon volatility. Varying evidences of relationship between macroeconomic variables with stock prices were widely documented in the existing literature

There is in fact a relationship between stock prices and certain macroeconomic indicators and those studies were mostly conducted in developed economies. While in the context of less developed economies, like Asian markets macroeconomic factors could not be reliable indicators for stock market price movements because of the inability of stock markets to fully capture information about the change in macroeconomic fundamentals

(Mundell, 2010). The relevance of the studies conducted on the developed economies is yet to be seen in the context of smaller, developing and under-developed capital markets.

The importance of stock markets as financial channels for saving and investment is gaining significant role in Nepalese economy. In general, volatility in the stock market is less than the average volatility of other developing countries. The reason is mainly low volume of trading equities due to low demand. However, in recent years pricing volatility has increased due to the increase in the volume of trading triggered by the speculative motives of investors. Macroeconomic stability, therefore, has become an important condition for financial development and economic growth of the country. In the light of these facts, it is necessary to examine how far stock market in Nepal is being influenced by macroeconomic variables (Shrestha, 2019).

The relationship between the stock price and macro-economic factors is important to study for many reasons. First, it helps policy makers understand the full effect of prevailing and upcoming policies and regulations. Second, if investors were aware of this relationship and fully understood it, then they will make more informed investment decisions thus reducing their exposure to risk. And third, knowing which factor leads the other can help in reducing the shock factor because the public will be somewhat aware of what might happen in the economy or the financial market and thus will be able to take protective measures (Karki, 2018). Economic liberalization and financial sector reforms in Nepal have guided in a change in the financial architecture of the economy. This leads to the number of banks and financial institutions come in to operation, widening the scope for a re-examination of the relationship between the stock market and the economic and non-economic variables in Nepal.

1.2 Problem statement

This study tries to identify the impact of the different interest rates and inflation rate on stock index. The stock index can give us the idea of the overall health of economy. There are many factors that determine the stock market performance, including monetary and exchange rate policies, GDP, money supply, exchange rate, political news and rumors. However, an interest rate and inflation rate has been chosen in this study. Interest rate and inflation rate is expected to have greater impact on stock index. Thus decreasing the

interest rate and inflation rate due to expansionary monetary policy may stimulate the stock market index because of increased economic activities. Though financial economists, policy makers and investors have long-attempted to understand impact of interest rate and inflation rate on stock index, the exact patterns of the interactions remain unclear, the nature and strength of the dynamic interactions between them is of high interest and inflation and need to be evaluated empirically.

Naik and Padhi (2012) examined the relationships between the Indian stock market index and five macroeconomic variables, namely, industrial production index, wholesale price index, money supply, treasury bills rates and exchange rates. Naik and Padhi revealed that the stock prices positively relate to money supply and industrial production but negatively relate to inflation. The exchange rate and the short-term interest rate were found to be insignificant in determining stock prices. Barasa (2014) investigated the determinants of stock market performance of the stock exchange. Barasa revealed that the relationship between inflation as measured using customer price index and performance of stock market was not significant. This study concluded that the relationship involving inflation and stock market performance was inverse and unimportant. Karki (2018) empirically examined the macro-economic factors of the stock market performance in Nepal. Karki considers the annual data of four macroeconomic variables; real GDP, inflation, interest rate and broad money supply. Empirical results reveal that the performance of stock market is found to respond positively to real GDP, inflation and money supply, and negatively to interest rate. More importantly, long run evidence cannot be found between macroeconomic variables and stock market index which suggests that stock price movements in Nepal are not explained by the macroeconomic variables. It supports random walk hypothesis in Nepalese stock market.

Khatri (2019) investigated the dynamic relationship among the stock market and macroeconomic factors such as inflation, money supply, interest rate, gross domestic product, exchange rate and foreign direct investment of Nepal. Findings revealed that the stock prices were positively and significantly related to money supply. Real economic activity and interest rate have insignificant and negative relationship with the stock prices. Similarly, foreign direct investment, inflation and exchange rate with US dollar have a positive and insignificant relationship with the Nepalese stock market. Shrestha

and Pokhrel (2019) conducted a study on factors affecting stock index in Nepal. Empirical results revealed that the Nepal's stock index is found to respond positively to broad money growth, and negatively to interest rate. Findings indicated that the availability of liquidity and the low interest rates stimulate the stock index. The stock index has positive association with inflation and negative association with broad money and interest rate. More importantly, stock index has been found to respond significantly to changes in political environment and the policies of Nepal Rastra Bank about lending against share collateral and partly to paid-up capital hike. Still, large chunk of fluctuation in share index is not explained by the models, indicating the ample role of news, rumors and speculations. Panta (2020) analyzed the macroeconomic determinants of stock market prices in Nepal. The result indicates that the fluctuation of NEPSE Index in long run is strongly associated with broad money supply, interest rate, inflation, and exchange rate. The GDP, money supply and exchange rate can positively define in short run while only money supply holds positive relationship in long run.

Therefore, based on the above discussion, the study aims to identify the dynamic relationship between interest rate, inflation rate and stock index in order to identify the impact of interest rate and inflation rate changes on stock index.

1. What is the pattern of interest rate, inflation rate and NEPSE index over the period?
2. Is there any relationship between interest rate, inflation rate and NEPSE index?
3. Is there any effect of saving interest rate, fixed interest rate and lending interest rate on NEPSE index?
4. Does the inflation rate affect the NEPSE index?
5. What is the overall impact of interest rate and inflation rate on NEPSE index?

1.3 Objectives of the study

The major objective of the study is to identify the dynamic relationship between interest rate, inflation rate and stock index. The specific objectives of the study are;

1. To identify the pattern of interest rate, inflation rate and NEPSE index.
2. To examine the relationship between interest rate, inflation rate and NEPSE index.
3. To analyze the effect of interest rate, inflation rate on NEPSE index individually and jointly.

1.4 Hypotheses of study

The study was carried out based on certain hypothesis. With the help of hypotheses, the study is able to analyze the impact of interest rate and inflation rate on stock index. Following are the hypotheses made in order to study impact of interest rate and inflation rate of stock index:

Ho1: There is no significant effect of saving and fixed interest rate on NEPSE index.

Ho2: There is no significant effect of lending interest rate on NEPSE index.

Ho3: There is no significant effect of inflation rate on NEPSE index.

1.5 Rationale of the study

This study examines whether the stock index are affected by the change in the inflation rate and interest rate in Nepal. Investors and potential investors will get to understand whether change in interest rate and inflation rate affects the return on the stock index and to what extent it affects investment in both markets. It will assist local firms to identify periods that may be conducive to get listed on the stock index as well as assist investors to make good investment decision. On the other hand understanding the impact of interest rate and inflation rate on the stock index can aid the Nepalese policy makers to carefully plan and forecast the impact of the policies with a view to attract investors to invest in the stock index.

Therefore understanding the behavior of interest rate and inflation rate towards the stock market in Nepal can help the local as well as the foreign investors to carefully plan their investment and building their portfolio management. In addition to being useful as a source of information, it may also arouse interest for further studies in this or related areas concerning the activities of both foreign and local investors

1.6 Limitation of the study

Performance of the stock market is very important to investors and they react to macroeconomic variables which may affect the performance of the stock index. Interest rate and inflation are the key macroeconomic variables which affect the stock index. This study will help the investors by providing empirical evidence of interest rate and inflation effect on stock index which will help in their decision-making. For this purpose yearly

data of six year interest rate & inflation from 2014 to 2019 is selected. Stock returns will be calculated from NEPSE. As all the data taken for this research were secondary and the previous year's data was not available due to the COVID-19, this is the main limitation of this research. The analysis has also been constrained by the sample size which could have affected the results. Correlation measures the linear association between two variables, but it may not always be reliable. Two variables can have a strong nonlinear relation and still have a very low correlation. Interest rate and inflation rate were only variables that are taken in order to analyze the impact on NEPSE index. However there are lot of other macro economic factors that affects the stock index like GDP, money supply, exchange rate, NRB policy, news, rumors and speculation.

1.7 Chapter Plan

This study has been organized into five chapter viz. introduction, literature review, research methodology, analysis and discussion, summary and conclusion. The first chapter deals with the introduction part of the study. It includes background of the study, problem statement, objectives of the study, hypothesis of the study, rationale of the study, limitation of the study and chapter plan of the study. The second chapter contains theoretical review and empirical view. The third chapter deals with research framework and definition of variables, research design, population and sample, and sampling design, nature and sources of data, and the instrument of data collection and method of analysis. The fourth chapter presents the analysis of data and discussion in the form of various tables and figures and the fifth chapter is about summary and conclusion. Finally, an extensive references and annexure of presented at the end of the study.

CHAPTER II

REVIEW OF LITERATURE

Literature surveys are basis for research in nearly every academic field. It includes the current knowledge including substantive findings, as well as theoretical and methodological contributions to a particular topic. It provides foundation of knowledge on topic. Literature surveys are secondary sources and do not report new or original experimental work. Most often associated with academic-oriented literature, such reviews are found in academic journals. It consists of review of empirical literature and related theories of the research. It is useful in setting the purpose of the study and provides guidelines for determining the variables under study. It enables a researcher to find out about the existing bodies of knowledge on topic of his/her interest. It helps to find out the areas yet to be studied in the concerned topic and need for additional research. It states the finding from previous researches hence enabling researches to generate the hypothesis for the research.

2.1 Theoretical Literature Review

There includes several theories regarding interest rate and inflation rate affecting stock index. Cassel (1918) developed the purchasing power parity theory which is also called inflation theory of exchange rates in order to deal with the price relationship of goods with the value of different currencies. Fisher effect theory states that nominal interest rates in two or more countries should be equal to the required real rate of return to investors plus compensation for the expected amount of inflation in each country (Fisher, 1930). Liquidity preference theory explained that the rate of interest at any time, being the reward for parting with liquidity, is a measure of the unwillingness of those who possess money to part with their liquid control over it. Fama (1970) describes the efficient market as market price that fully reflects all available information. The efficient-market hypothesis (EMH) asserts that financial markets are "informational efficient". *Arbitrage pricing theory* (APT) is a multi-factor asset *pricing model* based on the idea that an asset's returns can be predicted using the linear relationship between the asset's expected return and a number of macroeconomic variables that capture systematic risk. Random walk theory indicated that the past movement or direction of the price of a stock

or overall market cannot be used to predict its future movement. It is the occurrence of an event determined by a series of random movements – in other words, events that cannot be predicted. Details of this theory are given below.

2.1.1 Purchasing Power Parity Theory

The starting point of exchange rate theory is purchasing power parity (PPP), which is also called the inflation theory of exchange rates. PPP can be traced back to sixteen-century Spain and early seventeen century England, but Swedish economist (Cassel, 1918) was the first to name the theory PPP. Cassel once argued that without it, there would be no meaningful way to discuss over or under valuation of a currency. Absolute PPP theory was first presented to deal with the price relationship of goods with the value of different currencies. The theory requires very strong preconditions. Generally, Absolute PPP holds in an integrated, competitive product market with the implicit assumption of a risk-neutral world, in which the goods can be traded freely without transportation costs, tariffs, export quotas, and so on. However, it is unrealistic in a real society to assume that no costs are needed to transport goods from one place to another. In the real world, each economy produces and consumes tens of thousands of commodities and services, many of which have different prices from country to country because of transport costs, tariffs, and other trade barriers. Absolute PPP is generally viewed as a condition of goods market equilibrium. Under absolute PPP, both the home and foreign market are integrated into a single market. Since it does not deal with money markets and the balance of international payments, it was consider being only a partial equilibrium theory, not the general one. Perhaps because absolute PPP require many strong 16 impractical preconditions, it fails in explaining practical phenomenon, and signs of large persistent deviations from Absolute PPP have been documented.

2.1.2 Fisher Effect Theory

Fisher effect theory states that nominal interest rates in two or more countries should be equal to the required real rate of return to investors plus compensation for the expected amount of inflation in each country (Fisher, 1930). That is the relationship that exists between interest rates and exchange rate movements. It hypothesized that the expected nominal return on common stocks consists of a “real” return plus one expected rate of

inflation. Results of empirical studies have shown that expected inflation, changes in expected inflation, and unexpected inflation are negatively correlated to stock returns. They explained the generalized fisher effect such that the market, if it is efficient and reflects all the available information at time t-1, will set the price of common stocks so that the expected nominal return from t-1 to t is the sum of the appropriate equilibrium expected real rate and the market's assessment of expected inflation rate for the same time period. When expected inflation is high, investors move out of financial assets into real assets. According to this hypothesis equities serve as hedges against inflation because they represent claims to real assets, which suggest a positive stock price is correlated to expected inflation and appreciation in stock price.

2.1.3 Liquidity Preference Theory

Liquidity preference theory consists in the statement that the rate of interest at any time, being the reward for parting with liquidity, is a measure of the unwillingness of those who possess money to part with their liquid control over it. The rate of interest is the price which equilibrates the desire to hold wealth in the form of cash, with the available quantity of cash one needs money because one has expenditure plans to finance, or is speculating on the future path of the interest rate, or, finally, because one is uncertain about what the future may have in store so it is advisable to hold some fraction of one's resources in the form of pure purchasing power (Keynes, 1936). These motives became known as transactions, speculative and precautionary motives to demand money. On the other hand, in the world of the quantity of money in existence one of the ultimate independent variables is determined by the action of the central bank. Accordingly, most of the Keynesian literature took liquidity preference to mean demand for money and liquidity preference theory as a theory whereby the rate of interest is determined by demand and supply of money. This narrow interpretation of liquidity preference theory is debatable though. An alternative view is that it is a theory of asset choice. In fact, as Keynes emphasized in his debate with Ohlin, liquidity preference was a theory of choice between holding money idle and Holding loans, being the role of the rate of interest to equalize the attractions of both.

2.1.4 Efficient Market Hypothesis (EMH)

Fama (1970) describes the efficient market as market price that fully reflects all available information. The efficient-market hypothesis (EMH) asserts that financial markets are "informational efficient". That is, one cannot consistently achieve returns in excess of average market returns on a risk-adjusted basis, given the information publicly available at the time the investment is made. It is important to note, however, that in the empirical work to date, the usual procedure has been to infer market efficiency from the observed independence of successive price changes. There has been very little actual testing of the speed of adjustment of prices to specific kinds of new information.

2.1.5 Arbitrage Pricing Model

The modus operandi of arbitrage pricing model is for all intents and purposes that measures the risk premium which is devoted to numerous factors influencing the returns generated on assets to ascertain their significance level or to confirm if they are “priced” into stock market returns. For that reason, it provided the foundation for us all to believe that a long-standing equilibrium does exist concerning the prices of stock prices and macroeconomic variables. This was after they established that the forces of the economy affect the discount rates, the capacity of firms to generate cash flows as well as dividends in the future (Ross, 1976).

2.1.6 Random Walk Theory

Malkiel (1989) stated that the past movement or direction of the price of a stock or overall market cannot be used to predict its future movement. It is the occurrence of an event determined by a series of random movements – in other words, events that cannot be predicted. For example, one might consider a drunken person’s path of walking to be a random walk because the person is impaired and his walk would not follow any predictable path. Applying the random walk theory to stocks suggests that stock prices change randomly, making it impossible to predict stock prices.

2.2 Empirical Literature Review

The literature has tackled the concepts of impact of inflation rate and interest rates on stock index. Understanding the inflation, interest rates and stock index will help advocate

for intervention by government through fiscal and monetary policies to control inflation and interest rates. Empirical review has been provided with studies on macroeconomic variables being evaluated. As it can be noted, the debate on the relationship between inflation, interest rate and stock index is not yet settled. Hence, the present study seeks to bridge the gap.

Gunsel and Cukur (2007) analyzed the effect of macroeconomic factors on London stock returns for the period between 1980 and 1993. Gunsel and Cukur used interest rates, risk premiums, exchange rates, money supply, and unanticipated inflation, sectoral dividend yields and sectoral unexpected production as independent variables and returns on London shares as the dependent variable. They used correlation analysis, unit root test and the linear regression model to establish the relationship between the variables. Findings revealed that macroeconomic factors have a significant influence on the UK stock market but each factor can affect different industries in different ways. That is, macroeconomic factors can affect one industry positively, but negatively affect other industries

Ioannidis and Kontonkas (2008) investigated the relationship between stock index and inflation rate for Greece over the period 2000 to 2013. Ioanides and Kontonkas used ARDL co integration technique in conjunction with causality to test the long-run and short-run effects between the involved variables as well as the direction of these effects. There were arguments that stock index can hedge inflation. Another argument was that the real stock market was immune to inflation pressures. They attempted to investigate the three types of relationship whether firstly the stock index had been a safe place for investors in Greece. Empirical evidence classified the relationships into three types. First, there was negative relationship between the stock market returns and inflation. There was long run negative significant relationship between inflation rate and stock market returns over the first sub-period.

Alam and Uddin (2009) examined evidence supporting the existence of share market efficiency based on the monthly data between stock index and interest rate for fifteen developed countries. Alam and Uddin used multivariate regression model and vector error model to analyze the variables. It was found that interest rate has significant

negative relationship with changes of share price. They further stated that if the interest rate was considerably controlled for these countries, it would be the great benefit for these countries stock exchange through demand pull way of more investors in share market, and supply push way of more extensional investment of companies.

Mundell (2010) investigated inflation and interest rate mechanism. Mundell used vector error correction model to verify the relation. He stated that the anticipated inflation caused a rise in the money rate of interest. Interest rate slightly fluctuated because of unstable cost of living. That was because interest rate rose when prices started to increase but never that much high as it should be. It was assumed in the study that the real profits can be capitalized at real interest rate. Inflation causes a difference between money interest rate and real interest rate and this difference causes a gap between nominal earnings and money earnings.

Ahmad and Raoof (2010) examined the relationship between stock return, interest rate and exchange rates in Pakistani economy. The data on the short term interest rate, exchange rate and stock market returns over the period of 1998-2009 was collected. A multiple regression model was applied to test the significance of change in interest rate and exchange on stock returns. Ahmad and Raoof revealed that both the change in interest rate and change in exchange rate had a negative significant impact on stock returns over the sample period.

Joseph (2012) studied the effect of foreign exchange and interest rate changes on UK firms in the chemical, electrical, engineering and pharmaceutical industries for the period of 1988 to 2000. Joseph employed two different measures of foreign exchange rate, along with a measure of interest rate changes. The results revealed that industry returns were more negatively affected by interest rate changes than by foreign exchange rate changes. The negative effects of interest rate changes and foreign exchange rate changes appeared more evident for the electrical and engineering sectors whereas these effects were positive for the pharmaceutical industry. Additionally, the results at the portfolio-level were generally similar with those based on the firm level analysis, except that the short term foreign exchange rate impact was very weak at the portfolio level. Overall, the

results at the individual firm level implied that the impact of foreign exchange rate and interest rate changes had adverse effects on stock returns.

Naik and Padhi (2012) examined the relationships between the Indian stock market index (BSE Sensex) and five macroeconomic variables, namely, industrial production index, wholesale price index, money supply, treasury bills rates and exchange rates over the period of 1994–2011. Naik and Padhi applied the Johansen's co-integration and vector error correction model to explore the long-run equilibrium relationship between stock market index and macroeconomic variables. Their analysis revealed that macroeconomic variables and the stock market index are co-integrated and, hence, a long-run equilibrium relationship exists between them. It has also been observed that the stock prices were positively related to money supply and industrial production but negatively significant to inflation, exchange rate, short-term interest rate in determining stock prices.

Rostamy (2013) investigated the impact of market return, oil price, and interest rate and exchange rate changes on stock returns in Tehran Stock Exchange. Rostamy used monthly data during the period of November 22, 2003 to November 20, 2008. He applied the multivariate regression model and autoregressive distributed lag model to explore the relationship between the variables. He concluded that market return, oil price; exchange rate and interest rate changes have significant positive impact on some industries returns.

Goswami and Jung (2013) studied the effects of economic factors on Korean stock market. Goswami and Jung employed the vector error correction model to verify the short run and long run relationship between stock price and nine macroeconomic variables namely; short run interest rate, long run interest rate, inflation, money supply, industrial production, oil price, balance of trade for current account and foreign exchange from two different currencies i.e. Korean won per USD and Korean won per Japanese Yen. They concluded that the Korean Stock index was positively related to industrial production, inflation and SR interest rate.

Hasan and Samarakoon (2013) analyzed the ability of interest rates, measured by Treasury bill rates of three maturities; 3, 6 and 12 months which tracks the expected monthly, quarterly and annual returns in the Sri Lankan stock index for the period 2005 to 2012. The stock return was measured by the continuously compounded monthly

returns on the All Share Price Index (ASPI) and Sensitive price index. Through the application of the OLS method, it was suggested that the short-term interest rates are positively significant to future returns and they are able to reliably track expected returns prospects. Hasan and Samarakoon also concluded that the 12 months maturity is the most powerful tool to track monthly and quarterly expected return among all the three maturities. In contrast to the findings in most prior studies on foreign markets, it indicated that short-term interest rates in Sri Lanka are positively related to future returns. They are able to reliably track expected returns of all three return horizons. The effect of interest rate on future returns becomes larger and stronger with longer maturity periods and quarterly returns horizons. In addition, the explanatory power also tends to increase with return horizons, except in annual returns.

Barasa (2014) examined the determinants of stock market performance of the stock exchange. A descriptive research design was employed by the study and used secondary data for a period 2000 to 2013. Barasa revealed that the share index as well as CPI, money supply and GDP per capita deteriorated just before, during and immediately after the general elections. He also established that the relationship between inflation as measured using CPI and performance of stock market was not significant. This study concluded that the relationship involving inflation and stock market performance was inverse and unimportant.

Venkatraja (2014) investigated the relationship between the Indian stock market performance and five macroeconomic variables. Venkatraja used index of industrial production, wholesale price index, gold price, foreign institutional investment and real effective exchange rate over the period of April 2010 to June 2014. He used error correction model and vector auto regression model to establish the relationship between variables. He concluded that 82 percent of variation in sensex is explained by these five selected macroeconomic factors. Furthermore, the study concluded that the coefficients of all the variables except index of industrial production are statistically significant. Thus, inflation, inflow of foreign institutional investment, exchange rate and gold price has positive significant impact on the Indian stock market performance.

Laichena and Obwogi (2015) analyzed the macroeconomic variables effects of east Africa' stock returns. Laichena and Obwogi examined the effect of interest rates, rate of inflation, rate of currency exchange, GDP and their impacts on stock returns in East Africa. They used a board data of three East African states Kenya, Uganda and Tanzania from 2005 to 2014. The conclusion of the research exposed the important affiliation involving the macroeconomic variables in the research and stock returns in East Africa. They concluded that lending interest rate and fixed interest rate was negative and significant towards stock market however inflation rate, money supply and GDP were insignificant towards stock market. The research suggested that lawmakers in East Africa ought to strive to enhance the macroeconomic situations of the state to advance stock returns.

Mugambi and Okech (2016) studied the macroeconomic variables impact on the bank stock returns in the Nairobi Securities Exchange listing. Mugambi and Okech employed secondary data from the CBK from 2000 to 2015. They used correlation analysis, Unit root test and the linear regression model to establish the relationship between the interest rate, inflation rate and exchange rate with the stock return. Findings revealed that interest rate, inflation and exchange rate influence bank stock return significantly negative way, while the impact of GDP on bank stock returns was insignificant. The study recommended that the government should ensure a stable macroeconomic environment and moderate its monetary policy interventions.

Humpe and Macmillian (2017) explained the cross-sectional variation in the relation between international security returns and expected inflation based on their sensitivities to world stock and bond factors. Humpe and Macmillian explained the inflation sensitivities of returns on country indexes and international mutual funds on their sensitivities to world stock and bond indexes. The result from OLS regression coefficient for return sensitivity of stock to the stock market factor was negative and significant at the five percent level. The coefficient for return sensitivity to the bond market factor was positive and significant at the one percent level. Thus, the results support the hypothesis that the inflation sensitivity of a security was insignificant related to its stock index return sensitivity and positively significant related to its bond return sensitivity. Concluded that

the inflation sensitivity of a security was positively (negatively) related to its sensitivity to the world bond index (world stock index). .

2.3 Review of Nepalese Studies

Shrestha and Subedi (2014) investigated the determinants of the stock index (NEPSE) in Nepal using monthly data for the period of mid-August 2000 to mid-July 2014. The correlation analysis and OLS estimations of behavioral equations were used for examinations. Consumer price index, broad money, Treasury bill was chosen as macro variables. In order to incorporate the major changes in politics and NRB's policy on lending against collateral of shares, two dummy variables have also been used. The correlation analysis shows the existence of the significant relationship between the NEPSE index and macro variables. Moreover, empirical results obtained from OLS estimations revealed that the NEPSE index was found to respond positively to inflation and broad money growth, and negatively to treasury bills rate. This suggests that, in Nepal, share investors seem to take equities as a hedge against inflation and consider stock as an alternative financial instrument. Further, the lowering borrowing costs stimulate the investment in the Nepalese stock market. More importantly, stock market has been found to respond significantly to changes in political environment and the policy of NRB.

Karki (2018) empirically examined the macro-economic factors of the stock market performance in Nepal. Karki considered the annual data of four macroeconomic variables; real GDP, inflation, interest rate and broad money supply from 1994 to 2016 and attempted to reveal the relative influence of these variables on stock prices represented by NEPSE Index of the Nepalese capital market. He used error correction model, unit root test, correlation and regression model for examination. Empirical results revealed that the performance of stock market was found to respond positively to real GDP, inflation and money supply, and negatively to interest rate. More importantly, long run equilibrium evidence cannot be found between macroeconomic variables and stock market index which suggests that stock price movements in Nepal are not explained by the macroeconomic variables. It supports random walk hypothesis in Nepalese stock market.

Shrestha and Pokhrel (2019) conducted a study on factors affecting stock index in Nepal. Shrestha and Pokhrel used both simple OLS and ARDL bound testing approach for empirical examination. Empirical results revealed that the Nepal's stock index was found to respond positively to broad money growth, and negatively to interest rate. This suggests that availability of liquidity and the low interest rates stimulate the stock index. On the other hand, ARDL method confirmed the existence of long run co integration of stock index with consumer price index, broad money and interest rate. The stock index has positive association with inflation and negative association with broad money and interest rate. More importantly, stock index has been found to respond significantly to changes in political environment and the policies of Nepal Rastra Bank about lending against share collateral and partly to paid-up capital hike. Still, large chunk of fluctuation in share index is not explained by the models, indicating the ample role of news, rumors and speculations.

Khatri (2019) investigated the dynamic relationship among the stock market and macroeconomic factors such as inflation, money supply, interest rate, gross domestic product, exchange rate and foreign direct investment of Nepal. Khatri has used multivariate co integration model and vector error correction model for the period Mid-July 1994 to Mid-July 2015. Findings revealed that the stock prices were positively and significantly related to money supply. Real economic activity and interest rate have significant and negative relationship with the stock prices. Similarly, foreign direct investment, inflation and exchange rate with US dollar have an insignificant relationship with the Nepalese stock market. Vector error correction model suggested that there was no significant effect of macroeconomic variables to the Nepalese stock price in the short run. Co integration model suggested that Nepalese stock market was not efficient in both the short run and the long run.

Shrestha (2019) examined the effect of macroeconomic variables on the NEPSE index over the period of January 2002 to December 2016. Shrestha adopted correlation and causal comparative research design to evaluate the effect of macroeconomic variables on the NEPSE index. The test of stationary showed that all the variables are not stationery at their level except the variable interest rate and they became stationery at their first difference. Thus all the variables except interest rate are used at their first difference for

further analysis. Pearson's correlation model was used to observe the relationship between NEPSE index and macroeconomic variables. Furthermore, Regressions model was used to analyze the effect of macroeconomic variables on the NEPSE index. The regression analysis showed that the coefficient of exchange rate and gold price was statistically insignificant at 5 percent level of significance whereas the coefficient of interest rate was statistically significant 5 percent level of significant. Similarly, the coefficient of wholesale price index was statistically significant at 1 percent level of significance. Thus, he concluded that the interest rate and wholesale price index had more explanatory power than exchange rate and gold price for explaining variation in stock market index and they had greater effect on stock market index than exchange rate and gold price in Nepalese stock market

Panta (2020) analyzed the macroeconomic determinants of stock market prices in Nepal. Panta adopted error correction model which was delivered from ARDL model through simple linear transformation to integrate short run adjustments with long run equilibrium without losing long run information. The analysis had been done by using 25 years annual data from 1994 to 2019. The result indicates that the fluctuation of NEPSE Index in long run is strongly associated with broad money supply, interest rate, inflation, and exchange rate. The GDP, money supply and exchange rate can positively define in short run while only money supply holds positive relationship in long run.

2.4 Review of Previous Thesis

Pudasaini (2016) studied the macro economic variables affecting the stock market. The macro variable factor includes the inflation rate, exchange rate and interest rates. The consumer price index was taken as the proxy for inflation rate whereas the treasury bills were taken as the proxy for the interest rate. Correlation and regression analysis were performed in order to find the relation between the macro economic variables affecting the stock market. Findings regarding the relation between the interest rates and exchange rate with the stock index were statistically significant and negative whereas the inflation rate with the stock index was found to be insignificant. Pudasaini examined the relation of consumer price index, treasury bills and average exchange rate with the stock index.

Ghimire (2017) investigated the impact of interest rate on stock index. Ten commercial bank's long term interest rate of 5 years was taken for conducting research. Stock price data were taken from the stock exchange company of Nepal. He has used correlation and regression model in order to conclude the results of relation between the market and interest rates. The saving interest rate, fixed interest rate and lending interest were taken as the variable for the interest rate. Findings regarding the saving interest rate, fixed interest rate and lending interest rate towards the stock index was significant and negative. The low lending interest rate attracts the investor to lend the money and invest in the share market for better return.

Dhami (2017) examined the determinants of stock market performance in Nepal. Dhami examined the determinants of the stock market performance in Nepal using monthly data for the period of mid-August 2006 to mid-July 2016. He used inflation, broad money growth and interest rate as a variable. The impact of major changes in politics and Nepal Rastra Bank's policy on lending against share collateral has also been assessed. Results obtained revealed that the performance of stock market is found to respond positively significant to inflation and broad money growth, and negatively significant to interest rate.

Thapa (2018) analyzed the impact of inflation and exchange rate on stock market liquidity. Thapa used linear regression model to establish the relationship between the inflation rate and exchange rate with the Nepal stock exchange. He has taken ten years data of inflation rate, exchange rate and stock index for finding the results. Findings revealed that inflation and exchange rate had an insignificant relationship with the Nepal stock exchange.

Gautam (2018) studied the impact of interest rate, exchange rate and inflation on stock returns. All the three macro variables which are taken under consideration are considered very important for the economy of any country and any change among these variables effect the economy in various ways and the regulatory authority take steps in order to make changes in their policies which can affect the economy in a positive way. Ten years monthly data from 31st July, 2007 to Jun 30th 2017 is taken in consideration. Multiple regression models are applied on the data and the result shows that there is a weak

relationship between the dependent variable and independent variables. The impact of interest rate and inflation is insignificant towards stock returns of NEPSE index while the exchange rate has significant impact on stock returns.

2.5 Research Gap

Performance of the stock market is very important to investors and they react to macroeconomic variables which may affect the performance of the stock market. Interest rate and inflation are the key macroeconomic variables which affect the stock market. This study will help the investors by providing empirical evidence of interest rate and inflation effect on stock market which will help in their decision-making. For this purpose monthly data of six year saving interest rates, fixed interest rates, lending interest rates and inflation rate from 2014 to 2019 are selected. Stock Index of 72 month or six years will be calculated from NEPSE webpage. The time which given for the reporting writing was not enough for writing a comprehensive research. The analysis has also been constrained by the sample size which could have affected the results. Mean, median, mode, correlation and regression were used in order to get the findings for this research. Correlation and regression analysis measures the linear association between two variables, but it may not always be reliable. Two variables can have a strong nonlinear relation and still have a very low correlation. Some researchers may have used treasury bills as the proxy for the interest rates and some may have taken fixed deposit as the proxy for interest rates. Due to which, results and finding and conclusions may differs accordingly which is the one of the research gap in this dissertation.

CHAPTER III

RESEARCH METHODOLOGY

This chapter has been divided into five sections. First section deals with the brief description of research design, while second section explains the nature and sources of data employed. The third section deals with the method of analysis that is used to get the findings. Subsequently, fourth section defines about the model and fifth section has been devoted to the research framework and definition of different independent and dependent variables of this study.

3.1 Research Design

This study has followed descriptive and causal research designs to deal with the various issues raised in the study. Descriptive research includes surveys and fact finding enquiries of different kinds. The major purpose of descriptive research is the description of the state of affairs as it exists at present. It is undertaken in order to ascertain and be able to describe the characteristics of the variables of interest.

The causal research design is selected to examine the relationship between the dependent variable and the independent variables. The causal research investigates the possible causes affecting a particular situation by observing existing consequences and searching for the possible factors leading to the results. This is because both the effect and alleged causes have already occurred. In other words, causal research is that research in which the independent variable or variables have already occurred and in which researcher starts with the observation of the dependent variable or variables. Then, analyze the independent variables in retrospect for their possible relations to, and effect on the dependent variable or variables. This research design is selected to examine the relationship of NEPSE index with saving interest rate, fixed interest rate, lending interest rate and inflation rate.

3.2 Nature and Sources of Data

This study is based on secondary data. The secondary sources of data has been employed to understand the financing constraint position of the small vs. large, constrained vs. unconstrained, high vs. low interest coverage, high vs. low stock tangibility and low vs.

high impact of interest rate and inflation rate on NEPSE index The necessary data required for this study has been collected from annual reports of NRB and NEPSE. Six years data from 2014 to 2019 of saving interest rate, fixed interest rate, lending interest rate and inflation rate have been selected in order to examine the relation of independent variables with dependent variables.

3.3 Method of Analysis

3.3.1 Mean

Mean is the arithmetic average of a range of values or quantities computed by dividing the total of all values by the number of values. It refers to the average that is used to derive the central tendency of the data. The arithmetic mean is the most commonly used and readily understood measure of central tendency. It is determined by adding all the data points in a population and then dividing the total by the number of points. In this study, mean is calculated to find out the average of all the short run and long run interest rate and inflation rate in comparison to stock index.

$$\text{Mean} = \frac{\sum fx}{n}$$

Where, X= Value of responses of each independent or dependent variable

N= Number of statements

3.3.2 Median

Median is the middle number in a sorted list of numbers. Median is the number separating the higher half of a data sample or population, from the lower half. To determine the median value in a sequence of numbers, the numbers must first be arranged in value order from lowest to highest. The basic advantage of the median over the mean in describing data is that is resilient to extremely large or small values and may be a better descriptor of a typical outcome. In this study, median is calculated to find out the mid value of the both dependent and independent variables. The formula for the median is as follow:

$$\text{Median} = \text{size of } \frac{(\text{n}-1)\text{th}}{2} \text{ item}$$

3.3.3 Standard Deviation

The standard deviation (SD) is a measure that is used to quantify the amount of variation or dispersion of a set of data values. A low standard deviation indicates that the data points tend to be close to the mean (also called the expected value) of the set, while a high standard deviation indicates that the data points are spread out over a wider range of values. A useful property of the standard deviation is that, unlike the variance, it is expressed in the same units as the data. In this study, standard deviation is calculated measuring the risk factor in the dependent variables due to the impact of dependent variables.

$$\sigma = \frac{\sqrt{\sum(x-\bar{x})^2}}{N}$$

Where, X = Value of responses of each dependent or independent variable.

$\bar{X}$ = Mean value of responses of each dependent or independent variable.

N = Number of response

3.3.4 Correlation

Correlation is a statistical technique that can show whether and how strongly pairs of variables are related. For example, height and weight related: taller people tend to be heavier than shorter people. The relationship isn't perfect. Correlations are useful because they can indicate a predictive relationship that can be exploited in practice. Degree and type of relationship between any two or more variables vary together over a period. Correlation value falls between -1 to +1. Value close to +1 indicates a high-degree of positive correlation, and values close to -1 indicate a high-degree of negative correlation. In this study, correlation is calculated for the finding the degree of relation between independent variables and dependent variables for all sample.

$$\frac{n\sum dx\sum dy - \sum dx\sum dy}{\sqrt{[n\sum dx^2 - (\sum dx)^2]}\sqrt{[n\sum dy^2 - (\sum dy)^2]}}$$

Where, X= Value of independent variable.

Y=Value of dependent Variable

N= Number of responses

3.3.5 Regression

In statistical tool modeling, regression analysis is statistical process for estimating the relationship among the variables. It includes many techniques for modeling and analyzing several variables, when the focus is on the relationship between a dependent variable and one or more independent variable. Regression analysis is widely used for prediction and forecasting where its use has substantial overlap with the field of machine learning. Regression analysis is also used to understand which among the independent variables are related to the dependent variables and to explore the forms of these relationships. In this study, regression is calculated for finding out direction of relationship between independent variables and dependent variables for all samples. The model of the study is below

Multiple regressions: $y = a + b_{1.}x_1 + b_{2.}x_2 + \ldots + b_{n.}x_n$

Where,

Y = dependent variable

x_1 = independent variable one

x_2 = independent variable two

b_1 = Coefficient of independent variable one

b_2 = Coefficient of independent variable two

3.4 The Model

Based on the regression, this study follows NEPSE index as the dependent variable and saving interest rate, fixed interest rate, lending rate and inflation rate as the dependent variable. This modal tries to study the degree of the relationship between the interest rate, inflation rate with the NEPSE index.

NEPSE Index $= \lambda + \lambda_1.SIR + \lambda_{2.}FIR + \lambda_{3.}LIR + \lambda_4.IFR$

Where:

λ i; i = 1,2,3,4 = the coefficient of various independent variables.

SIR = the log of saving interest rate

FIR = the log of fixed interest rate

LIR = the log of lending interest rate

IFR = the log of inflation rate

3.5 Research Framework and Definition of the Variables

A research framework has been used to help focus on the variables in the study. This study primarily focuses on stock index. Four non-equity macroeconomic variables such as inflation, saving interest rate, fixed interest rate and lending interest rate, are used in an attempt to examine the relationship between these variables and stock index. Stock Index is the dependent variable whereas the saving interest rate, fixed interest rate, lending interest rate and inflation rate are independent variable. The research framework of the study is in Figure 3.1.

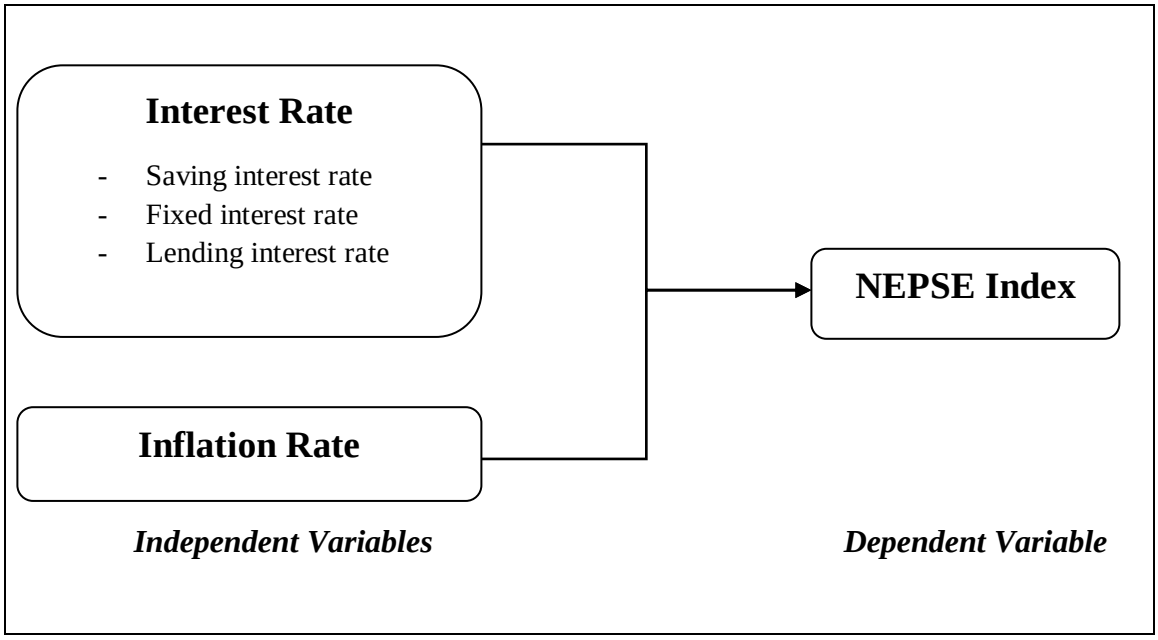

Figure 3.1 Research Framework

Figure 3.1 shows the research framework and objectives of the study which aims to determine the impact of selected variables namely saving interest rate, fixed interest rate, lending interest rate and inflation rate towards NEPSE index. The definitions of each variable used in the study are as follows:

3.5.1 Interest Rate

An interest rate is described as the price a borrower pays for the use of money he does not own, and has to return to the lender who receives for deferring his consumption, by lending to the borrower. Interest can also be expressed as a percentage of money taken over the period of one year. Interest rate is the rate of increase over time of a bank deposit. An Interest, which is charged or paid for the use of money, is often expressed as an annual percentage of the principal. Interest rate is the tool used by the central bank of a country to keep a check on any major currency fluctuation. An increase in interest rate is necessary to stabilize the exchange rate depreciation and to curb the inflationary pressure and thereby helps to avoid many adverse economic consequences (Ross, 1976).

3.5.1.1 Saving Interest Rate

A saving interest rate is a changing rate charged on a liability, such as fluctuating deposits where a depositor can withdraw or deposit money at any time. The savings rate is a measurement of the amount of money, expressed as a percentage or ratio that a person deducts from their disposable personal income to set aside as a nest egg or for retirement. In economic terms, saving is a choice to forego some current consumption in favor of increased future consumption, so the savings rate reflects a person or group's rate of time preference (Fama, 1970).

3.5.1.2 Fixed Interest Rate

Fixed interest rate is as an unchanging rate charged on a liability, such as a loan or mortgage or fixed rate of deposit. It might apply during the entire term of the loan or for just part of the term, but it remains the same throughout a set period. Mortgages can have multiple interest-rate options, including one that combines a fixed rate for some portion of the term and an adjustable rate for the balance. These are referred to as "hybrids." This type of rate avoids the risk that comes with a floating or variable interest rate, in which the rate payable on a debt obligation can vary depending on a benchmark interest rate or index, sometimes unexpectedly (Ross, 1976).

3.5.1.3 Lending Interest Rate

Lending interest rate is the amount charged by lenders for a certain period as a percentage of the amount lent or deposited. The total interest on the amount or the principal sum is determined by the duration of time over which the amount is deposited or lent. Most loans use simple interest. However, some also use compound interest, which includes interest on the principal amount as well as on the previously accumulated interests. Lending Rate is the other depository corporations' rate that usually meets the short- and medium-term financing needs of the private sector. This rate is normally differentiated according to creditworthiness of borrowers and objectives of financing (Cassel, 1918)

3.5.2 Inflation Rate

Inflation means a sustained increase in the aggregate or general price level in an economy. Inflation means there is an increase in the cost of living. There is widespread agreement that high and volatile inflation can be damaging both to individual businesses and consumers and also to the economy as a whole. Generally, the inflation rate is used to measure the price stability in the economy. A low inflation rate scenario will exhibit a rising currency rate, as the purchasing power of the currency will increase as compared to other currencies. The rate of inflation measures the annual percentage increase in prices; the most usual measure is that of retail prices. The government publishes an index of consumer prices each month, and the rate of inflation is the percentage increase in that index over the previous 12 months. Inflation can be simply defined as the sustained raise in general price level (Thapa, 2018).

3.5.3 Stock Index

The stock index is a common feature of a modern economy and it is reputed to perform functions that promote the growth and development of the economy. The market is an economic institution; which promotes efficiency in capital formation and allocation. It enables governments and industry to raise long-term capital for financing new projects, and expanding and modernizing industrial and commercial concerns. The stock index is a volatile environment with dramatic moves that can either give investors a positive or negative stock market return. Volatility declines as the stock market rises and increases as

the stock market falls. Increase in volatility increases the risk involved and reduces the overall returns on stock prices (Khatri, 2019).

3.5.3.1 NEPSE Index

Nepal Stock Exchange at the end of the day publishes the transaction index which is called NEPSE index. In simple language, the base market capitalization is taken which is special to calculate the NEPSE index. It is the first index to show the work of stock market. The increase in the value and transaction of transacted share increase then the market capitalization value also increases. While calculating the market capitalization, the total share is multiplied by the certain day's share value. As there is a different value of share number and share price, separate multiply value is calculated and added later to find the total sum. In this way, market capitalization is calculated. The market capitalization of each company is added to find out the total market capitalization. Stock exchange finds out the market index on the base of market capitalization. When the market capitalization increases, the NEPSE index also increases and when the market capitalization decreases, the NEPSE index also decreases (Shrestha, 2019).

CHAPTER IV

RESULTS AND DISCUSSION

Since this study aims to explain the impact of interest rate and inflation rate among stock market in Nepalese context and to determine the determinants of saving interest rate, fixed interest rate, lending interest rate and inflation rate for Nepalese stock market. It employs the various statistical tools and techniques in order to determine the relationship of interest rate, inflation rate and stock index and its significant impact. For this purpose, required secondary data were collected and analyzed in a systematic way so as to derive the empirical findings and determine the determinants of stock index.

4.1. Analysis of Secondary Data

This study primarily relies on the analysis of secondary data to derive the empirical findings on the study. Data that has been collected were tabulated and shown on figure for greater visibility and clarity. Data has been presented with time period of last six years from 2014 to 2019. And it has been analyzed using mean, median, mode, standard deviation, correlation and regression analysis. For analyzing the relationship between dependent and independent variables, Correlation and Regression Analysis were used. The sources of tables presented below are output from software and edited in excel.

The data related to saving interest rate, fixed interest rate, lending interest rate, inflation rate and NEPSE index were collected and analyzed through various methods in order to answer the various research questions. Research question is the question that a research project sets out to answer. Data are being analyzed in order to know the significant or insignificant impact of saving interest rate on NEPSE index, to know the significant or insignificant impact of fixed interest rate on NEPSE index, to know the significant or insignificant impact of lending interest rate on NEPSE index and to know the significant or significant impact of inflation rate on NEPSE Index. The pattern of monthly saving interest rate, fixed interest rate, lending interest rate and NEPSE index of year 2014, 2015, 2016, 2017, 2018 and 2019 are presented below with figures. SPSS software has been used in order to calculate the descriptive, correlation, univariate and multivariate regression analysis.

4.1.1 Pattern of monthly SIR, FIR, LIR, IFR and NEPSE Index in 2014.

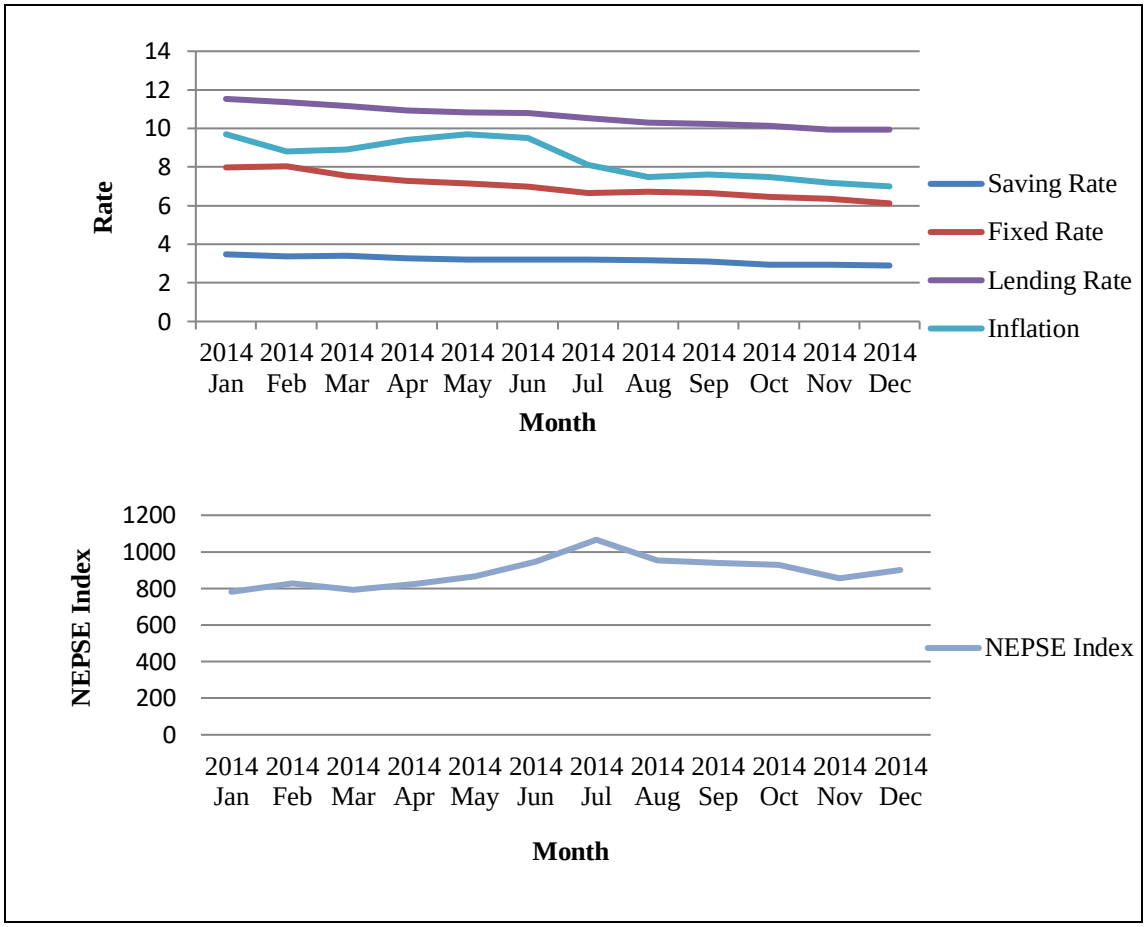

Figure 4.1. Pattern of SIR, FIR, LIR, IFR and NEPSE Index of 2014

Figure 4.1 shows the pattern of saving interest rate, fixed interest rate, lending interest rate, inflation rate and NEPSE Index of the year 2014. It was observed that saving interest rate, fixed interest rate, lending interest rate and inflation rate were following decreasing trend whereas NEPSE index following increasing trend.

Saving interest rate is fluctuating between 2 to 3% whereas the NEPSE index has been from 781.5 to 1066.1 points. Saving interest rate seems to have stability in the given year whereas the stock index has been found fluctuating continuously. NEPSE Index has been rise till July with 1066.1 indexes however after that it started to fall slowly with small points. The NEPSE market reaches at optimum level when saving interest rate reaches at its lowest level. However the concurrent relationship cannot be established based on above data. When saving interest rate was decreasing, NEPSE index was continuously rising with small points.

Fixed interest rate and NEPSE Index are found to be following same pattern. In the given year, fixed interest was stable till May however after that it started to fall with the small percentage. As usual NEPSE Index was also having same condition at given year. NEPSE index was also rising with fixed interest rate until May and it started to decline with the small point. The NEPSE market reaches at optimum level when fixed interest rate reaches at its lowest level. However the concurrent relationship cannot be established based on above data. In the given year fixed interest rate was from 6.12% to 8.04% and NEPSE index was from 781.5 to 1066.1. Positive relation indicates that while fixed rates were increasing, the NEPSE index was also increasing and when the fixed interest rates were decreasing, the NEPSE index was also decreasing in the given year.

Figure 4.1 shows the decrease of lending rate in the given year 2014. At this year, lending rate and NEPSE index are having inverse relationship where the lending rates were going downside and NEPSE index were on rising terms. At starting period, lending rate was 11.53% however at the end of the period, it was at 9.94%. In NEPSE index, the starting index was 781.5 and it started to rise till July with 1066.1 and started to fall in a slow pattern with not that much of a change The NEPSE market reaches at optimum level when lending interest rate reaches at its lowest level. However the concurrent relationship cannot be established based on above data. When lending rate is increasing in this year, NEPSE index were found to be decreasing and when lending rate is decreasing, NEPSE index seems to be on increasing trend.

Inflation rate in the given year seems to have stability until June however after that it started to fall down. At first inflation rate was at 9.7%. But after July, it started to decline till 7%. However while viewing NEPSE Index, it started to rise until July and after that it started to decline with small points. In NEPSE index, the starting index was 781.5 and it started to rise till July with 1066.1 and started to fall slowly with not that much of a change. At last, the NEPSE index was 902.3 points. Due to which it can observed that there is no relation between inflation rate and NEPSE index in the given year.

4.1.2 Pattern of monthly SIR, FIR, LIR, IFR and NEPSE Index in 2015.

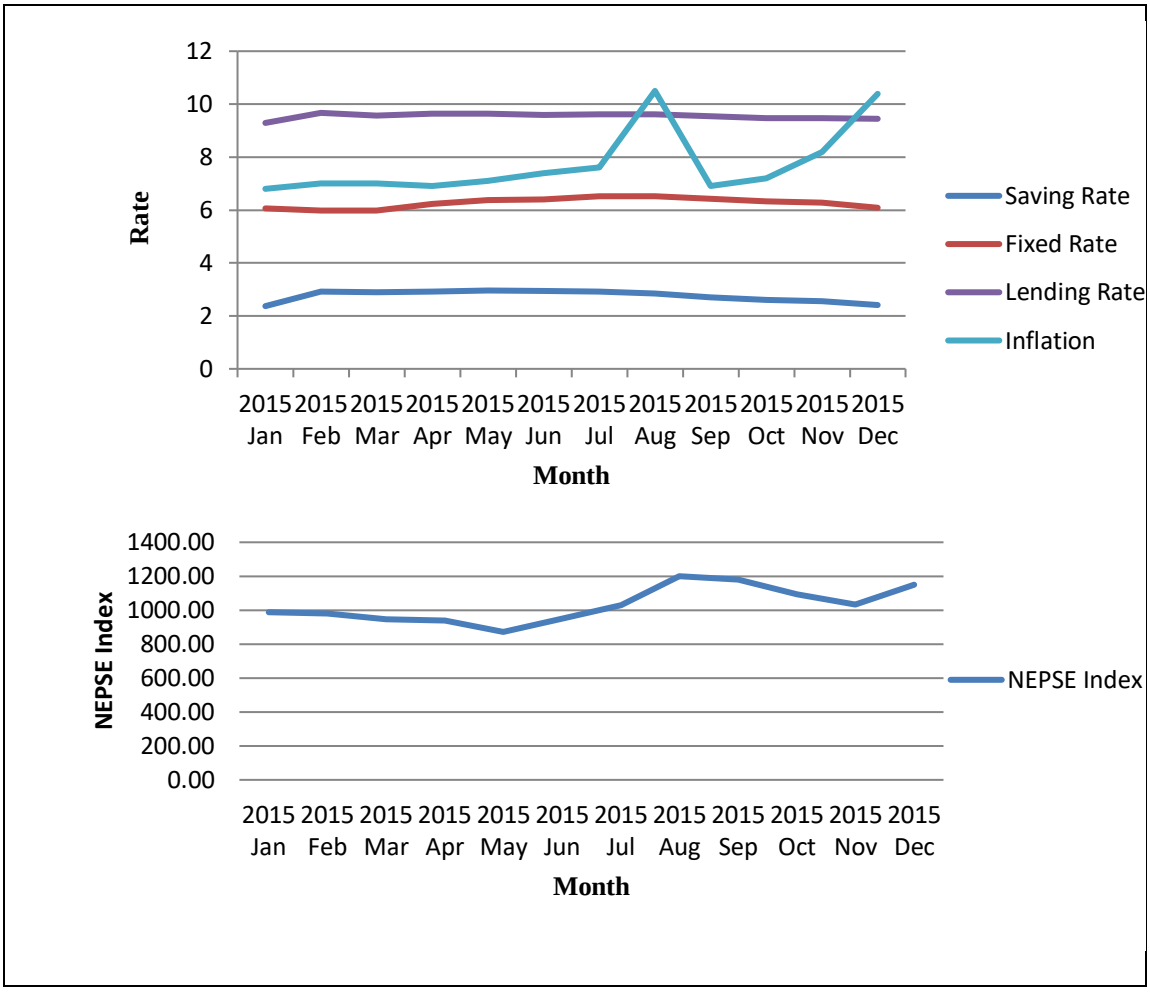

Figure 4.2. Pattern of SIR, FIR, LIR, IFR and NEPSE Index of 2015

Figure 4.2 shows the pattern of saving interest rate, fixed interest rate, lending interest rate, inflation rate and NEPSE Index of the year 2015. It was observed that saving interest rate, fixed interest rate and lending interest rate were following decreasing trend whereas NEPSE index and inflation rate had been found to be following both increasing and decreasing trend with continuous fluctuations.

Saving interest rate is fluctuating between 2 to 3% whereas the NEPSE index has been 871.94 to 1151.38. Saving interest rate in the given year has found to be stable by looking at the figure. However the NEPSE index seems to be having increasing trends. The saving interest rate and stock index seems to be having inverse relation with each other. Here saving interest rate is having slight increase until June and after that it started to

decline with slight change. However NEPSE index seems to be having risen continuously even after small change in saving interest rate.

Fixed interest in Nepal used to be in average of 9 to 12%. But however in the given year 2015, fixed interest rate was so much low. It was found to be from 5.98% to 6.52%. Due to the low interest rate in the given year, investors were investing in the stock market which gave rise to the stock index. The NEPSE index started from 986.66 and ended with 1151.38 points which seems to be actually good in share market. The relation between the fixed interest rate and NEPSE Index in the given year was found to be negative where fixed interest rate was found to be decreasing trend however the NEPSE index was on increasing trend. Lower the fixed interest rate higher the NEPSE Index and Higher the fixed interest rate, lower will be the NEPSE Index.

Figure 4.2 shows the stability of lending rate in the given year 2015. The lending rate has been found stable in the year with 9.29% to 9.67%. However even at the stable lending rate, NEPSE index seems to be following increasing trend where it started from 986.66 and ended at 1151.38 points. The change in NEPSE index seems to be higher in comparison to lending rate. The lending rate was found to be following slightly increasing and decreasing pattern in the given year with no big change. However it didn't created huge impact on NEPSE index. NEPSE Index kept on rising with no any relation with fixed interest rate.

Inflation rate was found to be following increasing trend till August 2015. After certain months, it started to fluctuate with slight percentage. However inflation was found to have positive relation with the NEPSE index. Inflation rate at the starting of the year was 6.8% and reached to 10.5 till august however after that it started to fall. NEPSE index was also following the same pattern as of Inflation rate. NEPSE index was increasing when the inflation rate was increasing and decreasing when the inflation was decreasing. It was showing direct relation between each other.

4.1.3 Pattern of monthly SIR, FIR, LIR, IFR and NEPSE Index in 2016.

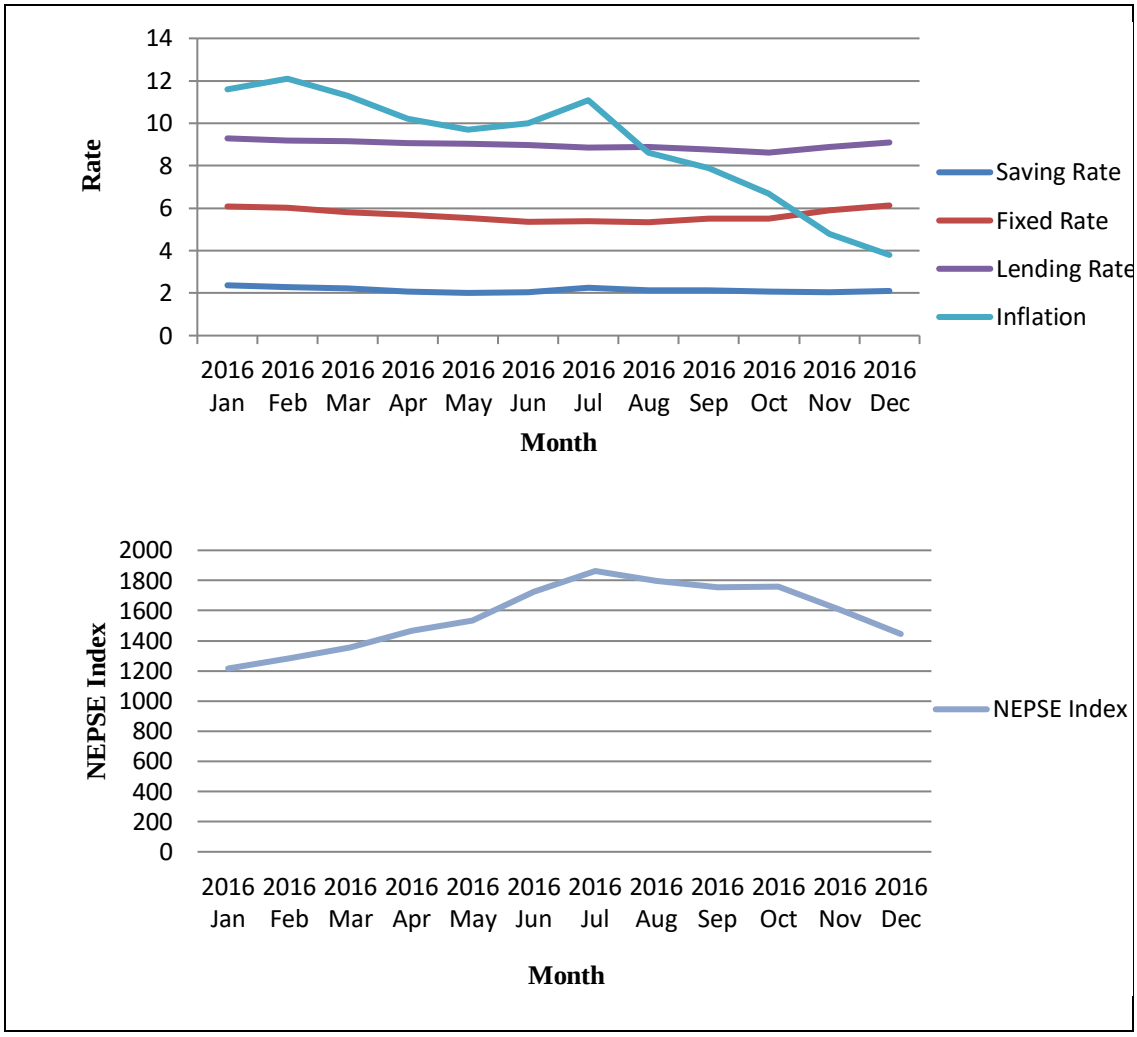

Figure 4.3. Pattern of SIR, FIR, LIR, IFR and NEPSE Index of 2016

Figure 4.3 shows the pattern of saving interest rate, fixed interest rate, lending interest rate, inflation rate and NEPSE Index of the year 2016. It was observed that saving interest rate, fixed interest rate, lending interest rate and inflation rate were following decreasing trend whereas NEPSE index was following increasing trend until July and after that it started to follow decreasing trend.

Average saving interest rate of Nepal used to be on four percent to six percent. However looking at figure 4.3, the saving interest rate was at average of two percent. It didn't increase or decreased hugely. NEPSE index was found to be increasing in huge points. It started with 1216.11 points and at midst, it reached to 1862.8 and after that it slightly started to decline. The NEPSE market reaches at optimum level when interest of saving

reaches at its lowest level. However the concurrent relationship cannot be established based on above figure.

Fixed interest rate and NEPSE index were found to be having inverse relationship with each other. Here when fixed interest rate is decreasing NEPSE Index has found to be increasing continuously. Fixed interest rate at the starting of the year was 6.07% and at the end of the year it was 5.9%. However NEPSE index was 1216.11 at the starting of the year and ended by 1608.3. Figure 4.3 shows the inverse relation of fixed interest rate and NEPSE index. The NEPSE market reaches at optimum level when interest rate of fixed reaches at its lowest level. Increase in fixed interest rate in given year shows the decrease of NEPSE Index and decrease in fixed interest rate shows the increase in the NEPSE index.

Lending rate in the given year has found to be on decreasing trend but however share index has been found increasing continuously. The NEPSE market reaches at optimum level when interest rate of lending reaches at its lowest level. However the concurrent relationship cannot be established based on above data. Decrease in lending rate will help the NEPSE index to rise. As investors will lend the money from the financial institutions and invest in share market for higher return. In the given year lending rate was continuously decreasing and NEPSE index was on increasing trend with slight ups and down. Lower the lending rate will result higher the NEPSE index and higher the lending rate will result lower the NEPSE index.

Inflation rate has been found to be highly fluctuating. It started to decrease to sudden level and stop at midst of the year and again started to fall frequently till it reached to 3.8%. However NEPSE index has found to be increasing continuously. The relationship between the inflation rate and NEPSE index has found to be negative. With the decrease in inflation rate, the NEPSE index was continuously rising. NEPSE index was not affected by the inflation in the given year. NEPSE index kept on following the increasing trend.

4.1.4 Pattern of monthly SIR, FIR, LIR, IFR and NEPSE Index in 2017.

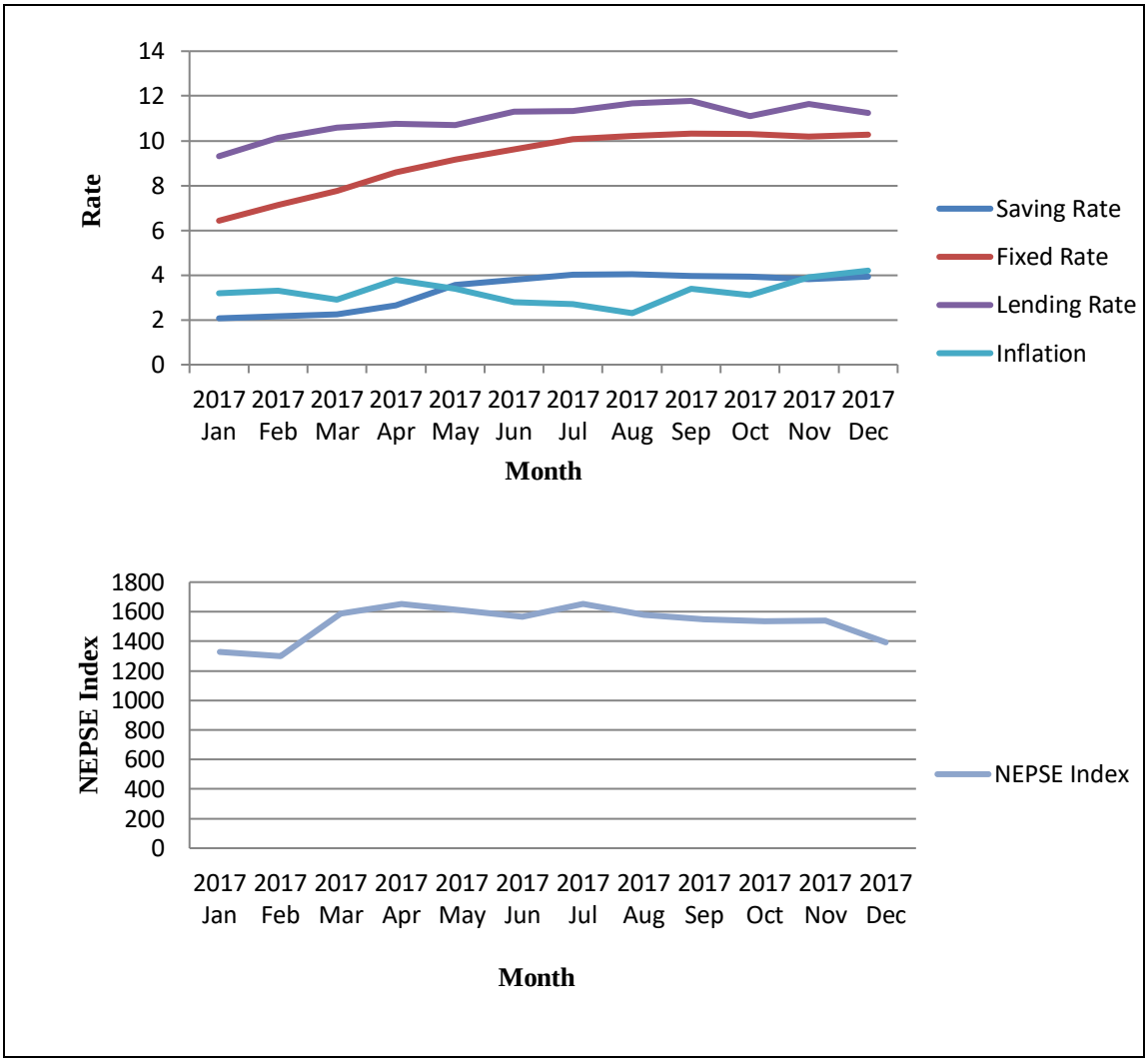

Figure 4.4. Pattern of SIR, FIR, LIR, IFR and NEPSE Index of 2017

Figure 4.4 shows the pattern of saving interest rate, fixed interest rate, lending interest rate, inflation rate and NEPSE Index of the year 2017. It was observed that saving interest rate, fixed interest rate & lending interest rate were following increasing trend whereas NEPSE index and inflation rate were following both increasing and decreasing trends with continuous fluctuations.

This year saving interest rate has found to be on increasing pattern till August and started to decline by small percentage. And same has happened to NEPSE index. The NEPSE index in the given year has found to be increasing until August and after that it started to decline. The saving interest rate and NEPSE index were found to have positive

relationship with each other. The NEPSE market reaches at lowest level when interest rates of saving reaches at its highest level. The impact of saving interest rate on NEPSE index has been found positive. Increase in saving rate has lead to increase in the NEPSE index and decrease in saving rate has lead to decrease in NEPSE index too.

Fixed interest rate in the given year was found to be on increasing trend. However the relation with the NEPSE index seems to be direct till the July after that the NEPSE index started to decline with slight point. Fixed interest was continuously rising at the given year but NEPSE index was dull and started to decline after the month of July. The relation between them found to be positive. As the fixed rate was increasing NEPSE index was also found to be increasing for certain time period.

The relationship between the lending interest rate and NEPSE index was found to be having positive. As the lending rate was increasing in the given year, NEPSE index was also continuously increasing. Lending rate started with 9.31% and ended at 11.25%. But while looking at the figure, NEPSE index was increasing continuously till July and it started to decline by slight change in percentage. The relationship between them was found to be positive in a given year. However NEPSE index was not found to fluctuating in broad way.

An inflation rate in given year has been found fluctuating whole year. As it keeps on increasing and decreasing continuously not making any positive or negative direction continuously. At the starting of the year, inflation rate was 3.2% however it kept on having ups and down. But while observing the figure, it was continuously kept on rising until July and started to fall by slighted points. It was found that inflation was having no impact on the share market, as the change in inflation was not affecting the share market in the year 2017.

4.1.5 Pattern of monthly SIR, FIR, LIR, IFR and NEPSE Index in 2018.

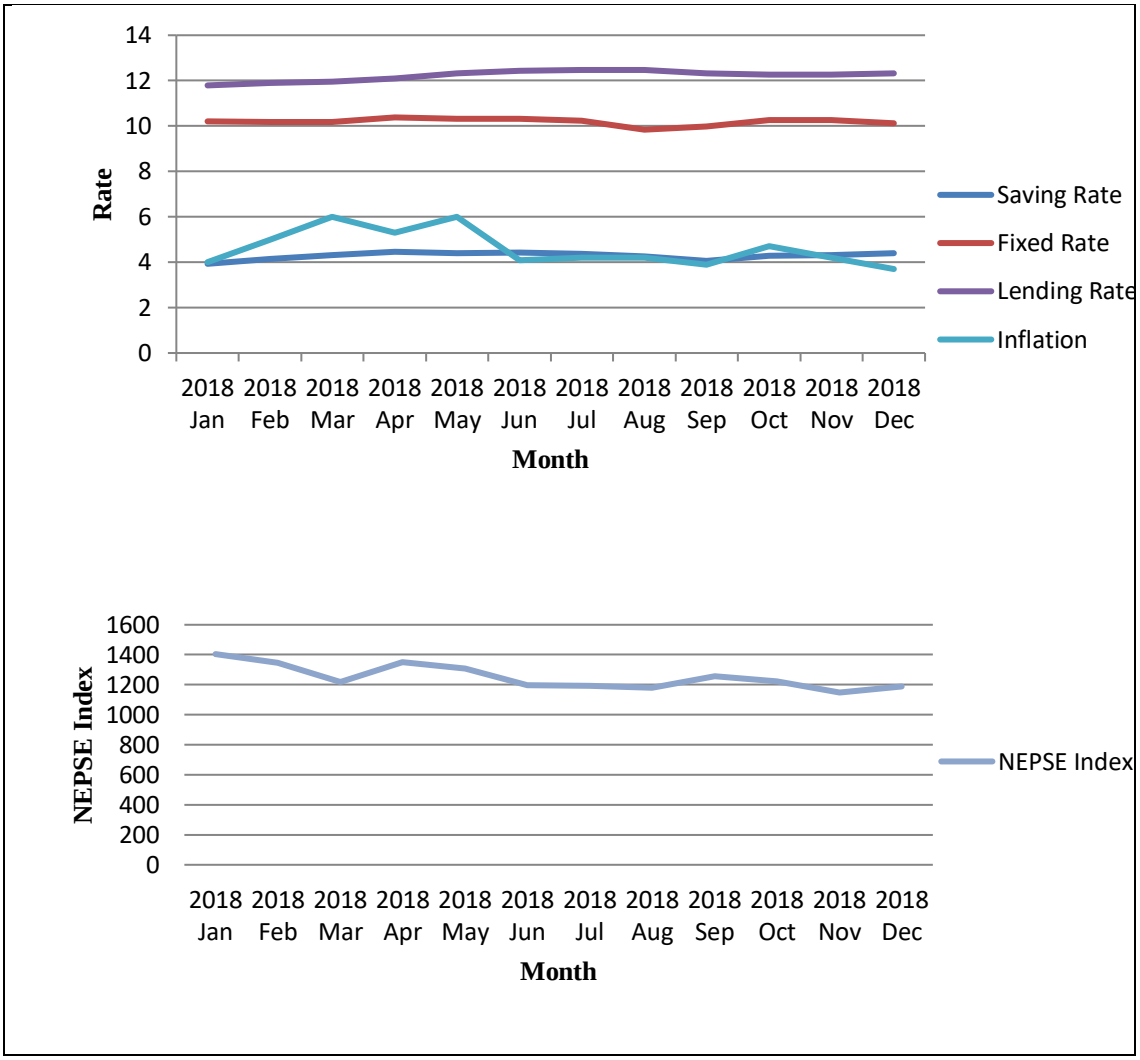

Figure 4.5. Pattern of SIR, FIR, LIR, IFR and NEPSE Index of 2018

Figure 4.5 shows the pattern of saving interest rate, fixed interest rate, lending interest rate, inflation rate and NEPSE Index of the year 2018. It was observed that saving interest rate, fixed interest rate & lending interest rate were following increasing trend whereas NEPSE index was following decreasing trend. Inflation rate in the given year was found to be following both increasing and decreasing trend.

This year saving interest was found to be having stable pattern with no any big changes. It was from 4% to 5%. This year saving interest rate has found to be having no any relationship with the NEPSE index. After viewing the figure and data, NEPSE index has

increased at both rise and fall of saving interest rate. Saving interest rate was not making any huge changes in NEPSE index.

Fixed interest rate in the given year 2018 was found to be stable whereas NEPSE was following downward trend. Increase in fixed rate has increased the NEPSE index and decrease in the fixed interest rate has decreased the NEPSE index too. As it can be observed from the figure that fixed interest rate was found to be increasing continuously with small change. However NEPSE index was also following the same pattern till October. After that there was no such frequent change.

Lending rate in the given year has found to be increasing continuously. Lending rate at the starting of the year was 11.79 and ended with 12.32%. The lending rate and NEPSE index has found to be having negative relationship with each other in the given year. As the lending rate was increasing, NEPSE index was on decreasing trend. At first the index started with the 1404.49 points. However after that it ended with 1187.28. It shows the negative relationship between the lending rate and NEPSE index.

Figure 4.5 demonstrates the relationship of inflation rate and NEPSE index as negative. When the inflation rate is increasing, NEPSE seems to be decreasing and when the inflation rate is decreasing, NEPSE index was found to be increasing. In this year, Inflation was found to be having up and down pattern continuously. Sometimes Inflation and NEPSE index were both increasing and sometimes they were both decreasing. Both were not constantly on same patterns. Figure shows that the inflation was not making any major impact on the NEPSE index.

4.1.6 Pattern of monthly SIR, FIR, LIR, IFR and NEPSE Index in 2019.

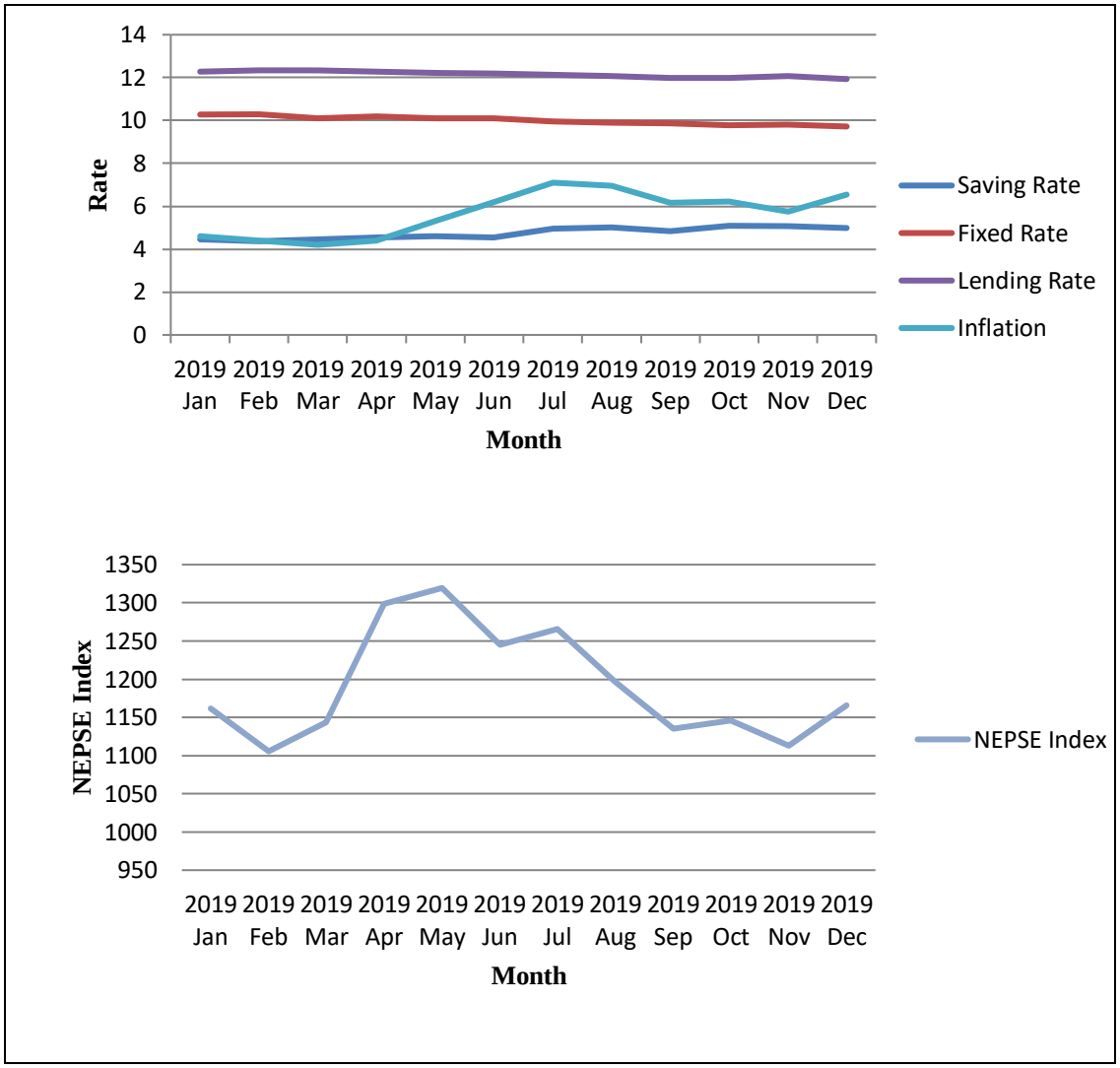

Figure 4.6. Pattern of SIR, FIR, LIR, IFR and NEPSE Index of 2019.

Figure 4.6 shows the pattern of saving interest rate, fixed interest rate, lending interest rate, inflation rate and NEPSE Index of the year 2018. It was observed that saving interest rate and inflation rate were following increasing trend whereas fixed interest rate & lending rate were following decreasing trend. NEPSE index in the given year was found to be following both increasing and decreasing trend.

This year saving interest rate was found to be having stable pattern throughout the year. It was started at 4.46% and ended at 4.99%. It can be observed that saving interest rate has a positive relation with the NEPSE index. When the saving interest rate was increasing, NEPSE index was also increasing and when the saving interest rate was decreasing,

NEPSE index was also decreasing. The NEPSE market reaches at optimum level when interest rate of saving reaches at its lowest level. However the concurrent relationship cannot be established based on above data.

Fixed interest rate in a given year was found to be on decreasing trend where it started with 10.28% and ended the year with 9.72%. However it was observed that fixed interest rate and NEPSE index were found to be having no any relationship in the given year. Even after time of decreasing fixed interest rate, NEPSE index was not affected and it was increasing and decreasing continuously in the given year. This figure has indicated no any relationship between fixed interest rate and NEPSE index.

Lending rate and NEPSE index has no any relationship in the given year. As the lending rate has been following decreasing trend, NEPSE index has no any impact on it. NEPSE index was keep on changing even the lending rate was increasing or decreasing. From the figure, it was found that lending interest rate was stable throughout the year with slight change in percentage however NEPSE index was having ups and down in whole year. So in the given year, lending rate was having no found any relation with NEPSE Index.

Inflation rate and NEPSE index in the given year 2019 have found to be having negative relation with each other. Inflation rate was found to be continuously increasing whereas the NEPSE index was found to be decreasing. The increase in inflation rate has decrease the NEPSE Index which shows the inverse relation between them. As the relation between them seems to be negative, rise in inflation rate will result in decline in NEPSE index and fall in inflation rate will result in rise in NEPSE Index.

4.1.7 Pattern of SIR, FIR, LIR, IFR and NEPSE Index in 2014-2019

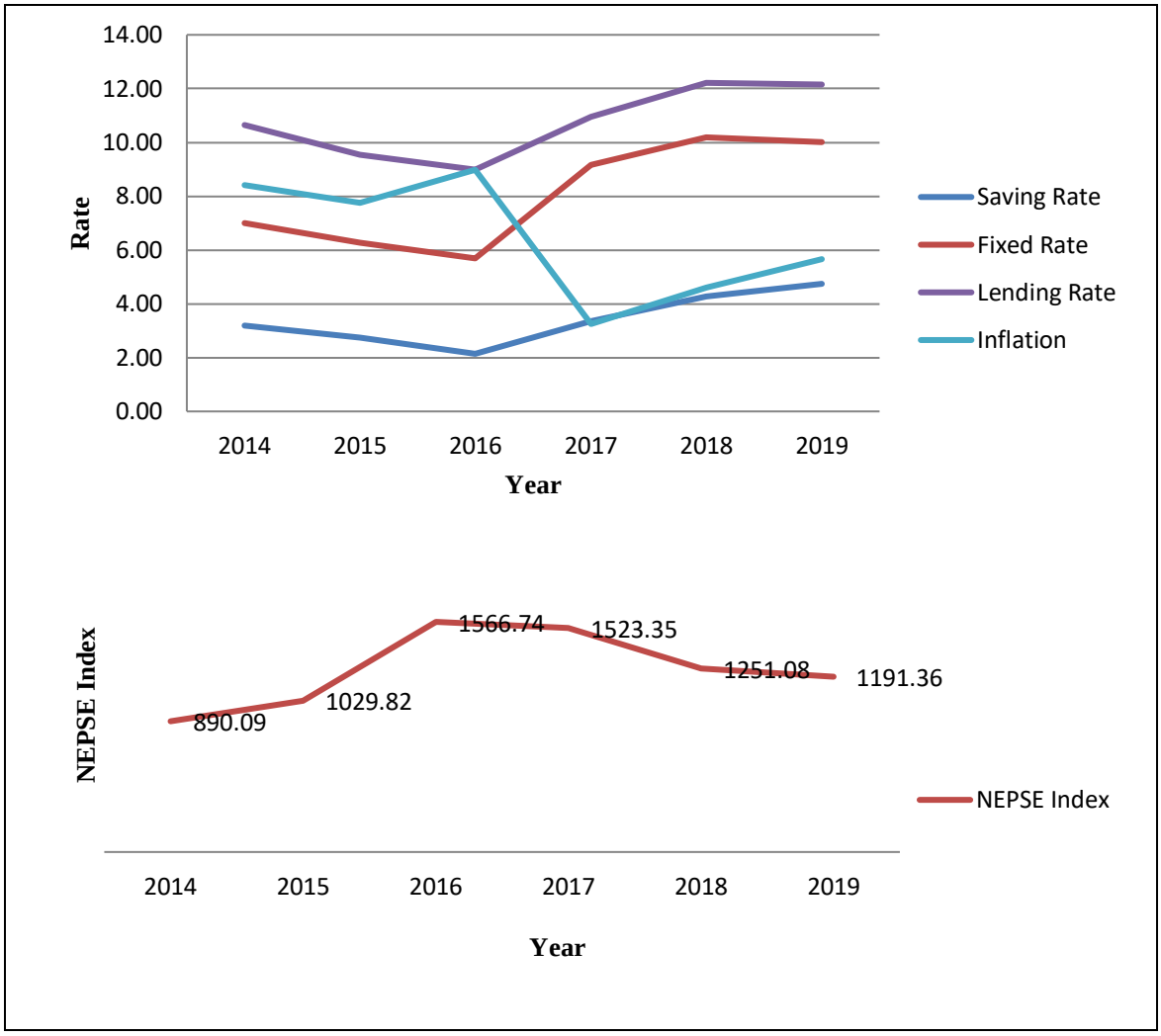

Figure 4.7. Pattern of average yearly SIR, FIR, LIR, IFR and NEPSE Index in 2014-2019

Figure 4.7 shows the pattern of saving interest rate, fixed interest rate, lending interest rate, inflation rate and NEPSE index from the period 2014 to 2019. From the figure, it can be observed that saving interest rate, fixed interest rate and lending rate were following decreasing trend from 2014 to 2016 and after that they started to follow increasing trend till the year 2019. Here inflation rate was found to be having both increasing and decreasing trend continuously with more ups and down. NEPSE index seems to be on increasing trend from 2014 to 2016 and after that it started to follow decreasing trend till 2019.

Saving interest rate was found to be following decreasing trend till 2016. After that it started to rise and became stable from 2018 to 2019. But looking at NEPSE index, it was

found totally opposite. At 2014, NEPSE index was 890.09 points and it started to rise until 2016 and after that it started to fall. It shows that the saving interest rate and NEPSE index has inverse relationship with each other. As it can be seen from figure, while saving interest was rising, NEPSE Index was falling down and when saving interest rate started to fall, NEPSE index started to rise.

Fixed interest rate was found to be following decreasing trend till 2016. After that it started to rise and became stable from 2018 to 2019. But however looking at NEPSE index, it was found totally opposite. At 2014, NEPSE index was 890.09 points and it started to rise until 2016 and after that it started to fall. It shows that the fixed interest rate and NEPSE index has inverse relationship with each other. As it can be observed from figure, while fixed interest was rising, NEPSE Index was falling down and when fixed interest rate started to fall, NEPSE index started to rise.

Lending interest rate was found to be following decreasing trend till 2016. After that it started to rise and became stable from 2018 to 2019. But looking at NEPSE index, it was found to be having inverse relation. At 2014, NEPSE index was 890.09 points and it started to rise until 2016 and after that it started to fall. It shows that the lending interest rate and NEPSE index has inverse relationship with each other. As it can be seen from figure, while lending interest was rising, NEPSE Index was falling down and when lending interest rate started to fall, NEPSE index started to rise.

Inflation rate was found to be following decreasing trend till 2017. After that it started to rise and became stable from 2018 to 2019. From the figure, it can be observed that inflation rate and NEPSE index were following same pattern and having positive relationship with each other. While inflation rate was decreasing, NEPSE index was also decreasing and while inflation rate was increasing, NEPSE index was also increasing. The positive relationship between them shows the positive impact of independent variable in dependent variable.

However the exact findings and results can be only generated after the correlation and regression analysis has been performed in all the given data of different independent variables and dependent variables. Hence difference analyses are conducted in order to have exact findings.

4.1.8 Descriptive Statistics for All Samples

Table 4.1

Descriptive Statistics

This table exhibits descriptive statistics (mean, median, and standard deviation, minimum and maximum values) of the variable being studied for the period of January 2014 to December 2019. NEPSE Index is the monthly index value of Nepal Stock Exchange. Saving Interest rate, Fixed Interest rate and Lending Interest rate are the monthly interest rate of Nepal Rastra Bank. Inflation rate is the consumer price index.

Variables	N	Mean	Median	Std. Deviation	Minimum	Maximum
Saving Rate	72	3.4085	3.25	0.95646	2.01	5.09
Fixed Rate	72	8.0522	7.655	1.92	5.34	10.38
Lending Rate	72	10.7514	10.815	1.27271	8.62	12.47
Inflation Rate	72	6.4421	6.625	2.51161	2.3	12.1
NEPSE Index	72	1242.074	1199.35	272.46821	781.5	1862.8

Table 4.1 demonstrates the mean, median, mode, standard deviation, minimum and maximum of all independent variables and dependent variable. The results were derived through the help of SPSS software. This study has used 6 years data from 2014 to 2019. The average mean of saving interest rate is 3.4085, fixed interest rate is 8.0522, lending interest rate is 10.7514, inflation rate is 6.4421 and NEPSE index is 1242.0735. The median of saving interest rate is 3.25, fixed interest rate is 7.6550, lending interest rate is 10.8150, inflation rate is 6.6250 and NEPSE index is 1199.3450. The standard deviation of saving interest rate is 0.95646, fixed interest rate is 1.91970, lending interest rate is 1.27271, inflation rate is 2.51161 and NEPSE index is 272.46821. The minimum of saving interest rate is 2.01, fixed interest rate is 5.34, lending interest rate is 8.62, inflation rate is 2.3 and NEPSE Index is 781.5. The maximum of saving interest rate is 5.09, fixed rate is 10.38, lending rate is 12.47, inflation rate is 12.10 and NEPSE Index is 1862.80. These data are analyzed through the help of software. It indicates the mean, median, standard deviation, minimum and maximum of all the saving interest rate, fixed interest rate, average deposit rate, lending rate, inflation rate and NEPSE Index.

4.1.9 Correlation Analysis

The correlation coefficients are calculated for the period of January 2014 to December 2019 on Nepal stock index value (NEPSE), Saving Interest rate (SIR), Fixed Interest Rate (FIR), Lending Interest rate (LIR) and Inflation rate(IFR).

Table 4.2

Correlation Coefficient of NEPSE Index, Saving Interest rate, Fixed Interest rate, Lending Interest Rate and Inflation Rate

This table shows the results of correlation analysis for the period of January 2014 to December 2019. Dependent variable is the NEPSE stock index and independent variables are SIR, FIR, LIR and IFR. SIR denotes saving interest rate, FIR denotes fixed interest rate, LIR denotes lending interest rate and IFR denotes lending interest rate.

	SIR	FIR	LIR	IFR	NEPSE Index
SIR	1				
FIR	0.911**	1			
LIR	0.938**	0.951**	1		
IFR	-0.460**	-0.670**	-0.542**	1	
NEPSE Index	-0.172**	-0.175*	-0.147**	0.277	1

** Correlation coefficient is significant at the 0.01 level (2-tailed).

* Correlation coefficient is significant at the 0.05 level (2-tailed).

Table 4.2 indicates the relationship of independent variables with dependent variable. Here the independent variables are saving interest rate, fixed interest rate, lending interest rate and inflation rate whereas the dependent variable is NEPSE Index. Table 4.2 shows the impact of saving interest rate, fixed interest rate, lending interest rate and inflation rate on the NEPSE index.

Table 4.2 shows the negative relationship of saving interest rate with the NEPSE index with the result of -0.172. Saving interest rate has significant negative relation with the NEPSE index. The significance level of 99% confidence level has been observed. The negative relationship indicates that change in independent variable will show inverse effect on dependent variables. The negative correlation shows that if the saving interest rate increases, NEPSE index will decrease and if the saving interest rate of bank and financial institutions decreases, NEPSE index will increase. Table 4.2 shows the significant negative relationship of fixed interest rate with the NEPSE index. The correlation between the fixed interest rate and NEPSE index has been found to be 0.175

with the significance of five percent confidence level. The negative relationship indicates that change in independent variable will inversely affect dependent variable. The negative correlation denotes that if the fixed interest rate increases, NEPSE index will decrease and if the fixed interest rate of bank and financial institutions index, NEPSE index will increase.

Lending rate and NEPSE index are found to be having negative relationship with each other as derived from the correlation analysis. Lending rate and NEPSE index shows the negative correlation of -0.147 with the significance of 99% confidence level. The negative correlation shows that if the lending interest rate increases, NEPSE index will decrease and if the lending interest rate of bank and financial institutions decreases, NEPSE index will increase. The findings regarding the negative relationship of interest rate with NEPSE index was found consistent with Gunsel and Cukur (2007), Ghimire (2017), Dhami (2017), Karki (2018), Shrestha and Pokhrel (2019), Khatri (2019), Shrestha (2019), Panta (2020) and contradicts with the findings of Rostamy (2013), Goswami and Jung (2013), Hasan and Samarakoon (2013), Gautam (2018).

Inflation rate and NEPSE index are found to be having insignificant relations. They show the positive correlation of 0.277 with the insignificant result. The correlation result is insignificant which means that there is no relation of inflation rate with NEPSE index. Even if the inflation rate is increasing or decreasing, it will not create any impact in the NEPSE index. The result of correlation between them is insignificant and found to be having no any relation with each other. The findings regarding the insignificant relationship of inflation rate with NEPSE index was found consistent with Barasa (2014), Shrestha and Subedi (2014), Laichena and Obwogi (2015), Pudasaini (2016), Gautam (2018), Shrestha and Pokhrel (2019), Khatri (2019), Panta (2020), and contradicts with the findings of Ioannidis and Kontonkas (2008), Naik and Padhi (2012), Mugambi and Okech (2016), Humpe and Macmillian (2017), Dhami (2017).

4.1.10 Regression Analysis

Regression analysis helps to find out the impact of independent variables on the dependent variable. The regression analysis is conducted for the whole sample. In the study, regression analysis is done for the different interest rates and inflation rate towards

NEPSE index. The factors affecting NEPSE index are saving interest rate, fixed interest rate, lending interest rate and inflation rate. Univariate regression and Multivariate regression models are conducted in order to know the impact of different independent variables on dependent variables.

4.1.10.1 Univariate Regression Model

Univariate linear regression focuses on determining relationship between one independent variable and one dependent variable.

Table 4.3

Univariate Regressions Result of NEPSE on Saving Interest rate, Fixed Interest Rate, Lending Interest Rate and Inflation Rate individually.

This table shows the results of regression analysis for the period of January 2014 to December 2019 by using following Univariate regression model. Dependent variable is the NEPSE stock index and independent variables are SIR, FIR, LIR, and IFR. The SIR denotes short term interest rate, FIR denotes fixed interest rate, LIR denotes lending interest rate, IFR denotes inflation rate and NEPSE index denotes Nepal Stock Exchange Limited index.

Models	Constant	SIR	FIR	LIR	IFR	Adj.R^2	F
I	1409.41	-49.095**				0.834	43.762
II	1156.71		-10.602**			0.722	24.832
III	1580.58			-31.485**		0.876	34.719
IV	1435.8				30.071	0.169	10.806

** Regression coefficient is significant at the 0.01 level (2-tailed).

* Regression coefficient is significant at the 0.05 level (2-tailed).

Table 4.3 indicates the Univariate regression analysis of saving interest rate, fixed interest rate, lending interest rate and inflation rate towards the NEPSE index. Data of six years have been taken in order to conduct the Univariate regression analysis. Different positive and negative, significant and insignificant results were observed from the analysis.

Table 4.3 demonstrates the negative relation of saving interest rate and NEPSE index. It shows the result of 49.095 with the significance of 99 percent confidence level. The

relation between the variables has been found accurate. It shows that an increase in saving interest rate will result in decrease of NEPSE Index whereas the decrease in saving interest rate will result in rise of NEPSE Index. The fixed interest rate and NEPSE index shows the negative relation with the result of 10.602 in model II. The regression results indicate the significant relationship of variables with 99 percent confidence level. The relation between the variables has been found accurate. The negative relationship indicates that change in independent variable will inversely affect dependent variables. If the fixed interest rate increases, NEPSE index will decrease and if the fixed interest rate of bank and financial institution decreases, NEPSE index will also decrease.

The lending interest rate and NEPSE index shows the negative relation with the result of 31.48 in model III. The regression result indicated the significant relationship of variables with 99 percent confidence level. The relation between the variables has been found accurate. The negative relationship indicates that change in independent variable will inversely affect dependent variables. If the lending interest rate increases, NEPSE index will decrease and if the lending interest rate of bank and financial institution decreases, NEPSE index will also decrease. The findings regarding the significant negative relationship of interest rate with NEPSE index was found consistent with Ahmad and Raoof (2010), Joseph (2012), Naik and Padhi (2012), Shrestha and Subedi (2014), Dhami (2017), Karki (2018), Shrestha and Pokhrel (2019), Khatri (2019), Shrestha (2019), Panta (2020) and contradicts with the findings of Rostamy (2013), Hasan and Samarakoon (2013), Gautam (2018).

Table 4.3 demonstrates insignicant relation of inflation rate with NEPSE index in model IV. The inflation rate and NEPSE index shows the positive relation with the result of 30.07. The regression result indicated the insignificant relationship of inflation rate with NEPSE. The relation between the variables has been found inaccurate. The insignificant relation indicates that there is no any relation of inflation rate with the NEPSE index. Even if the inflation rate increases or decreases, the NEPSE index will not be affected by it. The increase or decrease of inflation rate will not create any huge impact on stock index. The findings regarding the insignificant relationship of inflation rate with NEPSE index was found consistent with Laichena and Obwogi (2015), Pudasaini (2016), Gautam

(2018), Shrestha and Pokhrel (2019), Khatri (2019), Panta (2020), and contradicts with the findings of Naik and Padhi (2012), Goswami and Jung (2013), Humpe and Macmillian (2017), Dhami (2017).

It can be observed from the findings that independent variables like saving interest rate, fixed interest rate and lending rate have negative regression results with the dependent variable NEPSE Index whereas one independent variable inflation rate has an insignificant regression result with the dependent variable NEPSE index. Change in the inflation rate will not create any impact on NEPSE index as the relation has been found insignificant.

4.1.10.2 Multivariate Regression Model

Multivariate regression model is an extension of simple linear regression. It is used to predict the value of a dependent variable based on the value of two or more dependent variables.

Table 4.4

Multivariate Regressions Result of NEPSE on Saving Interest rate, Fixed Interest Rate, Lending Interest Rate and Inflation Rate

This table shows the results of regression analysis for the period of January 2014 to December 2019 by using following multivariate regression model. Dependent variable is the NEPSE stock index and independent variables are saving interest rate, fixed interest rate, lending interest rate and inflation rate.

Variable	Coefficients	T value	P value
Constant	3193.915**	7.535	0
Saving Interest Rate	-206.673**	-2.866	0.006
Fixed Interest Rate	-363.736**	-7.349	0
Lending Interest Rate	-395.326**	-5.699	0
Inflation Rate	11.489	0.827	0.411
Adjusted R-squared	0.532		
F Value	42.204		
Dependent Variable: NEPSE			

** Regression coefficient is significant at the 0.01 level (2-tailed).

* Regression coefficient is significant at the 0.05 level (2-tailed).

Table 4.4 depicts the multiple regression analysis of saving interest rate, fixed interest rate, lending interest rate and inflation rate towards the NEPSE index. Data of six years

have been taken in order to conduct the multiple regression analysis. Different positive and negative, significant and insignificant results were observed from the analysis.

Table 4.4 demonstrates the negative relation of saving interest rate and NEPSE index. It shows the result of 206.673 with the significance of 99 percent confidence level. The relation between the variables has been found accurate. It shows that an increase in saving interest will result in decrease of NEPSE Index whereas the decrease in saving interest rate will result in rise of NEPSE Index. The fixed interest rate and NEPSE index shows the negative relation with the result of 363.76. The regression results indicate the significant relationship of variables with 99 percent confidence level. The relation between the variables has been found accurate. The negative relationship indicates that change in independent variable will inversely affect dependent variables. If the fixed interest rate increases, NEPSE index will decrease and if the fixed interest rate of bank and financial institution decreases, NEPSE index will also decrease.

The lending interest rate and NEPSE index shows the negative relation with the result of 395.326. The regression result indicated the significant relationship of variables with 99 percent confidence level. The relation between the variables has been found accurate. The negative relationship indicates that change in independent variable will inversely affect dependent variables. If the lending interest rate increases, NEPSE index will decrease and if the lending interest rate of bank and financial institution decreases, NEPSE index will also decrease. The findings regarding the negative significant relationship of interest rate with NEPSE index was found consistent with Pudasaini (2016), Mugambi and Okech (2016), Ghimire (2017), Dhami (2017), Karki (2018), Khatri (2019), Shrestha (2019), Panta (2020) and contradicts with the findings of Rostamy (2013), Goswami and Jung (2013), Hasan and Samarakoon (2013), Gautam (2018).

Table 4.4 indicates insignicant relation of inflation rate with NEPSE index. It shows the positive relation with the result of 41 percent confidence level. The regression result indicated the insignificant relationship of inflation rate with NEPSE. The relation between the variables has been found inaccurate. The insignificant relation indicates that there is no any relation of inflation rate with the NEPSE index. Even if the inflation rate increases or decreases, the NEPSE index will not be affected by it. The increase or

decrease of inflation rate will not create any huge impact on stock index. The findings regarding the insignificant relationship of inflation rate with NEPSE index was found consistent with Karki (2018), Thapa (2018), Gautam (2018), Shrestha and Pokhrel (2019), Khatri (2019), Panta (2020), and contradicts with the findings Naik and Padhi (2012), Goswami and Jung (2013), Venkatraja (2014), Mugambi and Okech (2016), Humpe and Macmillian (2017).

As it can be seen from the results that independent variables like saving interest rate, fixed interest rate and lending rate have negative regression results with the dependent variable NEPSE Index whereas one independent variable inflation rate has an insignificant regression result with the dependent variable NEPSE index. Change in the inflation rate will not create any impact on NEPSE index as the relation has been found insignificant. R^2 equals 53.20 percent variations in NEPSE index due to saving interest rate, fixed interest rate, lending interest rate and inflation rate.

4.2 Discussion

There is significant negative impact of saving interest rate and fixed interest rate towards the NEPSE index. The negative relation states that if the saving interest rate and fixed interest rate increases, NEPSE index will decrease and if interest rate decreases, NEPSE index will increase. Hypothesis regarding no significant impact of saving interest rate and fixed interest rate towards the NEPSE index has been proven wrong. Low interest in saving and fixed deposit accounts leads the investors to pull their money from bank and financial institutions and invest them into the share market which will help to increase the NEPSE index. And if they are getting heavy returns in placing their money in fixed deposits, they will not take risk in order to invest in share market.

There is significant negative impact of lending interest rate to the NEPSE index. From the results derived through regression analysis, it can be observed that it has accurate inverse relation with NEPSE index. The negative relation states that if the lending interest rate increases, NEPSE index will decrease and if lending interest rate decreases, NEPSE index will increase. Hypothesis regarding no significant impact of lending interest rate towards the NEPSE index has been proven wrong. Hence, in case of low interest rates, depositors may use their deposits to buy stock on the one hand and on the other hand,

people can borrow at the low interest rates from banks and financial institution to make investment in share market. The findings regarding the relationship of interest rate with NEPSE index was found consistent with Gunsel and Cukur (2007), Alam and Uddin (2009), Ahmad and Raoof (2010), Joseph (2012), Naik and Padhi (2012), Shrestha and Subedi (2014), Laichena and Obwogi (2015), Pudasaini (2016), Mugambi and Okech (2016), Ghimire (2017), Dhami (2017), Karki (2018), Shrestha and Pokhrel (2019), Khatri (2019), Shrestha (2019), Panta (2020) and contradicts with the findings of Rostamy (2013), Goswami and Jung (2013), Hasan and Samarakoon (2013), Gautam (2018).

There is insignificant impact of inflation rate to NEPSE Index. Findings showed the insignificant relation of independent variable with dependent variable which means no any relation between them. Even if the inflation rate increases or decreases, it will not create any impact to NEPSE index. It shows no any relation of inflation rate with the NEPSE Index. Hypothesis regarding no significant impact of inflation rate towards the NEPSE index has been proven right. The findings regarding the relationship of inflation rate with NEPSE index was found consistent with Barasa (2014), Shrestha and Subedi (2014), Laichena and Obwogi (2015), Pudasaini (2016), Karki (2018), Thapa (2018), Gautam (2018), Shrestha and Pokhrel (2019), Khatri (2019), Panta (2020), and contradicts with the findings of Ioannidis and Kontonkas (2008), Naik and Padhi (2012), Goswami and Jung (2013), Venkatraja (2014), Mugambi and Okech (2016), Humpe and Macmillian (2017), Dhami (2017).

As all the data taken for this research were secondary and the previous year's data was not available due to the COVID-19, this is the major limitation of this research. The analysis has also been constrained by the sample size which could have affected the results. Correlation and Regression models are only used in order to know the impact of independent variables on dependent variables. However accurate and consistent results may have obtained if the models like error correction, ARDL, ANOVA test, causality test had been analyzed to conduct the research. Interest rate and inflation rate were only variables that are taken in order to analyze the impact on NEPSE index. However there are lot of other macro economic factors that affects the stock index like GDP, money supply, exchange rate, NRB policy, news, rumors and speculation.

The impact of macroeconomic variables on stock index can be analyzed using different variables like interest rate, inflation rate, money supply, NRB policy, exchange rate, GDP. Primary data analysis can give more fruitful decision to the researchers who were thinking about conducting the research on same topic. Different models like error correction model, casualty test and ANOVA test can be performed in order to conclude the consistent and fruitful results

CHAPTER V

SUMMARY AND CONCLUSION

5.1 Summary

Stock index, inflation and interest rate are three crucial factors of economic growth of a country. The impacts of interest rate and inflation on stock index provide important implications for monitory policy, risk management practices, financial securities valuation and government policy towards financial markets. Interest rate and inflation are the important economic factors affecting the common stocks. The relationship between the stock price and macro-economic factors is important to study for many reasons. First, it helps policy makers understand the full effect of prevailing and upcoming policies and regulations. Second, if investors were aware of this relationship and fully understood it, then they will make more informed investment decisions thus reducing their exposure to risk. The major objective of the study is to identify the dynamic relationship between saving interest rate, fixed interest rate, lending interest rate and inflation rate towards stock index.

The causal research design is selected for analyzing the relationship between the saving interest rate, fixed interest rate, lending interest rate and inflation rate and NEPSE index. It employs various quantitative statistical tools and techniques to determine the impact of independent variable to NEPSE index such as descriptive, correlation, and regression analysis. For this secondary data was collected and analyzed in systematic way to derive the findings. The tools that are used in order to analyze the data were mean, median, standard deviation, correlation and regression. The correlation and regression analysis were done in order to know the significant impact of independent variables towards the dependent variables.

There is significant negative impact of saving interest rate and fixed interest rate towards the stock index. As the relation has been found significant, the change in saving interest rate and fixed interest rate will inversely impact on NEPSE Index. There is significant negative impact of lending interest rate towards the NEPSE index. As the relation has been found significant, the change in lending interest rate will inversely affect the stock

index. Hence, in case of low interest rates, depositors may use their deposits to buy stock on the one hand and on the other hand, people can borrow at the low interest rates from banks and financial institution to make investment in share market. There is insignificant positive relation of inflation rate with the NEPSE index. Even if the relation result is positive but it is not significant and accurate. Increase or decrease in inflation rate will not create any impact on the NEPSE index.

5.2 Conclusion

This study concludes that the fluctuation of stock index is related to saving interest rate, fixed interest rate, lending interest rate. It is clear that interest rate is the determining variable of the stock market in Nepal. The direction of movement to stock index with interest rate is opposite. Low interest rate makes stocks more attractive because of low cost of credit and low opportunity cost foregone by holding bank deposits. The findings regarding the impact of interest rate on NEPSE index was found consistent with Gunsel and Cukur (2007), Alam and Uddin (2009), Ahmad and Raoof (2010), Joseph (2012), Naik and Padhi (2012), Shrestha and Subedi (2014), Laichena and Obwogi (2015), Pudasaini (2016), Mugambi and Okech (2016), Ghimire (2017), Dhami (2017), Karki (2018), Shrestha and Pokhrel (2019), Khatri (2019), Shrestha (2019), Panta (2020) and contradicts with the findings of Rostamy (2013), Goswami and Jung (2013), Hasan and Samarakoon (2013), Gautam (2018).

It was observed that the rise or fall of inflation rate will not affect the NEPSE index. The findings regarding the effect of inflation rate on NEPSE index was found consistent with Barasa (2014), Shrestha and Subedi (2014), Laichena and Obwogi (2015), Pudasaini (2016), Karki (2018), Thapa (2018), Gautam (2018), Shrestha and Pokhrel (2019), Khatri (2019), Panta (2020), and contradicts with the findings of Ioannidis and Kontonkas (2008), Naik and Padhi (2012), Goswami and Jung (2013), Venkatraja (2014), Mugambi and Okech (2016), Humpe and Macmillian (2017), Dhami (2017). It can be observed that the interest rate and inflation rate were not only the factors that affects stock index. There is large role of news, rumors and speculation that influence the stock index. These types of variables are hard to be quantified and applied in the model.

5.3 Implications

There are various factors that affect the NEPSE index. This study focuses on some of the major factors that influence the NEPSE index. The results of this study will have important implications and it is believed to be helpful for the individual, institution, banking sector and NEPSE market. People should evaluate all the variables that directly or indirectly affect the NEPSE index. The saving interest rate, fixed interest rate, lending interest rate and inflation rate are not only the variables that affect the stock index. There are variables like GDP, money supply, exchange rate, political news, speculation and rumors that affect stock index too. NRB's policy on lending against share collateral has been effective in influencing the share market. NEPSE index is highly influenced by rumors, news and speculations; available macroeconomic variables, like interest rate and inflation rate variables are not enough to predict the direction of change in stock index fully. To reduce rumors and speculation, transparency should be increased in this market by making information related to listed companies easily accessible and available. Transparency and communication should, in fact, be enhanced by the concerned authorities in order to clear gossips and rumors in the market.

References

Ahmad, M. & Raoof, A. (2010). Do interest rate, exchange rate effect stock returns? *International Research Journal of Finance and Economics, 50,* 145-180.

Alam, M., & Uddin, G.S. (2009), Relationship between Interest Rate and Stock Price: empirical evidence from developed and developing countries, *International Journal of Business and Management*, *4*(3), 43-51.

Barasa, J. W. (2014). Macroeconomic determinants of stock market performance in Kenya. *Case of Nairobi Securities Exchange*, *20*, 77-83.

Cassel, G. (1918). Causal relationship between macro-economic variables and stock market. *Journal of Social Sciences, 30*(2), 263-274.

Dhami, J. (2017). Determinants of Stock Market Performance in Nepal. An Unpublished Master's dissertation, Submitted to Central Department of Management, Tribhuvan University.

Fama, E.F. (1970). Efficient capital markets: A review of theory and empirical work. *The Journal of Finance, 25*(2), 383-417.

Fisher, I. (1930). The theory of interest. *The Quarterly Journal of Economic*, *4*(3), 499-516.

Gautam, R. (2018). The Impact of Interest rate, Exchange rate and Inflation rate on Stock Returns. An Unpublished Master's dissertation, Submitted to Central Department of Management, Tribhuvan University.

Ghimire, J. (2017). Impact of Interest rate on Stock Return. An Unpublished Master's dissertation, Submitted to Central Department of Management, Tribhuvan University.

Goswami, G., & Jung, S. (2013). Stock market and economic forces: evidence from Korea. *Journal of Management, 3,* 42-70

Gunsel, N., & Cukur, S. (2007). The effects of macroeconomic factors on the London Stock returns: a sectoral approach. *International Research Journal of Finance and Economics, 10*, 140-152.

Hasan, T., & Samarakoon, L. P. (2013). Short-term interest rates and expected stock returns: evidence from Sri Lanka. *Journal of Social Science Research,* 4(3), 20-28.

Humpe, A. & Macmillan, P. (2017), Can macroeconomic variables explain long-term stock market movements? *Applied Financial Economics*, 19(2), 11-19.

Ioannidis, C., and Kontonokas, A. (2008). The impact of monetary policy on stock prices. *Journal of Policy Modeling*, 30 (1), 33-53.

Joseph, N.L. (2012), Modeling the impacts of interest rate and exchange rates on UK stock returns. *Derivatives Use Trading and Regulation*, *7*, 306-323

Karki, D. (2018). Stock market responses to macroeconomic dynamics: testing for long-run equilibrium in Nepal. *Journal of Management,* 64-82

Keynes, J. M. 1936. The general theory of employment, interest and money. *Journal of Social Science, 7*(3), 38-52.

Khatri, M. (2019). Macroeconomic influence on the Nepalese stock market. *NRB Economic Review, 31*(1), 47-64.

Laichena, K. E., & Obwogi, T. N. (2015). Effects of macroeconomic variables on stock returns in the East African community stock exchange market. *International Journal of Education and Research*, *3*(10), 27-39.

Malkiel, B. G. (1989). Is the stock market efficient*? A Journal of Science, 243*, 1313-1318.

Mugambi, M. & Okech, T. C. (2016). Effect of macroeconomic variables on stock returns of listed commercial banks in Kenya. *International Journal of Economics, 4*(6), 390-418.

Mundell, R. (2010). Inflation and real interest. *Journal of Political Economy, 71*(3), 280-283.

Naik, P. K. and Padhi, P. (2012). The impact of macroeconomic fundamentals on stock prices revisited. Evidence from Indian Data, *Eurasian Journal of Business and Economics, 5*(10), 25-44.

Rano, S. U., & Bayero, A. (2019). Does inflation have an impact on stock returns and volatility? *Journal of Evidence from Ghana, 3*, 1-17.

Ross, S.A. (1976). The arbitrage theory of capital pricing. *Journal of Economic Theory*, *13*, 341-360.

Panta, B. P. (2020). Macroeconomic determinants of stock market prices in Nepal. *Quest Journal of Management and Social Sciences, 2*(1), 64-79.

Pudsaini, R. (2016). Macroeconomic Variables Affecting the Stock Market. An Unpublished Master's dissertation, Submitted to Central Department of Management, Tribhuvan University.

Rostamy, A. A. (2013). Oil price, exchange rate, interest rate, and market return relationship with industries stock return: evidence from Iranian Stock Exchange. *Research and Applications in Economics*, *1* (1), 114-137

Shrestha, P. K. & Subedi, B. R. (2014). Determinants of stock market performance in Nepal. *NRB Economic Review, 26*(2), 25-40.

Shrestha, P. K. & Pokhrel, S. (2019). Factor affecting stock index in Nepal. *SEBON Journal, 7*, 33-52.

Shrestha, P. M. (2019). Effect of macroeconomic variables on stock market index. *SEBON Journal, 7*, 95-107.

Thapa, S. (2018). Impact of Inflation and Exchange Rate on Stock market. An Unpublished Master's dissertation, Submitted to Central Department of Management, Tribhuvan University.

Venkatraja, B. (2014). Impact of macroeconomic variables on stock market performance in India: an empirical analysis. *Economic and Applied Management Research, 1*(6), 48-73

ANNEXURE

Annex 1

Date	SIR	FIR	LIR	IFR	NEPSE Index
2014 Jan	3.48	7.97	11.53	9.7	781.5
2014 Feb	3.37	8.04	11.37	8.8	825.7
2014 Mar	3.40	7.55	11.18	8.9	792.2
2014 Apr	3.28	7.29	10.92	9.4	823.2
2014 May	3.22	7.15	10.82	9.7	866.6
2014 Jun	3.20	6.99	10.81	9.5	945.8
2014 Jul	3.21	6.64	10.55	8.1	1066.1
2014 Aug	3.17	6.71	10.3	7.5	952.6
2014 Sep	3.10	6.65	10.23	7.6	938
2014 Oct	2.94	6.44	10.14	7.5	930.2
2014 Nov	2.94	6.36	9.94	7.2	856.9
2014 Dec	2.90	6.12	9.94	7.0	902.3
2015 Jan	2.37	6.07	9.29	6.8	986.66
2015 Feb	2.91	5.98	9.67	7.0	979.27
2015 Mar	2.89	5.98	9.56	7.0	945.74
2015 Apr	2.93	6.24	9.64	6.9	938.19
2015 May	2.96	6.38	9.65	7.1	871.94
2015 Jun	2.94	6.4	9.59	7.4	949.13
2015 Jul	2.91	6.52	9.62	7.6	1027.98
2015 Aug	2.85	6.51	9.61	10.5	1200.15
2015 Sep	2.69	6.42	9.54	6.9	1181.28
2015 Oct	2.61	6.33	9.46	7.2	1092.04
2015 Nov	2.55	6.27	9.47	8.2	1034.12
2015 Dec	2.40	6.08	9.44	10.4	1151.38
2016 Jan	2.37	6.07	9.29	11.6	1216.11
2016 Feb	2.29	6.03	9.2	12.1	1283.9
2016 Mar	2.22	5.81	9.17	11.3	1355.5
2016 Apr	2.06	5.68	9.06	10.2	1464.9
2016 May	2.01	5.54	9.04	9.7	1532.12
2016 Jun	2.04	5.37	8.98	10	1723.2
2016 Jul	2.24	5.39	8.86	11.1	1862.8
2016 Aug	2.12	5.34	8.88	8.6	1797.5
2016 Sep	2.13	5.5	8.77	7.9	1753.4
2016 Oct	2.06	5.52	8.62	6.7	1759.7
2016 Nov	2.04	5.9	8.88	4.8	1608.3

2016 Dec	2.11	6.13	9.11	3.8	1443.4
2017 Jan	2.07	6.43	9.31	3.2	1326.6
2017 Feb	2.16	7.13	10.12	3.3	1299.29
2017 Mar	2.26	7.76	10.6	2.9	1587.64
2017 Apr	2.66	8.58	10.77	3.8	1650.78
2017 May	3.56	9.15	10.69	3.4	1608.11
2017 Jun	3.80	9.61	11.29	2.8	1563.81
2017 Jul	4.01	10.08	11.33	2.7	1652.69
2017 Aug	4.04	10.22	11.68	2.3	1580.03
2017 Sep	3.95	10.32	11.78	3.4	1549.46
2017 Oct	3.93	10.31	11.1	3.1	1533.53
2017 Nov	3.82	10.20	11.64	3.9	1537.67
2017 Dec	3.94	10.27	11.25	4.2	1390.58
2018 Jan	3.93	10.2	11.79	4	1404.49
2018 Feb	4.15	10.19	11.9	5	1345.99
2018 Mar	4.32	10.17	11.96	6	1220.29
2018 Apr	4.46	10.38	12.1	5.3	1349.01
2018 May	4.39	10.33	12.32	6	1307.66
2018 Jun	4.42	10.31	12.42	4.1	1198.54
2018 Jul	4.36	10.24	12.47	4.2	1191.47
2018 Aug	4.27	9.84	12.47	4.2	1181.69
2018 Sep	4.06	9.98	12.31	3.9	1256.71
2018 Oct	4.29	10.25	12.26	4.7	1221.46
2018 Nov	4.32	10.27	12.26	4.2	1148.36
2018 Dec	4.41	10.11	12.32	3.7	1187.28
2019 Jan	4.46	10.28	12.29	4.6	1161.63
2019 Feb	4.37	10.29	12.34	4.4	1105.58
2019 Mar	4.45	10.1	12.33	4.2	1143.59
2019 Apr	4.53	10.18	12.28	4.4	1298.6
2019 May	4.59	10.09	12.23	5.3	1319.47
2019 Jun	4.55	10.09	12.2	6.2	1244.89
2019 Jul	4.96	9.95	12.13	7.1	1265.57
2019 Aug	5.02	9.89	12.08	6.95	1196.41
2019 Sep	4.85	9.87	11.97	6.16	1135.56
2019 Oct	5.09	9.78	11.98	6.21	1146.17
2019 Nov	5.06	9.82	12.07	5.76	1112.79
2019 Dec	4.99	9.72	11.93	6.55	1166.08