

# **IMPACT OF MACROECONOMIC VARIABLES ON STOCK MARKET INDEX**

A Dissertation Submitted to the Office of the Dean, Faculty of Management in partial  
fulfillment of the requirements for the Master's Degree

By

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## **Certification of Authorship**

I hereby corroborate that I have researched and submitted the final draft of dissertation entitled **“IMPACT OF MACROECONOMIC VARIABLES ON STOCK MARKET INDEX”**. The work of this dissertation has not been submitted previously for the purpose of conferral of any degree 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.

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## **IMPACT OF MACROECONOMIC VARIABLES ON STOCK MARKET INDEX**

has been prepared as approved by this department in the prescribed format of the faculty of management. This dissertation is forward for examination.

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We have examined the dissertation entitled **IMPACT OF MACROECONOMIC VARIABLES ON STOCK MARKET INDEX** presented by Anupama Budhathoki for the degree of **Master of Business Studies**. We hereby certify that the dissertation is acceptable for the award of degree.

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## Abbreviations

ADF	Augmented Dickey Fuller
ASEAN	Association of Southeast Asian Nations
BEA	Bureau of Economic Analysis
BSE	Bucharest Stock Exchange
COP	Crude Oil Price
DLnER	Coefficient of Exchange rate
DLnGP	Coefficient of Gold Price
DLnWPI	Coefficient of Wholesale Price
ECM	Error Correction Mechanism
FDI	Foreign Direct Investment
GDP	Gross Domestic Product
GDS	Gross Domestic Saving
IIP	Index of Industrial
lngdp	Log of Gross Domestic Product
lngds	Log of Gross Domestic Saving
lnind	Log of the Nepal Stock Exchange Index
IP	Industrial Production
IPO	Initial Public Offering
IR	Inflation Rate
ISE	Istanbul Stock Exchange

LnINT	Variables except Interest Rate
M2	Money Supply
NEPSE	Nepal Stock Exchange
NYSE	New York Stock Exchange
NX	Net Exports
NRB	Nepal Rastra Bank
OLS	Ordinary least squares
OMO	Open Market Operations
PE Ratio	Price earnings Ratio
PP	Phillips-Perron Test
SAARC	South Asian Association for Regional Cooperation
S.D	Standard Deviation
SMI	Stock Market Index
SVAR	Employing Structural Vector Autoregressive
TASI	Saudi Stock Exchange
T-bill	Treasury bill
VAR	Vector Autoregressive model
VECM	Vector Error Correction Model
WPI	Wholesale Price Index

## Abstracts

This study examines the effect of macroeconomic variables on stock market index of Nepal. To analyze the behavior of the Nepal Stock Exchange Index, it shows the relationship between stock market prices (NEPSE index) and macroeconomic variables such as Gross Domestic Product, Gross Domestic Saving, and Treasury bill rate. This study has examined the effect using descriptive and causal comparative research design to show the relationship between independent variables dependent variables. This research has been conducted by using 15 years annual data from fiscal year 2005/06 to 2019/20.

Thus, Empirical findings revealed that the positive correlation between Gross domestic product and gross domestic saving with NEPSE Index which means these variables tend to increase together and vice versa. Whereas the negative relationship with interest rate, as hypothesized, indicates that the stock returns goes on decreasing when market interest rate increases. The regression analysis showed that coefficient of GDP ( $\ln gdp$ ) equal 0.57 indicates that for 1 percentage point change (increase) in gross domestic product results 0.57 percentage point increase in stock market index ( $\ln ind$ ) and vice-versa, holding other things constant. Coefficient of GDS ( $\ln gds$ ) equal 0.22 indicates that for 1 percentage point change (increase) in gross domestic saving results 0.22 percentage point also increases in stock market index ( $\ln ind$ ) and vice-versa, *ceteris paribus*. Those results are very much similar to the priory expectation as it satisfies the alternative hypothesis of positive relationship with the stock index in the context of Nepal. Regarding the regression coefficient of interest rate( $int$ ) as independent variable with the stock index of depended variable, it is negative with 0.06, which suggests that for a 1 percentage point increase in interest rate supports to decrease the stock market index by 0.06 percentage point and vice-versa, keeping other variables in the model unchanged. Therefore, the alternative hypothesis of negative relationship between the interest rate and stock index of Nepal has been accepted in this study. The findings of this research can be utilized to better understand the behavior of the Nepalese stock market and to develop market-stabilization strategies.

Keywords: Gross Domestic Product, Gross Domestic Saving, Treasury bill rate, NEPSE Index

# CHAPTER I

## INTRODUCTION

### 1.1 Background of Study

Macroeconomic factor and stock market possess the important relation in-between. It is well known that stock markets have been an important indicator of the financial sector in many countries. Potential and idle resources can be transferred into productive channels through financial instruments in an economy so that the economy can grow faster. Mostly, investors respond to the complexities of macroeconomic magnitudes and affect stock market performance. It is mostly perceived that stock markets and macroeconomic magnitudes are in close relationship. This leads to a number of researches on the subject in an effort to identify some possible interactions between stock returns and macroeconomic variables.

Macroeconomics is a branch of economics that studies how an overall economy, the market or other systems that operate on a large scale behaves. Macroeconomics studies economy-wide phenomena such as inflation, price levels, rate of economic growth, national income, gross domestic product (GDP), and changes in unemployment. Macroeconomics deals with the performance, structure, and behavior of the entire economy, in contrast to microeconomics, which is more focused on the choices made by individual actors in the economy (like people, households, industries, etc.). Macroeconomists develop models explaining relationships between these factors. Such macroeconomic models, and the forecasts they produce, are used by government entities to aid in the construction and evaluation of economic, monetary, and fiscal policy; by businesses to set strategy in domestic and global markets; and by investors to predict and plan for movements in various asset classes. According to Liu and Shrestha (2008), the stock market returns are influenced by a country's macroeconomic activities. Macroeconomics is the study of the economy as a whole. Understanding macroeconomics requires understanding its terms. Because macroeconomic systems are complex, economists build models to represent the interactions of the important components of the economy. These models depend on key macroeconomic variables with the

greatest influence on the economy. Macroeconomics uses many terms that are common words, but have more specific meanings in macroeconomics, such as investment and capital. Macroeconomics is also studied through econometric models, which depend on key macroeconomic variables.

Macroeconomic variables affect the performance of the stock market. Investors consider macroeconomic variables when they value stocks. Interest rates, inflation rate, GDP deflator and unemployment rate are very important among these macroeconomic variables which affect the performance of the stock market. Abedallat and Shabib (2012) examined the influence of macroeconomic variables such as investment and Gross Domestic Product as independent variables, and the movement of the Amman Stock Exchange index as the dependent variable. They concluded a correlation between the two macroeconomic indicators and between each of these variables and the stock index separately, implying that price movements on the Amman Stock Exchange are influenced by the movements of these two variables, and that both of these variables have an impact on the Amman Stock Exchange index movement. Furthermore, they observed that variations in investment had a stronger impact on the Amman Stock Exchange index than changes in GDP. This study is to identify the impact of macroeconomic variables on stock prices. It is believed that domestic economic fundamentals play determining role in the performance of stock market. Knowledge of stock market sensitivity to macroeconomic behavior of key variables and vice-versa is important in many areas of investments and finance. This study will be useful to understand this relationship between macroeconomic variables and stock prices.

Assuming that macroeconomic fluctuations pose influence on stock prices through their effect on future cash flows and the rate at which these cash flows are discounted, the relationship between stock prices and macroeconomic variables has been widely investigated in previous studies which are covered in literature review section. The arbitrage pricing theory (Ross, 1976) has been the primary motive of earlier studies and may be considered as global asset pricing models. Among macroeconomic factors included in the models are either monetary ones such as inflation, gross domestic product (GDP), gross domestic saving (GDS), Treasury Bills Rate etc. or real economic ones such as production, oil prices, etc. The studies aim to explain expected returns over time. Therefore, the motive and methodologies

employed are based upon the understanding that expected returns are associated with these variables. And, the direction of the relationship is assumed to be unidirectional, and from macroeconomic variables to stock returns.

First, policy makers would be able to predict the full effect of current and upcoming policies and regulations. Second, investors can make more informed decision when they fully understand this relation and thus decrease their exposure to risk. Third, if the public are aware of the changes that might happen in the economy or the financial market, the shock factor will be reduced and the public will be able to take protective measures (Abu-Libdeh & Harasheh, 2011). However, this attention was mainly focused on developed countries and only few researches investigated this relationship in developing countries. In a developed economy, the nature of the relationship between stock market and macroeconomic variables may differ from developing economies. Therefore, the aim of this study is to explore the nature of the relationship between three macroeconomic variables such as gross domestic product (GDP), gross domestic savings (GDS) and interest rates with the stock market index of Nepal.

Knowledge of stock market sensitivity to macro-economic variables is important in many areas of investments and finance which will be helpful to understand the relationship. Can the macroeconomic variables explain the changes in stock exchange returns? This is one of the main questions put forward by economists from all around the world. If so, how significant is the relationship between the macroeconomic data and the stock exchange returns as barometer of capital market returns and how this relationship may be analyzed. Given an ever more globalized world how strong is the dependence between the variations of the domestic capital market with the international market? For answering these questions this study shows the relationships between some variables specific to Nepalese economy and other external factors.

Macroeconomic factors can't be reliable indicators for stock market price movements in the Asian markets because of the inability of stock markets to fully capture information about the change in macroeconomic fundamentals. But most of studies suggest that there is inverse relation among interest rate and stock prices. Interest rate is the cost of borrowing and used

as a discount rate to discount future cash flows of the financial assets. Increase in interest rate causes decrease in stock prices because required rate of return on stocks rises which causes decrease in stock prices. Actions of monetary authorities have an important impact on stock prices and fluctuation of interest rates signals good or bad information to investors. Moreover, gross domestic product and gross domestic saving are a realistic guide to a nation's well-being. Well-established stock market activates the investment projects and persuades the people for savings and this process will generate the economic activities in a country. The most imposing role of stock market is to work as a relationship between savers and borrowers. This helpful for the generation of saving form the huge group of small savers and these saving can be investment in profitable means. The stock market engaged the reallocation of money from the different firm of the economy. Economic strength in a country could be measured by macroeconomics variables. Inflation, interest rate, unemployment rate and gross domestic product deflator are some macroeconomics variables that show economic condition in Nepal. The impact of macro-economic variables on share prices is uncontrollable. The description and forecasting of macroeconomics require statistics on macroeconomic variables. The most prominent of these variables is the GDP, GDS, and Treasury bill rate (T-bill), but there are many others. Another important variable is interest rates, which is the cost of credit, the cost of borrowing money. Although there are many types of interest rates, the prime rate, which is the interest rate that a sound business qualifies for, is often published in the newspapers. Central banks have significant control over the interest rate, since they can set interest rates for other banks and they can also control the money supply. A greater supply of money leads to lower interest rates, while a contraction of the money supply raises rates. When the interest rate set by the central bank is already near 0 or even 0, then the central bank may turn to what is called quantitative easing, where money is created and placed within the economy by buying longer-term government debt from primary dealers of the central bank. Interest rates affect not only how much consumers will borrow, but it will also affect how much businesses will borrow, especially since businesses will only borrow if they can invest the money for a higher expected return than the interest rate on the borrowed funds.

Stock market is one of the chief factors in promoting the economic condition of a country. The countries stabilized economically can be measured using stock prices based on the stock

market. Thus, it can be concluded that the performance of stock market is an integral part of the financial system of any economy, as it plays a role in channelizing funds, connecting savers and investors, which lead to economic growth of a country. Investors closely monitor the macroeconomic variables as they impact on stock market behavior. A stock market is a market which is known as loose network of economic transactions of stocks where the buyers and sellers are present for performing such transactions. Stock market is also known as equity market or share market. As we know, stock market plays crucial role in the growth of Nepalese economy. Stock market makes it possible for the economy to ensure long-term commitments in real capital. Such stock market provides long-term funds to listed companies in stock exchanges by pooling the funds from various investors which allow companies to expand their business and it provides investors an alternative investment opportunity.

Stock market plays a crucial role in the financial system of a country. It can be viewed as a channel through which resources are properly channelized. It enables the governments and industries to raise long-term capital for financing new projects. The stock markets of developing economies are likely to be sensitive to various macro-economic factors such as gross domestic product, imports, exports, exchange rates etc. When there is high demand on financial products, as a constituent of financial market, and ultimately stock market needs to develop. Many factors can be a signal to stock market participants to expect a higher or lower return when investing in stock and one of these factors are macroeconomic variables. Thus, macro-economic variables tend to affect stock market developments (Panta, 2020).

The stock market index has a significant positive relationship with Gross Domestic Product, ER, and IR, but a negative relationship with inflation as wholesale price index (Nijam, Ismail & Musthafa, 2015). The study's significance is in determining the impact of macroeconomic factors on the NEPSE Index, which is represented by share prices reactions to these variables and therefore this becomes an indicator for investors to be able to reflect these variables on share prices. The equilibrium relationships between stock markets and macroeconomic variables holds implications for investors, as well as for policy makers to recognize and to evaluate changes in economic conditions, or to forecast the future performance of the macro-economy. It's important to find the relation relationship between macroeconomic variable and stock prices to predict the market as well, based on the economic growth.

## **1.2 Problem Statement**

The study of macroeconomic variables has drawn various studies which most of them have concluded that fluctuations in the stock market returns continue to be directly interconnected with the various macroeconomic variables. According to Fama (1970), the return at the stock market is perceived in terms of market efficiency. The point of stock market efficiency depends on the speed and accuracy within which macroeconomic variable information is built into the stock market returns.

The empirical literatures have varying conclusions depending on the country of study, selected variables and period of study. From the studies it is challenging to take a broad view of the results because each study is unique depending on the stock market, the variables and the time of study. An agreement in the study doesn't exist as to the causes of the variations findings and conclusions. The purpose of the study was therefore to ascertain the effect of macroeconomic variables on stock market return at the Nepal Stock Exchange?

## **1.3 Objectives of Study**

The basic objective of this study is to determine the effect of macroeconomic variables on stock market index of Nepal. The other specific objectives are as follows:

- i. To examine the relationship between macroeconomic variables and stock market index.
- ii. To assess the effect of Gross Domestic Product on stock market index of Nepal.
- iii. To analyze the effect of Gross Domestic Saving on stock market index of Nepal.
- iv. To evaluate the effect of Interest rate on stock market index of Nepal.

## **1.4 Rationale of Study**

The findings of this study will provide detailed comparative and empirical data on performance of the NEPSE alongside the various economic measurements parameters as well as provide important analysis and explanations on whether stock market performance should be considered as one of the leading indicator of the state of the economy of Nepal. The study should inform the relevant sectors of the economy on whether it is importance to allocate

time and effort in making NEPSE an efficient market for allocation of scarce capital resources.

It will enhance the understanding of the various stake holders as each endeavor to play their roles to analysis and evaluate the worthwhile over the different time period in growing Nepal's capital markets. The study will add to the existing body of knowledge on the subject matter and also valuable for researcher for further research work.

### **1.5 Limitation of Study**

The limitations of the study are as follows:

- i. This study is only based on secondary data.
- ii. The model used in this study is limited on regression.
- iii. Other macroeconomic indicators, such as the price of gold, the exchange rate, the interbank rate and other macro and non macroeconomic variables are not included in this study.
- iv. The study is based on historical data; any judgments drawn from it should be used with caution.

### **1.6 Organization of Study**

The study is carried out in different phases and techniques as needed in this research. In addition, the study is structured into following chapters to make it easier to understand.

Chapter I Introduction, introduce the major impact of macroeconomic variables on stock market in Nepal, statement of problems, objectives, significance, limitations and other introductory framework of the study. Chapter II Literature Review contains a brief review of the literature relevant to this research. It covers the conceptual foundation as well as an overview of the important investigations. It provides an overview of previous research and research gap in related field on this subject. Chapter III Research Methodology, describes the different methodologies employed in this study, sources of data are mentioned and described in this chapter. For this purpose, statistical tools are defined; which will be used for the analysis of the presented data.

Chapter IV Results and Discussion is the major part of the whole study in which all collected relevant data are analyzed and interpreted by the help of different financial and statistical tools. Data analysis is the portions of the study in which the secondary data is collected and results are found out during the study period. The data was analyzed using MS-Excel and SPSS software, and the results were interpreted accordingly. The fifth and last chapter Results and Discussions contains the study's summary, conclusions, and implications. This chapter contains the findings, as well as their suggestions and recommendations based on the analysis and interpretation of the data.

References are included in the last parts. The literature cited and citations used for the study are found in the references section. Similarly, acknowledgements, table of contents, list of figures are included in this first part of the thesis report.

## **CHAPTER II**

### **LITERATURE REVIEW**

#### **2.1 Theoretical Review**

##### **2.1.1 Macroeconomics**

Macroeconomics is a branch of economics that studies how an overall economy—the market or other systems that operate on a large scale behaves. Macroeconomics studies economy-wide phenomena such as inflation, price levels, rate of economic growth, national income, Gross Domestic Product (GDP), and changes in unemployment. Macroeconomics is by definition a branch of economics which investigates the relationship among macroeconomic variables, such as national product, total employment, the monetary aggregate, the general price and the like.<sup>1</sup> It is contrasted with microeconomics which describes optimizing decisions of individual economic agents and the way they are balanced with each other in a vast number of markets for goods and services. Iwai, (1987). Several factors have been attributed to this increase, for instance, improved macroeconomic fundamentals, such as monetary stability, and higher economic growth (Claessens et al., 2006).

##### **2.1.2 Gross Domestic Product(GDP)**

GDP is the market value of goods and services produced within a selected geographic area (usually a country) in a selected interval in time (often a year). Rightly or wrongly, this has become the standard by which we measure the size and health of a country. (Leamer, 2009.) The Bureau of Economic Analysis (BEA) gives a clear definition for GDP: Gross domestic product (GDP) is the value of the goods and services produced by the nation's economy less the value of the goods and services used up in production. GDP is also equal to the sum of personal consumption expenditures, gross private domestic investment, net exports of goods and services, and government consumption expenditures and gross investment.

Accordingly, GDP is defined by the following formula:

$$\text{GDP} = \text{Consumption} + \text{Investment} + \text{Government Spending} + \text{Net Exports}$$

or  $(GDP = C + I + G + NX)$

where consumption (C) represents private-consumption expenditures by households and nonprofit organizations, investment (I) refers to business expenditures by businesses and home purchases by households, government spending (G) denotes expenditures on goods and services by the government, and net exports (NX) represents a nation's exports minus its imports.

### **2.1.3 Gross Domestic Saving (GDS)**

Gross Domestic Saving is GDP minus final consumption expenditure. It is expressed as a percentage of GDP. Generally, it is possible to accept that increasing gross savings contribute to higher investment, and this leads to the higher GDP growth in the short run. It means that the higher saving rate leads to less consumption, which could also result in the larger amount of capital investment and finally a higher rate of economic growth. (Elias, & Worku, 2015). GDS is difference of GDP and consumption expenditure where it directly proportional to GDP and indirectly proportional to consumption expenditure.

Accordingly, GDS is defined by the following formula:

$$(GDS = GDP - \text{Domestic Expenditure})$$

Gross Domestic Savings are calculated as GDP less final consumption expenditure (total consumption). Hence, domestic saving can also be perceived as a choice between consumption today and consumption tomorrow as it is a way to accumulate wealth over time and raise living standards in the future. The primary problem is whether this choice is made optimally so that incentives emphasizing current consumption do not lead sub-optimal savings rates. ([www.sesric.org](http://www.sesric.org))

### **2.1.4 Treasury Bills (T-Bills)**

Treasury Bills (or T-Bills for short) are a short-term financial instrument that is issued by the US Treasury with maturity periods ranging from a few days up to 52 weeks (one year). They are considered among the safest investments since they are backed by the full faith and credit of the nation. Treasury bills are short-term securities issued by the nation. The Treasury sells

bills at regularly scheduled auctions to refinance maturing issues and to help finance current deficits. It also sells bills on an irregular basis to smooth out the uneven flow of revenues from corporate and individual tax receipts. Cook, (1993). Treasury bills are issued by governments through their central banks to resolve temporarily insufficient budget. Yet, treasury bills are also employed as one of open market operations (OMO) forms for monetary policy. Hence, by issuing treasury bills, central banks can raise short-term fund for governments and absorb surplus liquidity from financial markets simultaneously. For that reason, financial market participants are more likely to be confused when treasury bills are issued with unclear or mixed objectives. Issuance of treasury bills for the purpose of raising fund for governments may lead to unintended liquidity drain. In this case, an essential function of central banks, that is, price stabilization for monetary policy may be destroyed. Yi, (2014).

### **2.1.5 Stock Exchange**

Nepal Stock Exchange, in short NEPSE, is established under the Companies Act- 2006, operating under Securities Act- 2007. The basic objective of NEPSE is to impart free marketability and liquidity to the government and corporate securities by facilitating transactions in its trading floor through member, market intermediaries, such as broker, market makers etc. NEPSE opened its trading floor on 13<sup>th</sup> January 1994. (*Introduction / About Us*, n.d.) A capital Market plays vital role in the economy as it mobilizes the unproductive financial resource in productive sectors of the economy (Nepal Rastra Bank, 2012). It can be classified as Primary capital market and secondary capital market. When a company publicly sells new stocks and bonds for the first time, it does so in the primary capital market. This market is also called the new issues market. In many cases, the new issue takes the form of an initial public offering (IPO). The secondary market is where securities are traded after the company has sold its offering on the primary market. The New York Stock Exchange (NYSE), London Stock Exchange, and Nasdaq are secondary markets. KRAMER, (2020, October 2)

## **2.2 Review of Law and order**

Securities Act, 2007 and Companies Act, 2063(2006) are major acts where NEPSE is established.

According to the definition of Securities Act, (2007) section 2 (i) "Stock exchange" means a market, place or facility performing the purchase, sale or exchange of securities on a regular basis by bringing together the purchasers and sellers of securities. Section 2 (f) "Securities" means any shares, stocks, bonds, debentures, debenture stocks or collective investment scheme certificate issued by a body corporate or treasury bonds, saving bonds or bonds issued by the Government of Nepal or by a body corporate against the guarantee of the Government of Nepal, and this term also includes such other securities as may be specified by the Board to be transacted or transferable through the stock exchange or the instrument to purchase, sell or exchange such securities. Similarly from section 2 (g) of Securities Act (2007) "Securities transactions" means the issue, purchase, sale or exchange of securities and other acts pertaining thereto. This act has mentioned different sections related to securities of Nepal and it is the legal document where the existence of NEPSE is based on. This law is formed to regulate or manage the act of securities market and persons who are involved in the business of securities by issuance, purchase, sales and exchange of securities for the purpose of protecting investor's rights. Securities Act, 2007. This act includes the definition of key terms, registration and issuance of securities, Provisions Relating to Stock Exchange, Provisions Relating to License to Carry on Securities Business, Collective Investment Scheme, Operation of Securities business, Regulation, Monitoring, Inspection and Inquiry, Offenses Relating to Insider Trading in Securities and Transactions of Securities and Punishment.

Companies Act, 2063(2006) section 2 (g) "Listed company" means public company which has its securities listed in the stock exchange. Similarly it is defined in section 2 (r) "Shareholder" as a person having ownership in the share of a company, in section 2(w) "Securities Board" means the securities board established under the prevailing law to regulate and manage securities, in section 2 (x) "Securities" means any shares, bonds, debentures or stocks issued by a company, and this term includes the receipt relating to deposits of securities and the rights and entitlement relating to securities.

This act is formed to make dynamism in the economy development of country through easy, effective, simpler, and more transparent to industry trade and business sector.

## **2.3 Review of Previous Studies**

### **2.3.1 Review of International Studies**

Jahferand & Inoue (2014) researched the relationship between stock market development and economic growth in Sri Lanka using quarterly data from 1996 to 2011. The stationarity of the data was tested using Augmented Dickey Fuller (ADF) test. It was found that all variables are stationary on first differencing. The relationships between economic growth and indicators of stock market development were investigated using Johansen co-integration tests, and Vector Error Correction Model. Co-integration results economic growth in Sri Lanka. VECM results show unidirectional causality from stock market development to economic growth despite different variables used to measure the stock market development. The findings supported the theoretical prediction that development of stock market would play a key role in economic growth. The research concluded that stock market development leads to the economic growth in Sri Lanka and efforts should be devoted to develop the stock

Ullah et al. (2017) studied that stock market is one of the most widely followed markets in the world with a horde of transactions facilitated every day. Thus, not surprisingly a plethora of research has been dedicated to understanding the nature of these markets and what factors affect their movements and performance in general. Several studies have postulated that macroeconomic variables do tend to significantly affect stock market performance, while other studies found inconclusive relation at best. It is also worth noting that most of these studies were conducted on developed markets and rarely touched on the developing markets. On this background, the objective of this study is to examine the significance of macroeconomic variables in effecting stock market performance of SAARC countries using the OLS multiple regression Model. We have used annual data for the period 2005-2015. The findings of the study showed that macroeconomic variables i.e. exchange rate, foreign currency reserve and interest rate are all statistically significant in affecting stock market performance of SAARC countries. Whereas, inflation and money do not have a significant relationship in affecting stocks market performance.

Amaresh et al. (2020) studied that stock market performances are considered as a significant indicator of financial and economic circumstances of a country. A secured and regulated financial environment is being provided by the stock market where shares can be transacted at lower operational risk. The stock market also functions as a platform through savings, and investments of individuals are channelized into productive investment proposals. It allows capital formation and economic growth for the nation. The ultimate objective of this study is to examine the impact of macro-economic variables on stock market performance. The macro-economic variables (independent variables) used in this research study are Inflation, Interest Rate, and GDP. Stock market performance (All-Share Price Index) is the dependent variable. 120 Monthly observations from January 2009 to December 2018 had been taken for the study. The Augmented Dickey Fuller's unit root test, Ordinary Least Squares Regression and Correlation analysis were applied to the variables. The results of correlation analysis indicated that inflation and Stock market performance are positively associated meanwhile interest rate, and GDP and Stock market performance are negatively correlated. The Ordinary Least Square results showed that nearly 75% of the variation in all share price index is explained by the three macroeconomic variables, GDP, TB and WPI

Acikalin et al. (2008) studied the relationships between returns in Istanbul Stock Exchange (ISE) and macroeconomic variables of Turkish economy. Employing co integration tests and vector error correction model(VECM) on a quarterly data set, we find long-term stable relationships between ISE and four macroeconomic variables, GDP, exchange rate, interest rate, and current account balance. As a result of causality tests, they found unidirectional relationships between macro indicators and ISE index. That is, consistent with the existing literature, changes in GDP, foreign exchange rate and current account balance have an effect on ISE index. However, on the contrary to expectations, changes in the stock market index do affect interest rates.

Mookerjee (1997) studied using a subset of macroeconomic variables (narrow and broad money supply, nominal exchange rates and foreign currency reserves), that are especially pertinent in the context of a small open economy, researcher tests for the presence of informational inefficiencies in the Singapore stock market. The paper uses the techniques of cointegration and causality together with forecasting equations to test for informational

inefficiencies in both the long and short run respectively. The results indicate that three of the four macro variables are cointegrated with stock prices, suggesting potential inefficiencies in the long run. The causality tests and forecasting equations provide conflicting evidence on the informational efficiency of the stock market in the short run. Finally, the implications of these findings at both the macro and micro level are discussed.

Samontaray et al. (2014) examines the three important factors influencing the returns in the Saudi Stock Exchange (TASI) based on the macroeconomic variables of Saudi Economy. The dependent variable taken is the Saudi index that is TADAWUL All Stock Index (TASI) and the three independent variables considered for study are the Oil WTI, Saudi Exports and the PE Ratio. Correlation analysis revealed that Saudi Exports and the PE Ratio were found to be highly correlated with TASI at 1% level of significance whereas Oil WTI and TASI are significantly correlated at 5% level. Step-wise regression analysis of the data revealed that the multiple regression models is significant at 1% level and the variable PE Ratio was the most important determinant of TASI followed by Oil WTI and Saudi Exports. Further the three independent variables explain about 93% of variation in the TASI Last Price.

Barakat et al. (2016) found shed light on the relationship between the stock market and macroeconomic factors in two emerging economies (Egypt and Tunisia) for the period from January 1998 to January 2014. Results indicated that there is a causal relationship in Egypt between market index and consumer price index (CPI), exchange rate, money supply, and interest rate. The same goes for Tunisia except for CPI, which had no causal relationship with the market index. Their results also revealed that the four macroeconomic are co-integrated with the stock market in both countries.

Pal & Mittal, (2011) examine the long-run relationship between the Indian capital markets and key macroeconomic variables such as interest rates, inflation rate, exchange rates and gross domestic savings (GDS) of Indian economy. Quarterly time series data spanning the period from January 1995 to December 2008 had been used. The unit root test, the co-integration test and error correction mechanism (ECM) had been applied to derive the long run and short-term statistical dynamics. The findings of their study establish that there is co-integration between macroeconomic variables and Indian stock indices which is indicative of a long-run relationship. The ECM shows that the rate of inflation has a significant impact

on both the BSE Sensex and the S&P CNX Nifty. Interest rates on the other hand, have a significant impact on S&P CNX Nifty only. However, in case of foreign exchange rate, significant impact is seen only on BSE Sensex. The changing GDS is observed as insignificantly associated with both the BSE Sensex and the S&P CNX Nifty. The paper, on the whole, conclusively establishes that the capital markets indices are dependent on macroeconomic variables even though the same may not be statistically significant in all the cases. This study emphasizes on the impact of macroeconomic variables on the stock market performance of a developing economy, whose performance is measured by these variables.

Increasing attention is being paid to the relationship between share prices and the macroeconomic variables by both economists and finance specialists. (Evidence from emerging markets) There is an increasing integration of the financial markets and implementation of various stock market reforms, the activities in the stock markets and their relationships with the macro economy have assumed significant importance. Economic agents use information in forming their expectations of future returns from holding stock securities. Singh et al. (2011) studied is an attempt to examine for Taiwan the casual relationship between index returns and certain crucial macroeconomic variable namely employment rate, exchange rate, GDP, Inflation and money supply. The analysis is based on stock portfolios rather than single stocks. In portfolio construction, four criteria are used: Market capitalization, price/earnings ratio (P/E ratio), PBR and yield. The purpose was to make a finer point with respect to the relationship between economic growth and stock market especially in terms of stock prices. Empirical findings revealed that exchange rate and GDP seem to affect returns of all portfolios, while inflation rate, exchange rate, and money supply were having negative relationship with returns for portfolios of big and medium companies.

The concurrent growth in some ASEAN stock markets and their economies in the last two decades raise empirical questions regarding the fundamental connection between stock price and key macroeconomic variables. Wongbangpo & Sharma, (2002) investigates the role of select macroeconomic variables, i.e., GNP, the consumer price index, the money supply, the interest rate, and the exchange rate on the stock prices in five ASEAN countries (Indonesia, Malaysia, Philippines, Singapore, and Thailand). They observe long and short term

relationships between stock prices and these macroeconomic variables. The macroeconomic variables in these countries are caused by stock prices in the Granger sense. Since the stock prices interact with the key macroeconomic variables in the short and long run, decent government economic or financial policies can yield impressive gains in both the sectors.

Maysami et al. (2004) analyzes the co-movement between sectorial stock dices of the us and Singapore, through examining whether the S&P 500 Electronics(Semiconductor) Price Index leads Stock Exchange of Singapore's Electronics Price Index. The article also examines price co-movement of stocks listed dually in Singapore and the US. Using Johansen's (1988) Vector Error Correction Model (VECM), the paper concludes the existence of long-run co integrating relationship both between the US and Singapore electronic sectors in general, and more specifically among the three dually listed stocks under consideration. However, the results point to a short-term disequilibrium the prices of dually listed stocks, leading to the conclusion that short-run arbitrage opportunities may exist

Hosseini et al. (2011) studied the relationships between stock market indices and four macroeconomics variables, namely crude oil price (COP), money supply (M2), industrial production (IP) and inflation rate (IR) in China and India. The period covers in the study are between January 1999 to January 2009. Using the Augmented Dickey-Fuller unit root test, the underlying series are tested as non-stationary at the level but stationary in first difference. The use of Johansen-Juselius (1990) Multivariate Cointegration and Vector Error Correction Model technique, indicate that there are both long and short run linkages between macroeconomic variable and stock market index in each of these two countries.

Bekhet & Mugableh, (2012) studied empirical examination into the long-run and short-run equilibrium relationships between macroeconomic variables and the Malaysian stock market index (SMI) for the 1977-2011 period. Specifically, it employs Ng and Perron (NP) bounds statistics test to detect the boundaries of variables stationarity. Subsequently, the co-integrating relationships among variables are tested using the bounds F-statistic test. Eventually, the long-run and short-run equilibrium relationships are analyzed using Pesaran, Shin, and Smith (PSS) bounds tests Approach. The results indicate that all macroeconomic variables are co-integrated with SMI. Besides, understanding the long-run and short-run equilibrium relationships between macroeconomic variables and SMI could be highly

appreciable from the perspectives of policymakers, financial economists, domestic and international investors dealing with Malaysian stock market.

Rudzkiš, & Valkavičienė (2014) studied the effect of macroeconomic variables on economic growth, establishes the key drivers of economic growth and the casual relationship between economic growth and macroeconomic variables. Annual macroeconomic data was used for the period 1975-2012. The study employed the Vector error correction model and Vector Auto regression techniques. Findings suggest that Foreign Direct Investment (FDI) and inflation had a positive effect on economic growth, the key drivers of economic growth was its previous performance and FDI flows explaining 89% and 8% of variations respectively. The study supports the endogenous growth and the model of technology diffusion. Causality was unidirectional moving from economic growth to FDI and from gross fixed capital formation to GDP growth. Maintaining low inflation with the 3-6% target and high levels of FDI are vital for the growth. FDI can be increased by giving tax concessions to investors and removal of protectionist policies. Training of labour force is vital to widen absorptive capacity of new technology.

The economic growth of India has positioned it as one of the rapidly growing economies the world over and it is expected to be one of the top three economies globally over the next decade. Misra, (2018). Contrary to a slowdown in the earnings of Indian corporate due to excess existing capacity and the inability of banks to lend, the stock market ie Bombay Stock Exchange has performed well. The objective of the present research is to investigate the link that exists, if any, between BSE Sensex and macroeconomic variables such as Index of Industrial Production (IIP), inflation, the rate of interest, the price of gold, rate of exchange, FII and supply of money for the period April 1999-March 2017. The study also seeks to determine the strength of the link between the independent parameters and the dependent parameter ie BSE Sensex in the short run and long run based on the test of Johansen Cointegration, Granger Causality, and the Vector Error Correction mechanism. The analysis through the Vector Error Correction Model (VECM) confirms that there exists a long-run causality between the macroeconomic variables of Index of Industrial Production (IIP), inflation, interest rates, gold prices, exchange rate, foreign institutional investment, money supply and BSE Sensex. It establishes that there does exist a short run causality between

Inflation and BSE Sensex and Money Supply and BSE Sensex. The results importantly show that BSE Sensex causes changes in the exchange rate and money supply, FII, gold prices and IIP.

Ntshangase et al. (2016) examined the relationship between the stock market and macroeconomic policy variables in South African for the period from 1994 to 2012. The Johansen cointegration test and the restricted VAR model were employed to analyse the relationship between the variables of interest. The chosen method explicitly calculates the disturbances by inverting an estimated structural VAR of the relationship among the contemporaneous VAR residuals. The findings from the study suggest that there exists a long-term relationship between the selected macroeconomic variables and the stock market in South Africa. The results show that changes in money supply, interest rate, inflation, exchange rate and government expenditure are transmitted into the stock market. Thus achieving macroeconomic equilibrium is of great importance as any disequilibrium will be fed into the stock market which eventually might compromise its role of mobilizing and allocating development financial resources to productive sectors of the economy.

Mbulawa, (2015).Examined the dependencies of individual sectoral stock price indices of OMX Baltic security market on macroeconomic indicators, using econometric methods. Regression models are constructed using quarterly time series of 2000–2011 years while the methodology is backed with the findings of Lithuanian and foreign scientists from an extensive overview of specific literature. Regression equations, obtained in the paper, allow us to identify the key macroeconomic and global indicators that statistically significantly affect the Baltic securities market and to quantify their impact on the stock price indices of individual sectors in the Baltic countries. Econometric analysis of OMX Baltic security market proves the hypothesis that the set of macroeconomic repressors may vary considerably depending on the individual sector's price indices, especially in the case of small open economy with immature stock markets. The paper provides investors who are shaping their portfolios taking into account the macroeconomic forecasts with additional opportunities on the basis of sectoral stock price indices regression equations.

KRÁLI (2012).This study investigates the relationship between local and global macroeconomic factors and stock market indices in Romania using the framework of the

macroeconomic APT model. Many researchers have demonstrated that macroeconomic conditions affect risk factors and influence asset returns. However, it is well-known that emerging markets' asset returns are characterized by higher volatility than on developed markets. Using the stepwise analysis method we found some evidence of the effects of exchange rates, interest rates (global), gold price, global stock indices and oil prices on stock returns of the Bucharest Stock Exchange (BSE). We also investigate the effects of macroeconomic factors on the investment firm's indices, BET-FI. The results of a Vector Autoregressive model (VAR) and Vector Error Correction Model (VECM) indicate the short and long run linkages between macroeconomic variables and BSE indices.

Umam et al. (2019), examined the impact of macroeconomic variables, namely the exchange rate, interest rates, industrial production index, SBIS and inflation on the Indonesian Islamic stock index. This study uses monthly data from May 2011 to December 2018. Research was quantitative study that applies the Johansen Cointegration Test and Vector Error Correction Model to see the long-term impact and shock response on certain variables. The findings indicate the existence of short-term and long-term causality between macroeconomic variables and the Indonesian Islamic stock index. Especially in the long run, industrial production index and inflation have a significant effect on ISSI, while the exchange rate, interest rates and SBIS have no significant effect on ISSI. IRF results show that the response of each variable and stable at different times. The ISSI response experienced a positive shock that occurred in the industrial production index and inflation. On the other hand, the exchange rate, the Bungan rate and SBIS were responded negatively by ISSI.

Cankal, (2015), This study attempts to bring a light to the relationship between stock market returns and basic macroeconomic variables using monthly data between 2003 and 2015 and employing structural vector autoregressive (SVAR) model for the Turkish economy. Turkey is considered as one of the most vulnerable five countries whose stock prices are most responsive to, exchange rate shocks. This study concludes that the stock prices in Turkey responsive to the shocks in exchange rate, interest rate, and inflation in order. The results of the analyses are in accordance with theoretical expectations as well as with the findings of the vast majority in the literature.

### **2.3.2 Review of Nepalese Studies**

Shrestha & Subedi, (2014) examines the determinants of the stock index (NEPSE) in Nepal using monthly data for the period of mid-August 2000 to mid-July 2014. 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 chosen for the study such as Consumer Price Index, Broad Money and Treasury Bill Rate. Time series properties of selected variables have been examined. Moreover, empirical results obtained from OLS estimations of behavioral equations reveal that the NEPSE index is 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.

Phuyal, (2016) examined long-run relation between macroeconomic variables and stock prices has found significant place in literature of finance. An existence of such relation would assure long term investors a confidence in the market as long as the macroeconomic environment is sound. This study was conducted using Johansen's co integration method, whether a long-term association of selected macroeconomic variables existed with stock prices in the emerging market like Nepali stock market. For this objective, monthly data from January 2003 to December 2012 were used with a set of six macroeconomic variables and stock market return. The results indicated that the Nepali stock market had a long run equilibrium relationship with a set of macroeconomic variables, like inflation rate, interest rate and remittance flow with the short term disequilibrium corrected by 1.79% on monthly basis. It further showed that there was Granger causality between them. In the short run, the stock market index was affected by the lag values of NEPSE index up to six levels and remittance income, as shown by Wald test. Those findings hold practical implications for policy makers, stock market regulators, investors and stock market analysts.

Similarly Shrestha, & Phil, (2018) examined the long run equilibrium and causal relationship between macroeconomic variables (exchange rate, import payment, money supply, foreign remittance, and wholesale price index) and NEPSE index for the period of January 2002 to December 2016. Study adopted Johansen cointegration test to observe the long run equilibrium and Granger Causality test to identify the causal relationship among the variables. The order of integration of all variables is determined by applying Augmented Dickey-Fuller (ADF) test and Phillips-Perron (PP) test. When variables are found the same order of integration then cointegration test is used to identify the number of cointegrating equations among the variables. This study concluded that there exist long run equilibrium among the macroeconomic variables and stock index. The result of Granger Causality test indicated that there exist no causal relationship between stock market index and macroeconomic variables in Nepalese stock market.

Shrestha, (2019) examined the effect of macroeconomic variables on the NEPSE index over the period of January 2002 to December 2016. The study 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 were not stationery at their level except the variable interest rate (LnINT) and they became stationery at their fiRs.t difference. Thus all the variables except interest rate (LnINT) are used at their fiRs.t 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 analyse the effect of macroeconomic variables on the NEPSE index. The regression analysis showed that the coefficient of exchange rate (DLnER) and gold price (DLnGP) is statistically insignificant at 5 percent level of significance whereas the coefficient of interest rate (LnINT) is statistically significant 5 percent level of significant. Similarly, the coefficient of wholesale price index (DLnWPI) is statistically significant at 1 percent level of significance. Thus, this study concludes that the interest rate (LnINT) and wholesale price index (DLnWPI) has more explanatory power than exchange rate (DLnER) and gold price (DLnGP) for explaining variation in stock market index and they has greater effect on stock market index than exchange rate and gold price in Nepalese stock market.

Table 2.1 depicts the summary of the related studies which shows the impact of macroeconomic variables on stock market using the different models during the study.

**Table 2.1 Summary of Related Studies**

<b>Author(s)</b>	<b>Methodology</b>	<b>Finding</b>
Mookerjee (1997)	Cointegration and causality with forecasting equations	It provides conflicting evidence on the informational efficiency of the stock market in the short run and indicates that three of the four macro variables are cointegrated with stock prices, suggesting potential inefficiencies in the long run.
Wongbangpo & Sharma, (2002)	Granger sense	The article examines the macroeconomic variables in these countries are caused by stock prices in the Granger sense. Since the stock prices interact with the key macroeconomic variables in the short and long run, decent government economic or financial policies can yield impressive gains in both the sectors.
Maysami et al. (2004)	Johansen's (1988) Vector Error Correction Model (VECM)	The analysis depicts that the existence of long-run co integrating relationship both between the US and Singapore electronic sectors in general, and more specifically among the three dually listed stocks under consideration.
Acikalin et al. (2008)	Co integration tests and vector error correction model (VECM)	Co integration tests and vector error correction model (VECM) show long-term stable relationships between ISE and four macroeconomic variables, GDP, exchange rate, interest rate, and current account balance. Causality tests found unidirectional relationships between macro indicators and ISE index.

Hosseini et al. (2011)	Augmented Dickey-Fuller unit root test and Multivariate Cointegration and Vector Error Correction Model	It examines the underlying series are tested as non-stationary at the level but stationary in first difference. There are both long and short run linkages between macroeconomic variable and stock market index in each of these two countries.
Pal & Mittal, (2011)	Unit root test, the co-integration test and error correction mechanism (ECM)	The results show that co-integration between macroeconomic variables and Indian stock indices which is indicative of a long-run relationship.
Singh et al. (2011)	Casual relationship	The analysis depicts that exchange rate and GDP seem to affect returns of all portfolios, while inflation rate, exchange rate, and money supply were having negative relationship with returns for portfolios of big and medium companies.
Bekhet & Mugableh, (2012)	Ng and Perron (NP) bounds statistics test, F-statistic test and using Pesaran, Shin, and Smith (PSS) bounds tests Approach	The result indicates that all macroeconomic variables are co-integrated with stock market index (SMI).
KRÁLI (2012).	APT model and Vector Autoregressive model (VAR) and Vector Error Correction Model (VECM	It result shows the effect and also short and long run linkages between macroeconomic variables and BSE indices.
Jahferand & Inoue (2014)	Augmented Dickey Fuller (ADF) test. Johansen co-integration tests and Vector Error Correction Model.	All variables are stationary on first differencing. VECM results show unidirectional causality from stock market development to economic growth despite different variables used to measure the stock market development.

Rudzki, & Valkavičienė (2014)	Vector error correction model and Vector Auto regression techniques	The result found that the Foreign Direct Investment (FDI) and inflation had a positive effect on economic growth.
Samontaray et al. (2014)	Correlation analysis	The study examines the Saudi Exports and the PE Ratio was found to be highly correlated with TASI at 1% level of significance whereas Oil WTI and TASI are significantly correlated at 5% level. Step-wise regression analysis of the data revealed that the multiple regression models is significant at 1% level and the variable PE Ratio was the most important determinant of TASI followed by Oil WTI and Saudi Exports.
Shrestha & Subedi, (2014)	Correlation analysis OLS estimations of behavioral equations	The empirical results reveal that the NEPSE index is found to respond positively to inflation and broad money growth, and negatively to treasury bills rate.
Cankal, (2015),	Structural vector autoregressive (SVAR) model	The analysis depicts the stock prices in Turkey responsive to the shocks in exchange rate, interest rate, and inflation in order.
Mbulawa, (2015).	Econometric methods and Regression models	It identify the key macroeconomic and global indicators that statistically significantly affect the Baltic securities market and to quantify their impact on the stock price indices of individual sectors in the Baltic countries.
Barakat et al. (2016)	Casual relationship	The article examines a causal relationship in Egypt between market index and consumer price index (CPI), exchange rate, money supply, and interest rate. The same goes for Tunisia except for CPI, which had no causal relationship with the market index.

Ntshangase et al. (2016)	Johansen cointegration test and the restricted VAR Model	There exists a long-term relationship between the selected macroeconomic variables and the stock market.
Phuyal, (2016)	Johansen's cointegration method, Wald test	The results indicated that the Nepali stock market had a long run equilibrium relationship with a set of macroeconomic variables and also stock market index was affected by the lag values of NEPSE index up to six levels and remittance income.
Ullah et al. (2017)	OLS multiple regression Model.	The study depicts, macroeconomic variables i.e. exchange rate, foreign currency reserve and interest rate are all statistically significant but inflation and money do not have a significant relationship in affecting stocks market performance SAARC countries.
Misra, (2018).	Johansen Cointegration, Granger Causality, and the Vector Error Correction mechanism	The result indicates that there exists a long-run causality between the macroeconomic variables of Index of Industrial Production (IIP), inflation, interest rates, gold prices, exchange rate, foreign institutional investment, money supply and BSE Sensex.
Shrestha, & Phil, (2018)	Johansen cointegration, Augmented Dickey-Fuller (ADF), Phillips-Perron (PP) test and Granger Causality test	This study concluded that there exist long run equilibrium among the macroeconomic variables and stock index. Granger Causality test indicated that there exist no causal relationship between stock market index and macroeconomic variables in Nepalese stock market.

Shrestha, (2019)	Pearson's correlation model, Correlation and causal comparative research design	It examines that all the variables were not stationery at their level except the variable interest rate and they became stationery at their first difference. Interest rate and wholesale price index has more explanatory power than exchange rate and gold price for explaining variation in stock market index and they has greater effect on stock market index than exchange rate and gold price in Nepalese stock market.
Umam et al. (2019),	Johansen Cointegration Test and Vector Error Correction Model	The findings show the existence of short-term and long-term causality between macroeconomic variables and the Indonesian Islamic stock index.
Amaresh et al. (2020)	Augmented Dickey Fuller's unit root test, Ordinary Least Squares Regression and Correlation analysis	In this study correlation analysis indicated that inflation and Stock market performance are positively associated meanwhile interest rate, and GDP and Stock market performance are negatively correlated. The Ordinary Least Square results showed that nearly 75% of the variation in all share price index is explained by the three macroeconomic variables, GDP, TB and WPI

## 2.4 Research Gap

Various quantitative and qualitative factors affect stock market prices globally and in Nepal, according to the literature research conducted above. Several studies show macroeconomic factors have a major impact on stock prices in the economy. Changes in macroeconomic policy have an impact on how businesses operate, their earnings, and, ultimately, their stock values. According to the previous review of literature, there have been several studies conducted by various researchers across different time periods, addressing diverse factors of stock prices. However, there are only a few researches in Nepal on the major determinants of

stock market price movement. As a result, the study aims to address a vacuum in the review of literature in this area in the near future.

This study examines the relationship between changes in macroeconomic factors such as Gross Domestic Product, Gross Domestic Saving and Interest rate with the stock market index in Nepal. The empirical study was based on fifteen years data and analyze through the descriptive and causal comparative research design. This study also fulfills the gap that was earlier unfilled. The economic growth is changing gradually so that this research covers the latest stock market moment and economic indicators then the earlier studies.

The findings of this study may have consequences for policymakers and portfolio managers, investors who should concentrate on macroeconomic indicators such as interest rates, gold price, consumer price index, and wholesale price index rather than including Gross Domestic Product, Gross Domestic Saving, and Interest rate as the primary indicator.

## **CHAPTER III**

### **RESEARCH METHODOLOGY**

The plan, structure, and strategy of investigations conceived to answer the research question or test hypothesis and control variation is known as research methodology. It is a broad research approach that specifies how research will be carried out and, among other things, the methodologies that will be used. These methodologies define the means or modes of data collecting, or, in some cases, how a specific outcome is to be calculated. It is known as a path from which we can systematically solve there search problem. This research tries to perform a well-designed quantitative and qualitative research in a very clear and direct way using both financial and statistical tools. The statistical techniques used to evaluate the hypotheses and methodology used in this study, are covered in the third chapter on research methodologies. The research design, sample size and selection process, data analysis, data collection procedure, and processing techniques and tools are all presented in this chapter.

#### **3.1 Research Design**

The overall strategy for conducting research that provides a brief and logical plan to address a specific research topic through the gathering, interpretation, analysis, and discussion of data is referred to as research design. The research design for this study is descriptive and causal comparative research. The descriptive research design is used to gather information and find facts regarding the elements that influence stock market prices. The causal comparative research approach is utilized to determine and explain the directions, magnitudes, and forms of observed relationships among the variables studied, which included real Gross Domestic Product, Gross Domestic Saving, Interest rate with NEPSE index. The goal of this study is to determine the nature of relationship that exists between macroeconomic variables and the stock market index.

#### **3.2 Population and Sample**

For analysis, the research utilizes time series data from macroeconomic indicators and stock market prices. The Nepal Stock Exchange Ltd (NEPSE), which was founded in 1993, is the country's only capital market with an index as a dependent variable. Sampling is taken as the

available data of recent fifteen years i.e. fiscal year 2005/06 to 2019/20. GDP, GDS, and Interest rate are the macroeconomic variables analyzed in this study that meet the sampling design criteria. For performance evaluation, a sample size of yearly periodic tables of macroeconomic indicators is used.

### **3.3 Nature & Sources of Data**

As the study is based on secondary information, they are obtained from various sources, such as NEPSE annual reports and Economic Bulletin provided by Nepal Rastra Bank (NRB). In addition, data is gathered through the use of text books, periodicals, and financial websites. According to the literature analysis, various macroeconomic factors influence stock market price, with GDS, Interest rate and real GDP being the most influential. The change in the NEPSE index gives information about the market rate of return. Nepal Rastra Bank (NRB) provides the necessary annual statistics on macroeconomic factors, while Nepal Stock Exchange Ltd provides data on stock market indexes (NEPSE). The annual interest rate of 91-days Treasury bill has been used as a proxy for interest rate. The time span for this study will be 2005/2006 to 2019/2020, as it will be about the impact of macroeconomic variables on stock market. This is the study's major point. The population and samples are same because the research is focused entirely on the relationship between the stock market and macroeconomic growth.

### **3.4 Methods of Analysis**

The systematic and careful evaluation of available evidence in order to draw specific conclusions and make an inference is known as analysis. The main goal of this research is to see if there is a link between the stock market index and macroeconomic variables. This has been performed using a variety of similar methods and techniques. Correlation analysis, regression analysis, has been used for this analysis. The empirical results have been estimated in the study by using annual data of 15 years for the year 2005/06 to 2019/20 time period.

### **3.4.1 Statistical Tools**

Planning, designing, collecting data, analyzing, deriving relevant interpretations, and publishing the research findings are all examples of statistical approaches used in conducting a study. Only when suitable statistical tests are employed are the results and inferences precise. In this work, the following methods and techniques are employed as statistical tools.

#### **a) Descriptive Statistics**

Before calculating the statistical analysis firstly we must assure the descriptive characteristics. Descriptive statistics statistically explain the data's features among the selected variables. It shows the macroeconomic variables used in this study. Gross Domestic Product, Gross Domestic Saving, Interest rate, and NEPSE Index are used for computing descriptive statistics. The mean, standard deviation, minimum value, maximum value are computed using descriptive statistics for explore the nature and distribution of data.

#### **b) Correlation Coefficient**

Correlation coefficient is a method of statistical evaluation used to measure how strength of a relationship between two variables. The appropriate statistical tool to measure the relationship between two or more variables in quantitative terms is the correlation analysis. Correlation shows the degree of relationship between the variables. It is the square root of the coefficient of multiple determinations. Correlation can either be positive or it can be negative. When the correlation coefficient is positive, an increase in one variable also increases the other. When the correlation coefficient is negative, the changes in the two variables are in opposite directions, but the correlation coefficient always remains within the limit of +1 to -1.

#### **c) Regression Analysis**

In statistical modeling, regression analysis is a set of statistical processes for estimating the relationships between a dependent variable and one or more independent variables (often called 'predictors'). More specifically, regression analysis helps one understand how the typical value of the dependent variable (or 'criterion variable') changes when any one of the

independent variables is varied, while the other independent variables are held fixed. Most commonly, regression analysis estimates the conditional expectation of the dependent variable given the independent variables – that is, the average value of the dependent variable when the independent variables are fixed. Less commonly, the focus is on a quintile, or other location parameter of the conditional distribution of the dependent variable given the independent variables. In all cases, the estimation target is a function of the independent variables called the regression function. In regression analysis, it is also of interest to characterize the variation of the dependent variable around the regression function which can be described by a probability distribution. In this analysis, regression model, have been used to analyze the predictive power of independent variables such as Gross Domestic Product, Gross Domestic Savings and Interest rate.

The models used for regression analysis is presented as follows:

$$\ln ind_t = \alpha + \beta_0 (\ln gdp_t) + \beta_2 (\ln gds_t) + \beta_4 (int_t) + \varepsilon_t$$

Where,

$\ln ind_t$  = the log of the Nepal Stock Exchange Index (NEPSE) value for time t,

$\ln gdp_t$  = the log of gross domestic product for time t,

$\ln gds_t$  = the log of gross domestic saving for time t,

$int$  = interest rate of 91-days treasury bill for time t,

$\alpha$  = A constant; equals the value of Y when the value of X=0,

$\beta$  = Unknown parameter, the coefficient of independent variable; the slope of the regression line,

$\varepsilon_t$  = the residual error term.

At the end, the MS-Excel and SPSS Statistics software has been employed to obtain the research results.

### 3.5 Research Framework

A research framework is a detailed representation of the structure of a research project plan in literature. We can establish the study's essential areas by looking at the structure. It also enables the formulation of relevant study questions and objectives. A literature review of existing studies and theories on the topic is used to develop the conceptual framework.

The theoretical basis of this study is represented in the diagram. Gross Domestic Product, Gross Domestic Savings, Treasury Bill Rate (Interest rate) are the independent variables, whereas NEPSE Index is the dependent variable.

The Figure 3.1 depicts the research Framework for dependent and independent variables employed in this study.

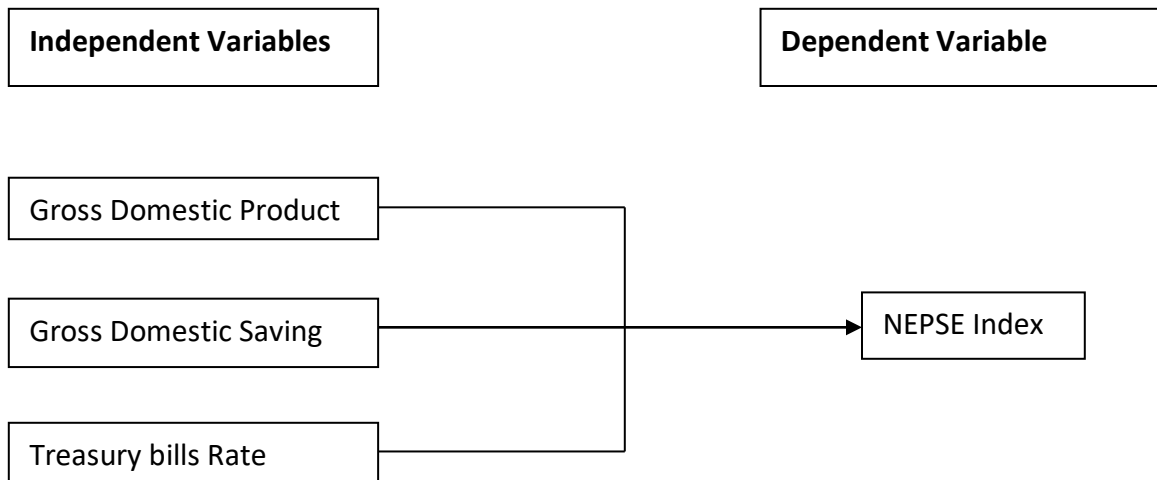


Figure 3.1: Research Framework

### 3.6 Definition of Variables

This section employs the definition of various variables, namely Gross Domestic Product, Gross Domestic Saving and Treasury bills Rate as independent variables and NEPSE index as a dependent variable are used under this study. Each of them has been discussed as follows:

- **Gross Domestic Product**

The monetary worth of all finished goods and services produced inside a country during a certain period is referred to as the gross domestic product (GDP). GDP is a measure of a country's economic health that is used to determine its size and growth rate. GDP can be estimated in three different ways: through spending, output, or income. It can be adjusted for inflation and population to give you a more complete picture. GDP is usually computed on an annual basis, although it can also be computed on a quarterly basis. Although GDP is typically estimated on an annual basis, it can also be calculated quarterly. GDP is the sum of all private and public consumption, government expenditures, investments, and exports minus imports within a specific territory.

- **Gross Domestic Saving**

Gross Domestic Saving (GDS) is defined as a surplus of income over expenditure. GDP minus final consumption spending equals Gross Domestic Savings. It's measured as a proportion of gross domestic product (GDP). As a result, domestic saving can be seen as a choice between today's consumption and tomorrow's consumption because it is a strategy to acquire money through time and increase living standards in the future. Stock markets contribute to mobilization of domestic savings by enhancing the set of financial instruments available to savers to diversify their portfolios. The sum of private and public savings is referred to as a country's national savings in economics. Gross Domestic Savings are calculated as GDP less total consumption. It is usually calculated by subtracting a country's income from its consumption and government purchases.

- **Treasury BillsRate**

Treasury bill rate is a cost of holding shares that is experienced as an opportunity cost. Higher Treasury bill rates, which are caused by monetary policy or the government's desire to borrow more from the domestic market, usually have a negative impact on stock market returns. This is because the value of equity decreases as the interest rate rises. This constitutes a threat to investing in stocks because fixed income securities

are now more appealing. This may reduce the desire of new and current investors to invest in equities or borrow money. This will result in an increase in the cost of running a business, hurting profit margins. Treasury bill rate also known as risk free rate is published monthly by NRB on their economic bulletin. From which monthly 91-days risk free rate is taken as the risk free rate of return for this study.

- **NEPSE Index**

The NEPSE Index is a measure of how much a representative sample of stocks has changed in value over time compared to a base date and value. Market avengers and indices are used by security market researchers, prospective investors, and securities analysts to describe, evaluate, and study the behavior and movements of the securities market. The basic objective of NEPSE is to impart free marketability and liquidity to the government and corporate securities by facilitating transactions in its trading floor through member, market intermediaries, such as broker, market makers etc. It depicts the performance of stock market over the period. NEPSE Index can be use for forecasting the movement of macroeconomic variables of nations, because it serves for various other indices for rate of interest, GDP growth and so on.

## CHAPTER IV

### RESULTS AND DISCUSSION

This chapter includes results and discussion of the presented data analysis. Data analysis is the process of examining and interpreting data to come up with solutions to queries. Identifying issues, determining the availability of adequate data, deciding which methods are appropriate for answering the questions of interest, implementing the method, and evaluating, summarizing, and conveying the results are the basic processes in the analytic process.

#### 4.1 Data Presentation of Variables

Data is gathered from government officials. Different macroeconomic variables, such as GDP, GDS, and Interest rate (T-bill 91 days), are tabulated and displayed using line graphs. Similarly, each fiscal year's closing prices NEPSE are recorded and displayed using trend line charts. Financial analysis, descriptive statistics, and correlation and regression analysis are some of the instruments used to evaluate performance.

**Table 4.1**  
*Status of variables*

<b>Fiscal Year</b>	<b>GDP in Billion</b>	<b>GDS in Billion</b>	<b>Interest Rate (%)</b>	<b>NEPSE Index</b>
2005/06	1075	96.514	2.84	386.8
2006/07	1227.3	120.52	2.42	683.9
2007/08	1491.1	146.55	4.22	963.4
2008/09	1527.9	144.18	5.83	749.1
2009/10	1902.1	217.87	6.50	477.7
2010/11	2570	182.69	7.41	362.85
2011/12	2579.6	235.22	1.31	389.74
2012/13	2634.2	215.49	1.74	518.83
2013/14	2701.9	253.05	0.13	1036.11
2014/15	2895.5	220.84	0.43	961.23
2015/16	2914.9	106.14	0.79	1718.15
2016/17	3443.6	447.15	1.45	1582.67
2017/18	3935.7	582.18	4.48	1212.36
2018/19	4063.3	621.88	3.2	1258.94
2019/20	4000.5	253.88	2.69	1362.349

Source: Economic bulletin of NRB and Annual Report of NEPSE

The correlation analysis is used to observe the relationship between the stock market index value and macroeconomic variables. Similarly the regression is used to analyze the impact of macroeconomic variables (independent variables) on the stock market index (dependent variable).

NEPSE Index is dependent variable, which is obtained from official websites of Nepal Stock Exchange. Similarly we have different macroeconomic variables(GDP, GDS, and interest rate) available which are independent variables are obtained from the official website of World Bank. Table 4.1 presents the 15 years used data for variable analysis.

#### 4.1.1 Gross Domestic Product

GDP is the final value of the goods and services produced within the geographic boundaries of a country during a specified period of time, normally a year. GDP growth rate is an important indicator of the economic performance of a country. The total market value of currently produced products and services inside a country's borders in a year is known as GDP. It's a metric for a country's official economic production. It shows the market size of a country in a glance. It is frequently associated with a higher quality of living.

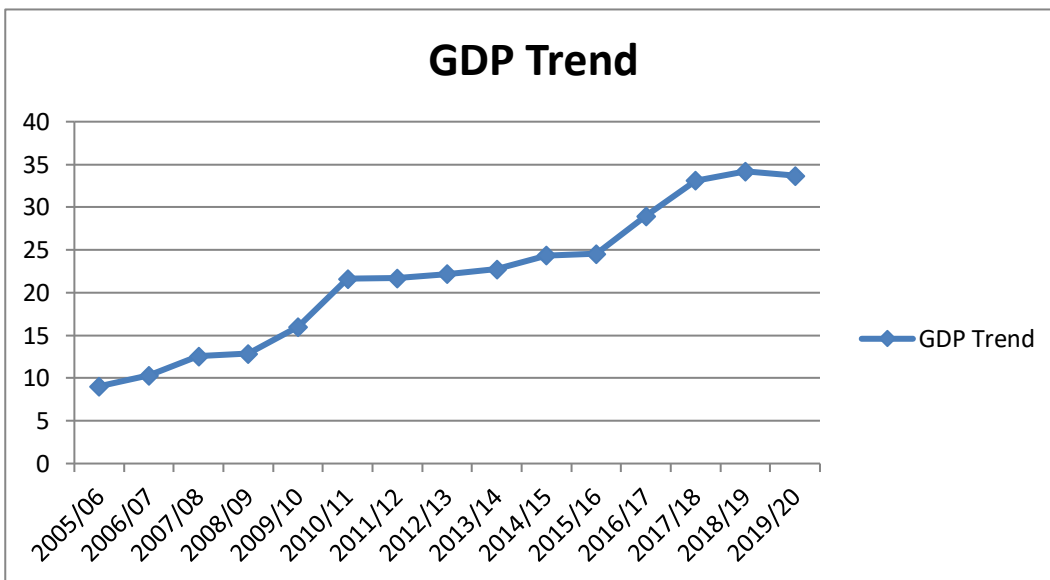


Figure 4.1: Gross Domestic Product of 15 Years

With respect to the Table 4.1, value of GDP is recorded minimum of 1075 at year 2005/06 whereas the maximum value of GDP 4063.3 at 2018/19. The upward trend of GDP over the study period has been depicted in Figure 4.1.

#### 4.1.2 Gross Domestic Saving

Gross Domestic Saving consists of savings of household sector, private corporate sector and public sector. It refers to a country's total private corporate and public savings in the form of liquid assets. A sufficient domestic saving rate is a requirement for a country's investment or capital formation and growth rate targets to be achieved.

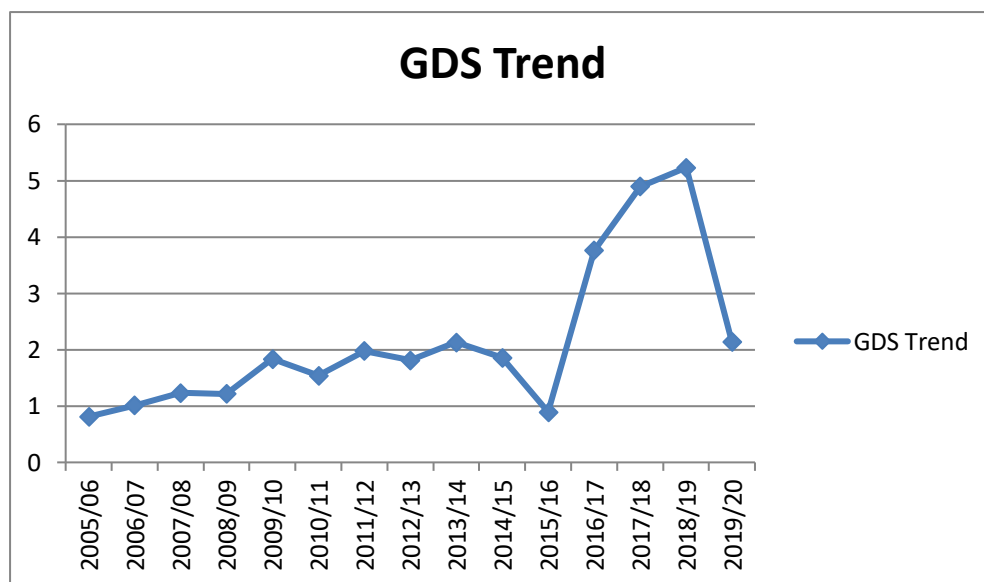


Figure 4.2 Gross Domestic Saving of 15 Years

Regarding the status of Gross Domestic Saving over the 15 years from 2005/06 to 2019/20 has been presented in Table 4.1; GDS is slightly increasing at the beginning period of the study and decrease at certain level but increases maximum at year 2018/19 and decreases down next year. GDS at year 2018/19 increases at maximum value of 621.88. Similarly GDS at year 2005/06 shows the minimum value of 96.514. The growth of GDS seems fluctuating which has been shown in Figure 4.2.

### 4.1.3 Interest rate

The interest rate is the percent of principal charged by the lender for the use of its money. Figure 4.3 includes the time series data of Treasury bills interest rate from 2005/06 A.D. to 2019/20 A.D. of 91 days. Nepal government issue treasury bills with the help of NRB to meet the short term financial deficit as well as to control money supply to the market. Generally Treasury bills of 28 days, 91 days, 182 days and 364 days issued by NRB.

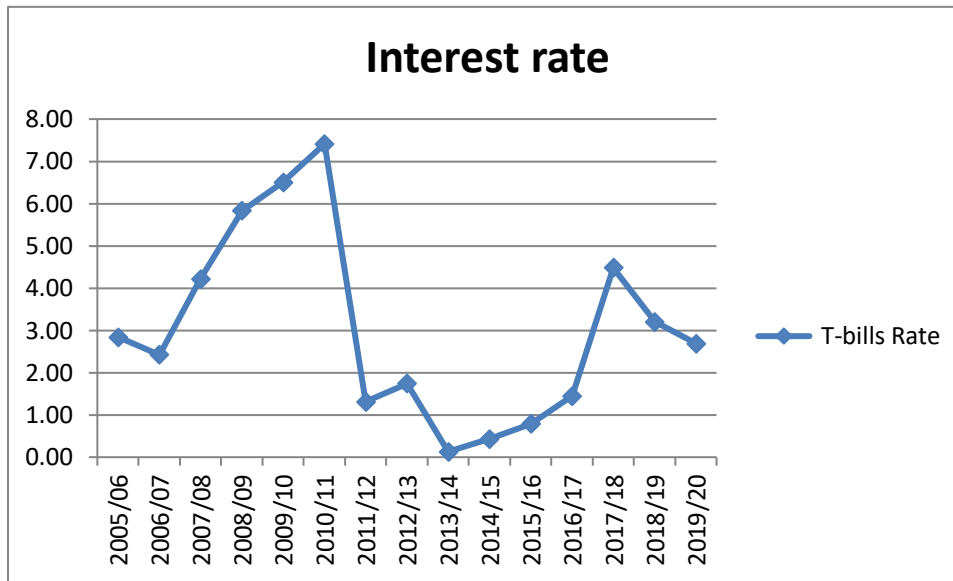


Figure 4.3: Interest rate of 15 Years

With regard to the Table 4.1, NRB has provided the interest rate minimum value of 7.41% at 2010/11 whereas the maximum value interest rate of Treasury bill of 0.13% at 2013/14. The movement of Interest rate shown in Figure 4.3 seems to be fluctuating.

### 4.1.4 NEPSE Index

The numbers of companies listed in Nepal stock Exchange are 374 numbers, till the date(as on 08-02-2021) out of which 285 are currently active, till date(as on 16-03-2021). These companies are Commercial Banks , Insurance Companies, Hydropower Companies, Finance Companies and others category. Nepal Stock Exchange at the end of the day published the transaction index which is called NEPSE Index. The equity market capitalization of the companies listed on NEPSE was approximately US\$30 billion as of date February 08, 2021.

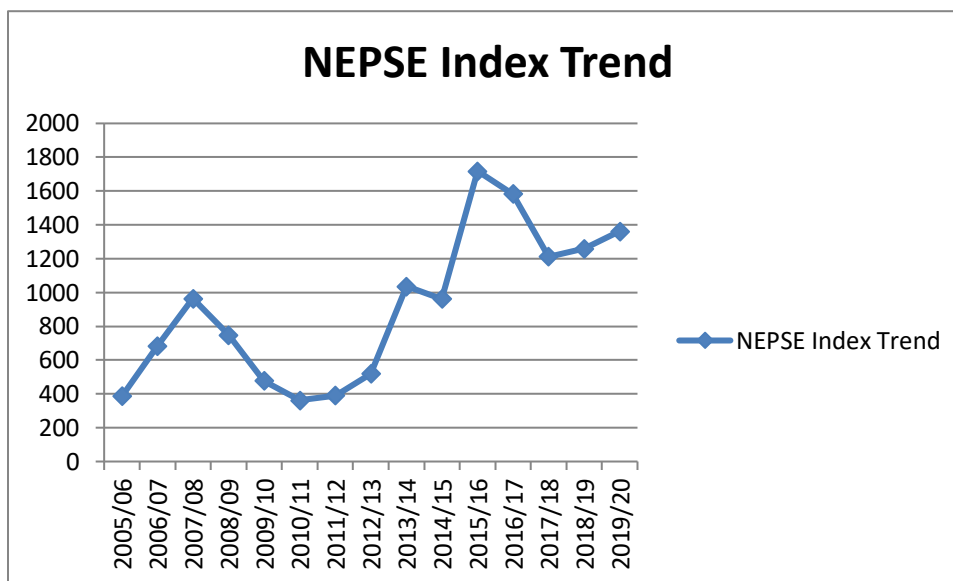


Figure 4.4 NEPSE Index of 15 Years

As shown in Table 4.1, the value of NEPSE Index has minimum value of 362.85 on year 2010/11. Similarly, there is maximum value of 1718.15 at 2015/16. The NEPSE index is increasing ratio, with increasing number of listed companies. The upward trend of NEPSE Index over the study period has been depicted in figure 4.4. There was an increase in margin lending too in the portfolio of banks. Since bank shares make up the majority of the stock market, the prices went up to facilitate margin lending. When prices of bank shares went up, the stock market gained points and reached peak in 2008. But as credit growth slowed and real estate market started cooling down, banks struggled because of their investments in real estate sector. The share prices also came crashing down after a steep climb. The overvalued stocks fell to their real value.

## 4.2 Descriptive Analysis

This section presents the descriptive analysis of variables taken under this study. Descriptive statistics are brief descriptive coefficients that summarize a given data set, which can be either a representation of the entire or a sample of a population. Descriptive statistics is divided into two sections: measures of central tendency and measures of variability. The

mean is used to determine the central tendency, whereas the standard deviation, minimum, and maximum variables are used to determine the variability.

**Table 4.2**

***Descriptive Statistics of Variable***

*The table exhibits descriptive statistics (Minimum, maximum, mean, median, and standard deviation) of Variable being studied for the period of 2005/06 to 2019/20. GDP and GDS are taken annually. NEPSE index is annually index value of Nepal Stock Exchange. Interest rate is annual interest rate of 91-days Treasury bill.*

<b>Descriptive Statistics</b>					
Variables	N	Minimum	Maximum	Mean	Std. Deviation
Lngdp	15	2.2021	3.5318	3.004854	0.4307984
Lngds	15	-0.2083	1.6548	0.607403	0.5684755
Int	15	0.1300	7.4139	3.029987	2.2438028
Lnind	15	5.8940	7.4490	6.689181	0.5344574

Table 4.2 indicates the descriptive statistics of the variables in the study. The mean value of the GDP is 3.004854. It shows low of 2.2021 and high of 3.5318. Its standard deviation is 0.4307984 which indicates lowest fluctuations in the dependent variable as compared to other independent variables. GDS also has impact on the stock market as it indicates the maximum value of 1.6548 and minimum value of -0.2083. The value of its mean is 0.607403 and standard deviation is 0.5684755. Interest rate indicates max of 7.4139 and min value of 0.1300 and the value of mean and S.D are 3.029987 and 2.2438028 respectively. It shows the highest fluctuations among the other variables. Whereas, dependent variable NEPSE index have its range of maximum and minimum is 7.4490 to 5.8940 percentages, where mean value is 6.689181 with 0.5344574 standard deviation.

**4.3 Correlation Analysis**

The correlation coefficients show the magnitude and direction of the linear relationship between two variables if that of the original data should change or remain unchanged. The

correlation ranges between plus and minus one. The correlation between the macroeconomic variables and stock market index has been presented which summarizes the correlation matrix with Pearson correlation coefficient. Correlation coefficient measure the relationship between two variables in quantitative terms. Correlation coefficient indicated that the return from two securities generally move in the same direction and vice versa. Correlation may be positive or negative.

**Table 4.3**

***Pearson's Correlation***

*The table 4.3 elucidates the outcomes of the Correlation analysis carried out from excel through Pearson correlation analysis. It shows the linkage/relationship among the variables specifically in the research. The correlation between the macroeconomic variables and stock market index explain the direction and magnitude of relationship among different pairs of macroeconomic variables during the period 2005/06 to 2019/20 A.D. It indicates that stock market prices represented by NEPSE index has positive relationship with GDP, GDS but has negative correlation with interest rate as expected.*

	Lngdp	Lngds	Int	Lnind
Lngdp	1			
Lngds	0.780283	1		
Int	-0.23855	-0.02509	1	
Lnind	0.552216	0.393646	-0.3997	1

Table 4.3 displays relations between dependent and independents variables. The correlation between NEPSE Index and GDP is 0.552. There is positive relationship between GDP Index and NEPSE Index which indicates that higher the GDP, higher would be the NEPSE Index and vice versa. This result gives an appropriate indication that development in real sector activity may contribute positively to the stock market. Likewise, there is positive relationship between GDS and NEPSE Index which is 0.393 means these variables tend to increase together and vice versa. Also, the correlation between interest rate and NEPSE Index has negative correlation that is -0.399 which indicates higher the Interest rate, lower would be the NEPSE Index and vice versa. The negative relationship with interest rate, as hypothesized,

indicates that the stock returns goes on decreasing when market interest rate increases. Investors will be reluctant to have borrowing at higher rate of interest and use it to stock investing.

#### 4.4 Regression Analysis

Regression analysis is a set of statistical techniques for evaluating the associations between a dependent variable and one or more independent variables. It is a statistical method that helps us to analyze and understand the relationship between two or more variables. This analysis predicts the value of a dependent variable, which we want to determine. The independent variables are the variables that are used to predict the value of the other variable. It primarily examines the estimated association between the stock price (NEPSE Index) dependent variable and macroeconomic variables independent variables using regression findings from various design variables.

**Table 4.4**

***Regression Results***

*The table 4.4 elucidates the results of the regression carried out from excel through multivariate regression analysis. It shows the linkage/relationship among the variables specifically in the research. The relation between the macroeconomic variables and stock market index explain the direction and magnitude of relationship among different pairs of macroeconomic variables during the period 2005/06 to 2019/20 A.D.*

Dependent variable: Stock index, lnind				
<b>Variables</b>	<b>Coefficients</b>	<b>Std. Error</b>	<b>t Stat</b>	<b>P-value</b>
Intercept	5.149569	1.416826	3.6345	0.0039
Lngdp	0.577131	0.502260	1.1490	0.2749
Lngds	0.022030	0.369747	0.0595	0.9535
Int	-0.068633	0.060329	-1.1376	0.2794
R-Square = 0.38128				
Adjusted R-Square = 0.21254				
No of observations = 15				
F-statistics = 2.25957 (0.13845)				

Table 4.4 Shows the model summary, ANOVA and Coefficients of variables. Model summary explains the total variation in the stock market explained by the macro economic variables GDP, GDS and Interest rate. The value of coefficient of multiple determinants R square is 0.38128. At a 95% confidence interval, this means that 38.12 percent of the fluctuation in share price can be explained by independent variables (GDP, GDS, and Interest rate) whereas the chance of error of the estimate is 0.47427. There is a positive relationship between the variables by 0.61748, as a result is complimented by the adjusted R square of about 21.25% which is essence of the proportion of total variance that is explained by the model. In addition, ANOVA Table shows that F value is about 2.25957 and a P-value or F (sig) that is equal to 13.84%.

The regression analysis results interpret that coefficient of GDP (lngdp) equal 0.57 indicates that for 1 percentage point change (increase) in gross domestic product results 0.57 percentage point increase in stock market index (lnind) and vice-versa, holding other things constant. This result is very much similar to the priory expectation as it satisfies the alternative hypothesis of positive relationship between the GDP and the stock index in the context of Nepal. Further, coefficient of GDS (lngds) equal 0.22 indicates that for 1 percentage point change (increase) in gross domestic saving results 0.22 percentage point also increases in stock market index (lnind) and vice-versa, *ceteris paribus*. The result satisfies the alternative hypothesis of positive relationship between the gross domestic savings and stock index. Regarding the regression coefficient of interest rate(int) as independent variable with the stock index of depended variable, it is negative with 0.06, which suggests that for a 1 percentage point increase in interest rate supports to decrease the stock market index by 0.06 percentage point and vice-versa, keeping other variables in the model unchanged. Therefore, the alternative hypothesis of negative relationship between the interest rate and stock index of Nepal has been accepted in this study.

This study has performed necessary analyses to identify the impact of macroeconomic variables on stock index. Thus, this multivariate regression result confirms the gross domestic product and gross domestic saving has positive explanatory power in explaining stock index of Nepal stock exchange. Whereas, interest rate has negative explanatory power in explaining stock index of Nepal stock exchange.

#### 4.5 Major Findings

- The status of GDP over the 15 year period from 2005/06 to 2019/20, the lowest value of GDP has recorded of Rs.1075 billion and the highest figure stood to be Rs.4063.3 billion. However overall trend exhibited the increasing over the time period.
- Similarly, GDS of 15 years from 2005/06 to 2019/20 presented on the trend line also exhibited the increasing. GDS at year 2018/19 increases at highest of Rs.621.88 billion whereas GDS at year 2005/06 shows the lowest value of Rs.96.514 billion.
- The interest rate has been found to fluctuate highly as the highest rate of 7.41% in 2010/11 whereas the lowest interest rate of Treasury bill of 0.13% at 2013/14 which has also clearly shown in Graphic presentation.
- Regarding the NEPSE Index, it has lowest point of 362.85 on year 2010/11 and there is highest point of 1718.15 at 2015/16, however the trend of stock index exhibited fluctuating.
- The adjusted R Square value of 0.381 has suggested 38.1 variation of stock market because of GDP, GDS and Interest rate.
- The analysis between the NEPSE Index and GDP has found positively correlated, indicating that development in real sector activity may contribute positively to stock market in the context of Nepal
- Likewise GDS and NEPSE Index have also found positively correlated suggesting these variables tend to increase together and vice versa.
- However, the Interest rate and NEPSE Index has found to be negatively correlated which indicates higher the Interest rate, lower would be the NEPSE Index and vice versa.
- Regression analysis of stock market in relation to GDP has also found positively associated. However, the relationship is not significant.
- Similarly, the regression analysis of stock market in relation to GDS has also found to be positively associated in context of Nepal. The result is found to accept alternative hypothesis of positive relation between gross domestic saving and stock index.
- Interest rate has found to have negative relationship with the stock market in regression analysis that the negative relationship with interest rate as hypothesized,

indicates that the stock return goes on decreasing when market interest rate increases. Investors will be reluctant to have borrowing at higher rate of interest and use it to stock investing.

#### **4.6 Discussion**

This study has performed necessary analyses to identify the impact of macroeconomic variables on stock index.

This study examines the effect of macroeconomic variables on stock market index of Nepal. To analyze the behavior of the Nepal Stock Exchange Index, it shows the relationship between stock market prices (NEPSE index) and macroeconomic variables such as Gross domestic product, gross domestic saving, and Treasury bill rate.

Macroeconomic variables existed with stock prices in the emerging market like Nepali stock market (Phuyal, 2016). Further, the study of Phuyal (2016) indicated that the Nepali stock market had a long run equilibrium relationship with a set of macroeconomic variables, like inflation rate, interest rate and remittance flow with the short term disequilibrium. Many researches were conducted studies earlier in Nepal to examine the impact of macroeconomic variables on stock market. The study of Shrestha & Subedi (2014), Phuyal (2016), Shrestha, & Phil (2018), Shrestha, (2019) supports the existence impact of macroeconomic variables on stock market. In contrast Shrestha & Phil (2018) study found result of Granger Causality test indicated that there exist no causal relationship between stock market index and macroeconomic variables in Nepalese stock market which adopted Johansen cointegration test to observe the long run equilibrium and Granger Causality test to identify the causal relationship among the variables.

This study includes different additional variables then other Nepalese research such as Gross domestic product and gross domestic saving. Where, Shrestha & Subedi (2014) study includes variable Consumer Price Index and Broad money. Similarly, Shrestha & Phil (2018) examined the long run equilibrium and causal relationship between macroeconomic variables (exchange rate, import payment, money supply, foreign remittance, and wholesale price index) and NEPSE index. Shrestha (2019) conducted research using variables Interest rate, wholesale price index, exchange rate and gold price. The global study of macroeconomic

variables impact on stock index includes namely crude oil price (COP), money supply (M2), industrial production (IP) and inflation rate (IR) in China and India in Hosseini et al. (2011) study. Mookerjee (1997) studied macroeconomic variables (narrow and broad money supply, nominal exchange rates and foreign currency reserves), that are especially pertinent in the context of a small open economy. Moreover, Samontaray et al. (2014) examines factors influencing the returns in the Saudi Stock Exchange (TASI) based on the macroeconomic variables of Saudi Economy introducing three independent variables considered for study are the Oil WTI, Saudi Exports and the PE Ratio.

The correlation result of this study indicates the positive correlation between Gross domestic product and NEPSE Index which means both variables tend to increase together and vice versa. Further, the regression analysis showed that coefficient of GDP ( $\ln gdp$ ) equal 0.57 indicates that for 1 percentage point change (increase) in gross domestic product results 0.57 percentage point increase in stock market index ( $\ln ind$ ) and vice-versa, holding other things constant. This result has similar result with Acikalin et al. (2008) at Istanbul Stock Exchange (ISE) with macroeconomic variables of Turkish economy supports the study which shows the consistent with the existing literature, changes in GDP have an effect on ISE index. In addition, Singh et al. (2011) in Taiwan test revealed that GDP seem to affect returns of all portfolios which supports this study. Amaresh et al. (2020) studies indicated that contrast result of GDP and Stock market performance which negatively correlated. The Augmented Dickey Fuller's unit root test, Ordinary Least Squares Regression and Correlation analysis were applied to the variables.

This study has further indicates the positive correlation between gross domestic saving and NEPSE Index which means these variables tend to increase together and vice versa. Regression Coefficient of GDS ( $\ln gds$ ) equal 0.22 indicates that for 1 percentage point change (increase) in gross domestic saving results 0.22 percentage point also increases in stock market index ( $\ln ind$ ) and vice-versa, *ceteris paribus*. Those results are very much similar to the priory expectation as it satisfies the alternative hypothesis of positive relationship with the stock index in the context of Nepal. Pal & Mittal (2011) examine relationship between the Indian capital markets and gross domestic savings (GDS) of Indian

economy finds there is co-integration between macroeconomic variables and Indian stock indices which is indicative of a long-run relationship, which support this study.

The empirical result of this study revealed that there exist negative relationship with interest rate, as hypothesized, indicates that the stock returns goes on decreasing when market interest rate increases. Regarding the regression coefficient of interest rate (int) as independent variable with the stock index of depended variable, it is negative with 0.06, which suggests that for a 1 percentage point increase in interest rate supports to decrease the stock market index by 0.06 percentage point and vice-versa, keeping other variables in the model unchanged. Therefore, the alternative hypothesis of negative relationship between the interest rate and stock index of Nepal has been accepted in this study. Also, empirical results of Shrestha & Subedi (2014) obtained from OLS estimations of behavioral equations reveal that the NEPSE index is found to respond negatively to treasury bills rate. Further, Shrestha (2019) concludes that the interest rate has more explanatory power for explaining variation in stock market index and they has greater effect on stock market index than exchange rate and gold price in Nepalese stock market. Ullah et al. (2017) examine the interest rate is all statistically significant in affecting stock market performance of SAARC countries. The review of global studies also support the finding that interest rate has negative relationship between the stock market index. Cankal, (2015) study in Turkey concludes that the stock price is responsive to the shocks interest rate in order. Ntshangase et al. (2016) study also shows the relation between the stock market and interest rate in South African is transmitted into the stock market. However, Acikalin et al. (2008) on the contrary to expectations, changes in the stock market index do affect interest rates.

The findings of this research result are in accordance with theoretical expectations as well as with the findings of the vast majority in the literature. This result can be utilized to better understand the behavior of the Nepalese stock market and to develop market-stabilization strategies.

## CHAPTER V

### SUMMARY AND CONCLUSION

#### 5.1 Summary

Stock market plays a major role in financial intermediation in both developed and developing countries. The stock market avail long-term capital to the listed firms by pooling funds from different investors and allow them to expand in business by offering investors alternative investment avenues to put their surplus funds. It helps in the promotion of economic investment. A rapid rise in the stock market index, on the other hand, is always causing for concern. If the increase in the index is not justified by the fundamentals, the rise will not be sustained, and the index will start falling, putting economic and financial stability at risk. The relationship between the stock market index and the macroeconomic variables that influence it must be recognized. . The stock markets of developing economies are likely to be sensitive to various macro-economic factors such as GDP, imports, exports, exchange rates etc. When there is high demand on financial products, as a constituent of financial market, and ultimately stock market needs to develop. Many factors can be a signal to stock market participants to expect a higher or lower return when investing in stock and one of these factors are macroeconomic variables. The stock market can be influenced by a number of factors. In the same way the macroeconomic variables like GDP, GDS and Interest rate were used in this research project to determine the impact of interest rate on share market of Nepal.

The study's objective was to inspect and examine the impact of macroeconomic variables on stock market. The relationship between stock prices and macroeconomic variables including GDP, GDS and interest rate is shown in this study for the implications in context of our country to whether the results support previous studies or not. In this report, we have used three independent variables to define relationship with the NEPSE index. This research examined at these implications in the context of our country to see if the findings matched earlier research or not. Gross Domestic Product and Gross Domestic Saving show the positive relationship with the stock market whereas there is negative relationship with the Interest rate. The annual data from the years 2005/06 to 2019/20 of 15 years for descriptive and causal comparative research design has been utilized.

## 5.2 Conclusion

This study has performed necessary analyses to identify the impact of macroeconomic variables on the stock market index. Stock market is growing in Nepal and exploring their scope in Nepalese market.

This study has measured the annual data of 15 years from 2005/06 to 2019/20. The relationship between macroeconomic variables like GDP, GDS and Interest rate and stock index (NEPSE Index) has been analyzed through correlation and impact of macroeconomic variables on stock index is analyzed through regression analysis. The correlation analysis shows positive relationship between GDP Index and NEPSE Index which indicates that higher the GDP, higher would be the NEPSE Index and vice versa. This result gives an appropriate indication that development in real sector activity may contribute positively to the stock market. Likewise, there is positive relationship between GDS and NEPSE Index which is 0.393 means these variables tend to increase together and vice versa. Also, the correlation between Interest rate and NEPSE Index has negative correlation that is -0.399 which indicates higher the Interest rate, lower would be the NEPSE Index and vice versa.

Similarly, the regression analysis results of this study interpret that coefficient of GDP ( $\ln gdp$ ) equal 0.57 indicates that for 1 percentage point change (increase) in gross domestic product results 0.57 percentage point increase in stock market index ( $\ln ind$ ) and vice-versa, holding other things constant. Further, coefficient of GDS ( $\ln gds$ ) equal 0.22 indicates that for 1 percentage point change (increase) in gross domestic saving results 0.22 percentage point also increases in stock market index ( $\ln ind$ ) and vice-versa, holding other things constant. At last, coefficient of Interest rate variable ( $int$ ) equal to -0.06 indicates that for 1 percentage point change (increase) in interest rate results 0.06 percentage point decrease in stock market index ( $\ln ind$ ) and vice-versa, holding other things constant. The result shows that there is a positive relationship between the GDP and NEPSE Index, and GDS and NEPSE Index respectively. Interest rate and NEPSE Index has a negative relationship with Stock Index.

### **5.3 Implication**

The study of macroeconomic variables on stock market in the context of Nepal is useful for different stakeholders such as investors, academicians, researchers and policy makers. Investors can make intelligent decision regarding market portfolio which decrease their exposure to risk. This study can be useful for the policy makers by using this kind of research output to form appropriate portfolio in order to enhance the capital market as well they can predict the full effect of current and upcoming policies and regulations of the country. Academicians, students of finance and economics also get benefited to know the main macroeconomic factor that affects the capital market. As this research is possible because of the previous studies, it would be beneficial for future research in the areas of macroeconomic factor of share index.

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# **IMPACT OF MACROECONOMIC VARIABLES ON STOCK MARKET INDEX**

**A Dissertation Proposal**

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## **1. Background of Study**

Macroeconomic factor and stock market possess the important relation in-between. It is well known that stock markets have been an important indicator of the financial sector in many countries. Potential and idle resources can be transferred into productive channels through financial instruments in an economy so that the economy can grow faster. Mostly, investors respond to the complexities of macroeconomic magnitudes and affect stock market performance. It is mostly perceived that stock markets and macroeconomic magnitudes are in close relationship. This leads to a number of researches on the subject in an effort to identify some possible interactions between stock returns and macroeconomic variables.

Macroeconomics is a branch of economics that studies how an overall economy, the market or other systems that operate on a large scale behaves. Macroeconomics studies economy-wide phenomena such as inflation, price levels, rate of economic growth, national income, gross domestic product (GDP), and changes in unemployment. Macroeconomics deals with the performance, structure, and behavior of the entire economy, in contrast to microeconomics, which is more focused on the choices made by individual actors in the economy (like people, households, industries, etc.). Macroeconomists develop models explaining relationships between these factors. Such macroeconomic models, and the forecasts they produce, are used by government entities to aid in the construction and evaluation of economic, monetary, and fiscal policy; by businesses to set strategy in domestic and global markets; and by investors to predict and plan for movements in various asset classes. According to Liu and Shrestha (2008), the stock market returns are influenced by a country's macroeconomic activities. Macroeconomics is the study of the economy as a whole. Understanding macroeconomics requires understanding its terms. Because macroeconomic systems are complex, economists build models to represent the interactions of the important components of the economy. These models depend on key macroeconomic variables with the greatest influence on the economy. Macroeconomics uses many terms that are common words, but have more specific meanings in macroeconomics, such

as investment and capital. Macroeconomics is also studied through econometric models, which depend on key macroeconomic variables.

Macroeconomic variables affect the performance of the stock market. Investors consider macroeconomic variables when they value stocks. Interest rates, inflation rate, GDP deflator and unemployment rate are very important among these macroeconomic variables which affect the performance of the stock market. Abedallat and Shabib (2012) examined the influence of macroeconomic variables such as investment and Gross Domestic Product as independent variables, and the movement of the Amman Stock Exchange index as the dependent variable. They concluded a correlation between the two macroeconomic indicators and between each of these variables and the stock index separately, implying that price movements on the Amman Stock Exchange are influenced by the movements of these two variables, and that both of these variables have an impact on the Amman Stock Exchange index movement. Furthermore, they observed that variations in investment had a stronger impact on the Amman Stock Exchange index than changes in GDP. This study is to identify the impact of macroeconomic variables on stock prices. It is believed that domestic economic fundamentals play determining role in the performance of stock market. Knowledge of stock market sensitivity to macroeconomic behavior of key variables and vice-versa is important in many areas of investments and finance. This study will be useful to understand this relationship between macroeconomic variables and stock prices.

Assuming that macroeconomic fluctuations pose influence on stock prices through their effect on future cash flows and the rate at which these cash flows are discounted, the relationship between stock prices and macroeconomic variables has been widely investigated in previous studies which are covered in literature review section. The arbitrage pricing theory (Ross, 1976) has been the primary motive of earlier studies and may be considered as global asset pricing models. Among macroeconomic factors included in the models are either monetary ones such as inflation, gross domestic product (GDP), gross domestic saving (GDS), Treasury Bills Rate etc. or real economic ones such as production, oil prices, etc. The studies aim to explain expected returns over time. Therefore, the motive and methodologies employed are based upon the understanding

that expected returns are associated with these variables. And, the direction of the relationship is assumed to be unidirectional, and from macroeconomic variables to stock returns.

First, policy makers would be able to predict the full effect of current and upcoming policies and regulations. Second, investors can make more informed decision when they fully understand this relation and thus decrease their exposure to risk. Third, if the public are aware of the changes that might happen in the economy or the financial market, the shock factor will be reduced and the public will be able to take protective measures (Abu-Libdeh & Harasheh, 2011). However, this attention was mainly focused on developed countries and only few researches investigated this relationship in developing countries. In a developed economy, the nature of the relationship between stock market and macroeconomic variables may differ from developing economies. Therefore, the aim of this study is to explore the nature of the relationship between three macroeconomic variables such as Gross domestic product, Gross domestic savings (GDS) and Interest Rates with the stock market index of Nepal.

Knowledge of stock market sensitivity to macro-economic variables is important in many areas of investments and finance which will be helpful to understand the relationship. Can the macroeconomic variables explain the changes in stock exchange returns? This is one of the main questions put forward by economists from all around the world. If so, how significant is the relationship between the macroeconomic data and the stock exchange returns as barometer of capital market returns and how this relationship may be analyzed. Given an ever more globalized world how strong is the dependence between the variations of the domestic capital market with the international market? For answering these questions this study shows the relationships between some variables specific to Nepalese economy and other external factors.

Macroeconomic factors can't be reliable indicators for stock market price movements in the Asian markets because of the inability of stock markets to fully capture information about the change in macroeconomic fundamentals. But most of studies suggest that there is inverse relation among interest rate and stock prices. Interest rate is the cost of

borrowing and used as a discount rate to discount future cash flows of the financial assets. Increase in interest rate causes decrease in stock prices because required rate of return on stocks rises which causes decrease in stock prices. Actions of monetary authorities have an important impact on stock prices and fluctuation of interest rates signals good or bad information to investors. Moreover, Gross domestic product and gross domestic saving are a realistic guide to a nation's well-being. Well-established stock market activates the investment projects and persuades the people for savings and this process will generate the economic activities in a country. The most imposing role of stock market is to work as a relationship between savers and borrowers. This helpful for the generation of saving form the huge group of small savers and these saving can be investment in profitable means. The stock market engaged the reallocation of money from the different firm of the economy. Economic strength in a country could be measured by macroeconomics variables. Inflation, interest rate, unemployment rate and Gross Domestic Product Deflator are some macroeconomics variables that show economic condition in Nepal. The impact of macro-economic variables on share prices is uncontrollable. The description and forecasting of macroeconomics require statistics on macroeconomic variables. The most prominent of these variables is the GDP, GDS, and Treasury bill rate (T-bill), but there are many others. Another important variable is interest rates, which is the cost of credit, the cost of borrowing money. Although there are many types of interest rates, the prime rate, which is the interest rate that a sound business qualifies for, is often published in the newspapers. Central banks have significant control over the interest rate, since they can set interest rates for other banks and they can also control the money supply. A greater supply of money leads to lower interest rates, while a contraction of the money supply raises rates. When the interest rate set by the central bank is already near 0 or even 0, then the central bank may turn to what is called quantitative easing, where money is created and placed within the economy by buying longer-term government debt from primary dealers of the central bank. Interest rates affect not only how much consumers will borrow, but it will also affect how much businesses will borrow, especially since businesses will only borrow if they can invest the money for a higher expected return than the interest rate on the borrowed funds.

Stock market is one of the chief factors in promoting the economic condition of a country. The countries stabilized economically can be measured using stock prices based on the stock market. Thus, it can be concluded that the performance of stock market is an integral part of the financial system of any economy, as it plays a role in channelizing funds, connecting savers and investors, which lead to economic growth of a country. Investors closely monitor the macroeconomic variables as they impact on stock market behavior. A stock market is a market which is known as loose network of economic transactions of stocks where the buyers and sellers are present for performing such transactions. Stock market is also known as equity market or share market. As we know, stock market plays crucial role in the growth of Nepalese economy. Stock market makes it possible for the economy to ensure long-term commitments in real capital. Such stock market provides long-term funds to listed companies in stock exchanges by pooling the funds from various investors which allow companies to expand their business and it provides investors an alternative investment opportunity.

Stock market plays a crucial role in the financial system of a country. It can be viewed as a channel through which resources are properly channelized. It enables the governments and industries to raise long-term capital for financing new projects. The stock markets of developing economies are likely to be sensitive to various macro-economic factors such as Gross Domestic Product, imports, exports, exchange rates etc. When there is high demand on financial products, as a constituent of financial market, and ultimately stock market needs to develop. Many factors can be a signal to stock market participants to expect a higher or lower return when investing in stock and one of these factors are macroeconomic variables. Thus, macro-economic variables tend to affect stock market developments (Panta, 2020).

The stock market index has a significant positive relationship with Gross Domestic Product, ER, and IR, but a negative relationship with inflation as wholesale price index (Nijam, Ismail &Musthafa, 2015).The study's significance is in determining the impact of macroeconomic factors on the NEPSE Index, which is represented by share prices reactions to these variables and therefore this becomes an indicator for investors to be able to reflect these variables on share prices. the equilibrium relationships between stock

markets and macroeconomic variables holds implications for investors, as well as for policy makers to recognize and to evaluate changes in economic conditions, or to forecast the future performance of the macro-economy. It's important to find the relationship between macroeconomic variable and stock prices to predict the market as well, based on the economic growth.

## **2. Problem Statement**

The study of macroeconomic variables has drawn various studies which most of them have concluded that fluctuations in the stock market returns continue to be directly interconnected with the various macroeconomic variables. According to Fama (1970), the return at the stock market is perceived in terms of market efficiency. The point of stock market efficiency depends on the speed and accuracy within which macroeconomic variable information is built into the stock market returns.

The empirical literatures have varying conclusions depending on the country of study, selected variables and period of study. From the studies it is challenging to take a broad view of the results because each study is unique depending on the stock market, the variables and the time of study. An agreement in the study doesn't exist as to the causes of the variations findings and conclusions. The purpose of the study was therefore to ascertain the effect of macroeconomic variables on stock market return at the Nepal Stock Exchange?

## **3. Objectives of Study**

The basic objective of this study is to determine the effect of macroeconomic variables on stock market index of Nepal. The other specific objectives are as follows:

- i. To examine the relationship between macroeconomic variables and stock market index.

- ii. To assess the effect of Gross Domestic Product on stock market index of Nepal.
- iii. To analyze the effect of Gross Domestic Saving on stock market index of Nepal.
- iv. To evaluate the effect of Interest rate on stock market index of Nepal.

#### **4. Rationale of Study**

The findings of this study will provide detailed comparative and empirical data on performance of the NEPSE alongside the various economic measurements parameters as well as provide important analysis and explanations on whether stock market performance should be considered as one of the leading indicator of the state of the economy of Nepal. The study should inform the relevant sectors of the economy on whether it is importance to allocate time and effort in making NEPSE an efficient market for allocation of scarce capital resources.

It will enhance the understanding of the various stake holders as each endeavor to play their roles to analysis and evaluate the worthwhile over the different time period in growing Nepal's capital markets. The study will add to the existing body of knowledge on the subject matter and also valuable for researcher for further research work.

#### **5. Brief Review of the literature**

In this chapter theoretical aspect of macroeconomic variables has been explored. Macroeconomic variables on the stock market play the main role for the financial decision making and financial management. In this chapter some academic course books, journal and other related studies have been reviewed. In addition independent studies carried out by well-known Nepalese financial exports and other is also taken into consideration. Momani and Alsharari (2012) examined the impact of macro-economic variables on the stock prices at Amman Stock Market of Jordan. Interest rate, national product, money supply and industrial product index we reanalyzed from 1992 to 2010 to discover the relationship between macro-economic variables and stock prices. As per the

results, interest rate impacts on the stock prices of Amman Financial Market significantly. The production index impacts the stock prices as well where its impact was negative for general and sectors index except the insurance sector, which had a positive impact.

Jahferand Inoue (2014) researched the relationship between stock market development and economic growth in Sri Lanka using quarterly data from 1996 to 2011. The stationarity of the data was tested using Augmented Dickey Fuller (ADF) test. It was found that all variables are stationary on first differencing. The relationships between economic growth and indicators of stock market development were investigated using Johansen co-integration tests, and Vector Error Correction Model. Co-integration results economic growth in Sri Lanka. VECM results show unidirectional causality from stock market development to economic growth despite different variables used to measure the stock market development. The findings supported the theoretical prediction that development of stock market would play a key role in economic growth. The research concluded that stock market development leads to the economic growth in Sri Lanka and efforts should be devoted to develop the stock.

Shrestha&Subedi (2014)examines the determinants of the stock index (NEPSE) in Nepal using monthly data for the period of mid-August 2000 to mid-July 2014. 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 chosen for the study such as Consumer Price Index, Broad Money and Treasury Bill Rate. Time series properties of selected variables have been examined. Moreover, empirical results obtained from OLS estimations of behavioral equations reveal that the NEPSE index is 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.

Ullah, Islam, Alam, & Khan (2017) studies that stock market is one of the most widely followed markets in the world with a horde of transactions facilitated every day. Thus, not surprisingly a plethora of research has been dedicated to understanding the nature of these markets and what factors affect their movements and performance in general. Several studies have postulated that macroeconomic variables do tend to significantly affect stock market performance, while other studies found inconclusive relation at best. It is also worth noting that most of these studies were conducted on developed markets and rarely touched on the developing markets. On this background, the objective of this study is to examine the significance of macroeconomic variables in effecting stock market performance of SAARC countries using the OLS multiple regression Model. We have used annual data for the period 2005-2015. The findings of the study showed that macroeconomic variables i.e. exchange rate, foreign currency reserve and interest rate are all statistically significant in affecting stock market performance of SAARC countries. Whereas, inflation and money do not have a significant relationship in affecting stocks market performance.

Amareesh, Anandasayanan, & Ramesh (2020) study that stock market a performance is considered as a significant indicator of financial and economic circumstances of a country. In a nutshell, a secured and regulated financial environment is being provided by the stock market where shares can be transacted at lower operational risk. The stock market also functions as a platform through savings, and investments of individuals are channelized into productive investment proposals. It allows capital formation and economic growth for the nation. The ultimate objective of this study is to examine the impact of macro-economic variables on stock market performance. The macro-economic variables (independent variables) used in this research study are Inflation, Interest Rate, and GDP. Stock market performance (All-Share Price Index) is the dependent variable. 120 Monthly observations from January 2009 to December 2018 had been taken for the study. The Augmented Dickey Fuller's unit root test, Ordinary Least Squares Regression and Correlation analysis were applied to the variables. The results of correlation analysis indicated that inflation and Stock market performance are positively associated meanwhile interest rate, and GDP and Stock market performance are negatively correlated. The Ordinary Least Square results showed that nearly 75% of the variation in

all share price index is explained by the three macroeconomic variables, GDP, TB and WPI. The study suggested some of the possible reasons for the positive impact of Inflation on the Colombo Stock market performance, and negative impact of Interest Rate on Stock market performance and recommended that efforts should be made to improve the Stock market performance.

## **6. Research Methodology**

### **6.1 Research Design**

The overall strategy for conducting research that provides a brief and logical plan to address a specific research topic through the gathering, interpretation, analysis, and discussion of data is referred to as research design. The research design for this study is descriptive and causal comparative research. The descriptive research design is used to gather information and find facts regarding the elements that influence stock market prices. The causal comparative research approach is utilized to determine and explain the directions, magnitudes, and forms of observed relationships among the variables studied, which included real Gross Domestic Product, Gross Domestic Saving, Interest rate with NEPSE index. The goal of this study is to determine the nature of relationship that exists between macroeconomic variables and the stock market index.

### **6.2 Population and Sampling procedure**

For analysis, the research utilizes time series data from macroeconomic indicators and stock market prices. The Nepal Stock Exchange Ltd (NEPSE), which was founded in 1993, is the country's only capital market with an index as a dependent variable. Sampling is taken as the available data of recent fifteen years i.e. fiscal year 2005/06 to 2019/20. GDP, GDS, and Interest rate are the macroeconomic variables analyzed in this study that meet the sampling design criteria. For performance evaluation, a sample size of yearly periodic tables of macroeconomic indicators is used.

### **6.3 Nature and Sources of data collection**

As the study is based on secondary information, they are obtained from various sources, such as NEPSE annual reports and Economic Bulletin provided by Nepal Rastra Bank (NRB). In addition, data is gathered through the use of text books, periodicals, and financial websites. According to the literature analysis, various macroeconomic factors influence stock market price, with GDS, Interest rate and real GDP being the most influential. The change in the NEPSE index gives information about the market rate of return. Nepal Rastra Bank (NRB) provides the necessary annual statistics on macroeconomic factors, while Nepal Stock Exchange Ltd provides data on stock market indexes (NEPSE). The annual interest rate of 91-days Treasury bill has been used as a proxy for interest rate. The time span for this study will be 2005/2006 to 2019/20020, as it will be about the impact of macroeconomic variables on stock market. This is the study's major point. The population and samples are same because the research is focused entirely on the relationship between the stock market and macroeconomic growth.

### **6.4 Research framework**

A research framework is a detailed representation of the structure of a research project plan in literature. We can establish the study's essential areas by looking at the structure. It also enables the formulation of relevant study questions and objectives. A literature review of existing studies and theories on the topic is used to develop the conceptual framework.

The theoretical basis of this study is represented in the diagram. Gross Domestic Product, Gross Domestic Savings, Treasury Bill Rate (Interest rate) are the independent variables, whereas NEPSE Index is the dependent variable.

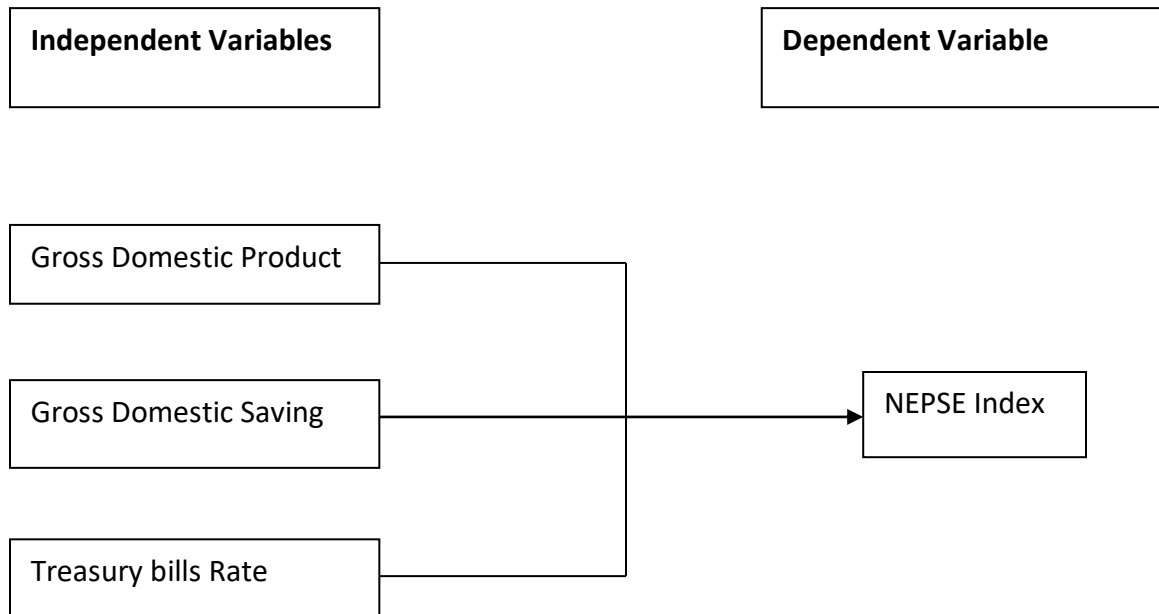


Figure 3.1: Research Framework

## 6.5 Definition of Variables

- **Gross Domestic Product**

The monetary worth of all finished goods and services produced inside a country during a certain period is referred to as the gross domestic product (GDP). GDP is a measure of a country's economic health that is used to determine its size and growth rate. GDP can be estimated in three different ways: through spending, output, or income. It can be adjusted for inflation and population to give you a more complete picture. GDP is usually computed on an annual basis, although it can also be computed on a quarterly basis. Although GDP is typically estimated on an annual basis, it can also be calculated quarterly. GDP is the sum of all private and public

consumption, government expenditures, investments, and exports minus imports within a specific territory.

- **Gross Domestic Saving**

Gross Domestic Saving (GDS) is defined as a surplus of income over expenditure. GDP minus final consumption spending equals Gross Domestic Savings. It's measured as a proportion of gross domestic product (GDP). As a result, domestic saving can be seen as a choice between today's consumption and tomorrow's consumption because it is a strategy to acquire money through time and increase living standards in the future. Stock markets contribute to mobilization of domestic savings by enhancing the set of financial instruments available to savers to diversify their portfolios. The sum of private and public savings is referred to as a country's national savings in economics. Gross Domestic Savings are calculated as GDP less total consumption. It is usually calculated by subtracting a country's income from its consumption and government purchases.

- **Treasury Bills Rate**

Treasury bill rate is a cost of holding shares that is experienced as an opportunity cost. Higher Treasury bill rates, which are caused by monetary policy or the government's desire to borrow more from the domestic market, usually have a negative impact on stock market returns. This is because the value of equity decreases as the interest rate rises. This constitutes a threat to investing in stocks because fixed income securities are now more appealing. This may reduce the desire of new and current investors to invest in equities or borrow money. This will result in an increase in the cost of running a business, hurting profit margins. Treasury bill rate also known as risk free rate is published monthly by NRB on their economic bulletin. From which monthly 91-days risk free rate is taken as the risk free rate of return for this study.

- **NEPSE Index**

The NEPSE Index is a measure of how much a representative sample of stocks has changed in value over time compared to a base date and value. Market avengers and

indices are used by security market researchers, prospective investors, and securities analysts to describe, evaluate, and study the behavior and movements of the securities market. The basic objective of NEPSE is to impart free marketability and liquidity to the government and corporate securities by facilitating transactions in its trading floor through member, market intermediaries, such as broker, market makers etc. It depicts the performance of stock market over the period. NEPSE Index can be used for forecasting the movement of macroeconomic variables of nations, because it serves for various other indices for rate of interest, GDP growth and so on.

## **6.6 Method of Analysis**

The systematic and careful evaluation of available evidence in order to draw specific conclusions and make an inference is known as analysis. The main goal of this research is to see if there is a link between the stock market index and macroeconomic variables. This has been performed using a variety of similar methods and techniques. Correlation analysis, regression analysis, hypothesis test have been used for this analysis. The empirical results have been estimated in the study by using annual data for the year 2005/06 to 2019/20 time period.

### **6.6.1 Statistical tools**

Planning, designing, collecting data, analyzing, deriving relevant interpretations, and publishing the research findings are all examples of statistical approaches used in conducting a study. Only when suitable statistical tests are employed are the results and inferences precise. In this work, the following methods and techniques are employed as statistical tools.

#### **a) Descriptive Statistics**

Before calculating the statistical analysis firstly we must assure the descriptive characteristics. Descriptive statistics statistically explain the data's features among the selected variables. It shows the macroeconomic variables used in this study. Gross Domestic Product, Gross Domestic Saving, Interest rate, and NEPSE Index are used for

computing descriptive statistics. The mean, standard deviation, minimum value, maximum value are computed using descriptive statistics for explore the nature and distribution of data.

#### **b) Correlation Coefficient**

Correlation coefficient is a method of statistical evaluation used to measure how strength of a relationship between two variables. The appropriate statistical tool to measure the relationship between two or more variables in quantitative terms is the correlation analysis. Correlation shows the degree of relationship between the variables. It is the square root of the coefficient of multiple determinations. Correlation can either be positive or it can be negative. When the correlation coefficient is positive, an increase in one variable also increases the other. When the correlation coefficient is negative, the changes in the two variables are in opposite directions, but the correlation coefficient always remains within the limit of +1 to -1.

#### **c) Regression Analysis**

In statistical modeling, regression analysis is a set of statistical processes for estimating the relationships between a dependent variable and one or more independent variables (often called 'predictors'). More specifically, regression analysis helps one understand how the typical value of the dependent variable (or 'criterion variable') changes when any one of the independent variables is varied, while the other independent variables are held fixed. Most commonly, regression analysis estimates the conditional expectation of the dependent variable given the independent variables – that is, the average value of the dependent variable when the independent variables are fixed. Less commonly, the focus is on a quintile, or other location parameter of the conditional distribution of the dependent variable given the independent variables. In all cases, the estimation target is a function of the independent variables called the regression function. In regression analysis, it is also of interest to characterize the variation of the dependent variable around the regression function which can be described by a probability distribution. In this analysis, regression model, have been used to analyze the predictive power of independent variables such as Gross Domestic Product, Gross Domestic Savings and Interest rate with NEPSE Index as independent variable.

The models used for regression analysis is presented as follows:

$$\ln ind_t = \alpha + \beta_0 (\ln gdp_t) + \beta_2 (\ln gds_t) + \beta_4 (int_t) + \varepsilon_t$$

Where,

$\ln ind_t$  = the log of the Nepal Stock Exchange Index (NEPSE) value for time t,

$\ln gdp_t$  = the log of gross domestic product for time t,

$\ln gds_t$  = the log of gross domestic saving for time t,

$int_t$  = interest rate of 91-days treasury bill for time t,

$\alpha$  = A constant; equals the value of Y when the value of X=0,

$\beta$  = Unknown parameter, the coefficient of independent variable; the slope of the regression line,

$\varepsilon_t$  = the residual error term.

At the end, the MS-Excel and SPSS Statistics software has been employed to obtain the research results.

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