

# **IMPACT OF MACROECONOMIC VARIABLES ON STOCK PRICES IN NEPAL**

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By

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## **CERTIFICATION OF AUTHORSHIP**

I hereby corroborate that I have researched and submitted the final draft of the dissertation entitled “Impact of Macroeconomic Variables on stock prices in Nepal”. The work of this dissertation has not been submitted previously for the purpose of conferral of any degrees, nor has it been proposed and presented as part of the requirements for any other academic purposes. The assistance and cooperation that I have received during this research work have 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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## ABBREVIATIONS

|       |  |
|-------|--|
| ADF   | Augmented Dickey-Fuller                |
| AMEX  | American Stock Exchange                |
| APT   | Arbitrage Pricing Theory               |
| ARDL  | Autoregressive Distributed Lag         |
| ASP   | Average Share Price                    |
| BSE   | Bombay Stock Exchange                  |
| CIP   | Capital International Perspective      |
| CPI   | Consumer Price Index                   |
| CRR   | Cash Reserve Ratio                     |
| CRSP  | Center for Research in Security Prices |
| DCF   | Discounted Cash Flow                   |
| DD    | Demand Deposits                        |
| DSE   | Dhaka Stock Exchange                   |
| DW    | Durbin Watson                          |
| ECM   | Error Correction Model                 |
| ECT   | Error Correction Term                  |
| EMH   | Efficient Market Hypothesis            |
| FDI   | Foreign Direct Investment              |
| FEVD  | Forecast Error Variance Decomposition  |
| GDP   | Gross Domestic Product                 |
| GNP   | Gross National Product                 |
| GRT   | Granger Representation Theorem         |
| GSE   | Ghana Stock Exchange                   |
| IFS   | International Financial Statistics     |
| IRF   | Impulse Response Functions             |
| INF   | Inflation                              |
| IR    | Interest Rate                          |
| KSE   | Karachi Stock Exchange                 |
| LIBOR | London Interbank Offered Rate          |

|        |  |
|--------|--|
| MCAP   | Market Capitalization  |
| NASDAQ | National Association of Securities Dealers Automated<br>Quotations |
| NEPSE  | Nepal Stock Exchange   |
| NRB    | Nepal Rastra Bank  |
| NYSE   | New York Stock Exchange  |
| OLS    | Ordinary Least Squares   |
| PP     | Phillips-Perron  |
| PPI    | Producer Price Index   |
| PPP    | Purchasing Power Parity  |
| RGDP   | Real Gross Domestic Product  |
| SEBON  | Securities Board of Nepal  |
| SEE    | Standard Error of Estimates  |
| SPSS   | Statistical Package for the Social Sciences                        |
| USD    | United States Dollar   |
| VAR    | Vector Auto Regression   |
| VECM   | Vector Error Correction Model                                      |
| WPI    | Wholesale Price Index  |
| TSE    | Toronto Stock Exchange   |
| VECM   | Vector Error Correction Model                                      |
| WPI    | Wholesale Price Index  |

## ABSTRACT

This study investigates the impact of key macroeconomic variables on stock prices in Nepal, focusing on the NEPSE Index as a measure of stock market performance. The purpose is to examine the short and long-term relationships between selected macroeconomic indicators, real gross domestic product (GDP), broad money supply (M2), inflation rate, interest rate, and stock market prices. The research employs a descriptive and causal-comparative research design. Descriptive statistics such as mean, standard deviation, skewness, and kurtosis are used to summarize data trends. Correlation, regression, and cointegration analyses are applied to assess the strength, direction, and equilibrium relationship between variables. Annual secondary data from 1994 to 2024 are sourced from Nepal Rastra Bank, NEPSE, and the World Bank. A long-term equilibrium link between the variables is revealed by cointegration analysis. Based on the findings, the study concludes that macroeconomic stability, particularly in real GDP and money supply, plays a vital role in the performance of the stock market. The results imply that investors should monitor macroeconomic indicators to make informed decisions, while policymakers should prioritize consistent economic planning. Future research should incorporate additional macroeconomic indicators such as exchange rates and foreign investment, and adopt advanced econometric models to capture nonlinear and time-varying dynamics.

**Keywords:** *Macroeconomic Variables, Stock Prices, NEPSE, Cointegration, GDP*

# CHAPTER I

## INTRODUCTION

### 1.1 Background of the study

A nation's economic development is greatly influenced by its stock market, which provides a venue for wealth generation, corporate finance, and resource allocation. To maintain market stability and promote economic progress, investors, legislators, and other stakeholders must have a thorough understanding of the factors affecting stock prices. Out of all the factors that affect stock prices, macroeconomic factors, including GDP, inflation, interest rates, and the money supply, are particularly important. All of these factors together represent the overall state of the economy and can affect market dynamics and investor behavior.

In recent years, Nepal's financial structure, an emerging and developing economy, has seen tremendous change. With continuous reforms, increasing financial awareness, and the expansion of financial institutions, Nepal's capital market has progressively acquired momentum. Among its multiple components, the Nepal Stock Exchange (NEPSE) has emerged as a vital pillar of the financial system, as well as a leading indicator of market performance and investor sentiment. It acts as both a platform for trading securities and a reflection of the overall economic situation. Despite its growing significance and increased engagement by institutional and common investors, there is still a significant gap in the full understanding of Nepal's stock market. There is particularly little empirical study on how macroeconomic variables like GDP, inflation, interest rates, and money supply influence or correlate with stock price changes in Nepal. This lack of clarity presents a problem for policymakers, investors, and academics looking to analyze market patterns and make informed financial decisions based on economic data. As a result, further investigation of the dynamic link between macroeconomic fundamentals and stock market behavior in Nepal is both important and necessary.

According to earlier research conducted in international settings, macroeconomic factors have a major direct or indirect impact on stock values. For instance, while changes in interest rates might affect investor preferences and the cost of capital, rising inflation can reduce purchasing power and company earnings. GDP growth frequently indicates the state of the economy as a whole, which affects investor confidence. The impact of market

risk factors on stock prices is debated, with some arguing that other factors also play a role. The literature on the correlation between macroeconomic indicators and stock prices is wide and varied. Thapa (2023) found that stock returns are positively and considerably impacted by real GDP and the broad money supply, whereas inflation and interest rates have the opposite effect.

While there is a correlation between stock prices and certain macroeconomic variables (Fama & Schwert, 1977), most studies have been done in developed economies. Macroeconomic factors are not reliable indicators for stock market price fluctuations in less developed nations, such as Asian markets, due to their limited ability to reflect changes in macroeconomic fundamentals (Fung & Lie, 1990). Research on developed nations may not be applicable to smaller, developing, or underdeveloped capital markets.

Due to an absence of empirical studies, the relationship between macroeconomic factors and stock prices in Nepal is not as well understood. By examining the effects of important macroeconomic factors on Nepali stock prices, this study seeks to close this gap. For investors, lawmakers, and financial institutions, the research's conclusions may offer important information that will help them make wise choices and improve market efficiency. Furthermore, creating regulations that guarantee a steady and favorable climate for Nepal's stock market expansion and economic development requires a knowledge of these relationships. In addition to addressing the particular possibilities and challenges faced by the Nepalese stock market, this study aims to add to the body of knowledge by examining macroeconomic issues and their impact on stock prices in Nepal.

The stock market is an essential component of a nation's financial system. It can be thought of as a gateway for appropriately channeling resources. It makes it possible for businesses and governments to raise long-term funds to support innovative initiatives. The GDP, inflation, interest rates, and other macroeconomic variables are likely to have an impact on the stock markets of developing nations. The stock market must eventually grow when there is a large demand for financial products as a component of the financial sector. Macroeconomic variables are one of several elements that can indicate to stock market participants that they should anticipate a better or lower return when making stock investments. Thus, developments in the stock market are often influenced by macroeconomic factors. Whether macroeconomic indicators have an effect on the stock

market is a topic of debate. Some thought that economic growth was positively impacted by financial development. A nation with a strong financial sector fosters economic expansion, which raises and sustains the demand for financial products. Economic activities and industry growth both increase when the economy begins to expand. Increased economic activity typically affects GDP, imports, exports, inflation, employment, and exchange rates, among other things. The development of the stock market is ultimately influenced by macroeconomic factors when there is a significant demand for financial products, which are a component of the financial market. However, for decades, empirical scholars have been debating how macroeconomic variables affect stock markets. While some scholars have successfully demonstrated a positive correlation between macroeconomic factors and stock market development, others contend that there is just a weak correlation.

Some academics argue that there is only a limited association between macroeconomic conditions and stock market development, while others have successfully shown a favorable correlation. Generally speaking, the stock market is highly information-responsive and volatile. Stock markets in emerging economies are likely to be influenced by a variety of factors, including changes in economic activity volume, political and global economic conditions, and other macroeconomic variables.

An essential component of a country's economic structure, the stock market facilitates investment opportunities, mobilizes and distributes financial resources, and boosts economic progress. Numerous factors, such as investor behavior, company-specific traits, and general macroeconomic conditions, affect stock prices, which are a crucial indicator of market performance. Macroeconomic factors are especially important among these since they represent the general state of the economy in which financial markets and business's function.

In the end, this research advances our knowledge of how macroeconomic factors influence stock market performance, especially in developing nations like Nepal. It highlights the necessity for a comprehensive strategy that examines the relationship between macroeconomic factors and stock market activity while taking local economic features into account. Stakeholders can use this research to better understand Nepal's financial markets and use that information to support resilient financial systems and sustainable economic growth.

## 1.2 Problem Statement

The stock market is an indicator of a country's economic health, reflecting investor attitudes and the general economic climate. Stock prices are naturally volatile and are impacted by a wide range of factors, including macroeconomic variables such as interest rates, inflation, GDP, and the broad money supply. In industrialized economies, substantial research has been done to better understand the complex relationship between macroeconomic variables and stock values. However, in developing economies such as Nepal, where the stock market is still evolving, this relationship is poorly understood and lacks strong empirical evidence.

Nepal's stock market, principally represented by the Nepal Stock Exchange (NEPSE), has experienced rapid expansion in recent years, capturing the interest of investors, politicians, and researchers alike. Despite its expansion, the market is exposed to a variety of economic and structural difficulties. Nepal's economy is heavily dependent on remittances, agriculture, and international aid, making it vulnerable to external shocks and macroeconomic swings. As a result, the relationship between macroeconomic variables and stock prices in Nepal may differ from that observed in other nations, demanding context-specific research. Studies undertaken in the United States and other mature countries suggest that inflation and interest rates have a negative impact on stock returns, whereas GDP growth and money supply have a positive impact (Mukherjee & Naka, 1995). Similar findings have been observed for emerging economies such as India, Bangladesh, and Pakistan, albeit with variances due to differences in economic structures, policy frameworks, and market maturity levels (Bhattacharya & Mukherjee, 2002). However, in Nepal, research into the relationship between macroeconomic variables and stock market performance is weak and scattered. While the Nepal Stock Exchange (NEPSE) has increased in prominence over the years and now plays an increasingly crucial role in capital formation and investment diversification, there is a lack of a comprehensive, evidence-based understanding of the macroeconomic dynamics that affect its performance. Empirical evidence from numerous countries supports these theoretical predictions. For example, Mukherjee and Naka (1995) discovered that macroeconomic variables such as currency rates, inflation, and industrial production have a considerable impact on stock prices in Japan. In emerging markets, Bhattacharya and Mukherjee (2002) found a long-term association between macroeconomic variables and

stock prices in India, while Alam and Uddin (2009) discovered a substantial inverse relationship between interest rates and stock prices in South Asian countries. These findings support the idea that stock markets are sensitive to macroeconomic conditions, and that knowing this relationship is critical for both short-term market timing and long-term investing strategies. Sharma and Neupane (2020) examined the short-run effects of macroeconomic variables but did not explore potential long-run equilibrium correlations. These limitations underscore the need for more thorough, methodologically sound, and longitudinal research that can provide additional insight into the dynamic interaction between macroeconomic variables and stock prices in Nepal.

Most previous research in Nepal are descriptive in character or focuses on short-term correlations without investigating long-term dynamics or causality between variables (Bhattarai, 2018). As a result, policymakers, investors, and financial analysts have insufficient analytical tools and insights to forecast market movements or make informed judgments based on macroeconomic patterns.

A study of the existing literature finds that there are few studies that look at the impact of macroeconomic variables on stock prices in Nepal. Most present research in this field has a severe disadvantage in that it is either very subjective in interpretation or narrowly targeted in scope. Many studies focus on certain time periods, individual macroeconomic indicators, or isolated market occurrences, limiting their capacity to provide a full understanding of the complex and changing link between macroeconomic variables and stock market performance. As a result, these studies frequently fail to capture the larger economic dynamics and long-term interconnections that develop over long-term periods. This narrow methodology may miss crucial trends, lag effects, or structural changes in the economy, decreasing the findings' application and usefulness for policy development, investment strategy, and academic research. There is an increasing demand for more comprehensive, data-driven, and longitudinal assessments that can reveal deeper, longer-term links between economic fundamentals and stock market behavior.

Furthermore, there is a scarcity of thorough research that incorporates several macroeconomic factors to examine their combined impact on stock prices. This knowledge gap causes issues for both investors, who rely on precise and reliable information to make informed judgments, and policymakers, who need to implement successful regulatory and economic policies.

Several specific elements of Nepal's economy and stock market complicate this relationship. First, the market has poor liquidity and inadequate diversification, with a high concentration of investments in the banking and financial industries. Second, macroeconomic data in Nepal is sometimes inconsistent and vulnerable to delays, making an empirical study difficult. Third, investor behavior in Nepal is driven not just by economic fundamentals, but also by sociopolitical variables such as policy uncertainty and governance issues.

The research intends to answer the following main questions:

1. How do macroeconomic variables like GDP, broad money supply, inflation rate and interest rate affect stock price in Nepal?
2. What is the direction and degree of the relationship between specific macroeconomic variables and the stock market index?
3. Is there a long-run equilibrium relationship between macroeconomic variables and stock market prices?

### **1.3 Objectives of the study**

The main objective of this research is to investigate and measure the effects of important macroeconomic factors on Nepali stock prices. Specific objectives include:

- i. To investigate how macroeconomic variables, including GDP, broad money supply, inflation rate, and interest rate, affect stock values in Nepal.
- ii. To analyze the direction and degree of relationship between specific macroeconomic variables and the stock market index.
- iii. To examine a long-term equilibrium between Nepal's macroeconomic variables and stock market prices.

### **1.4 Hypotheses**

In order to ascertain the type and degree of correlations between the macroeconomic factors like GDP, inflation, interest rate, broad money supply, and stock prices as measured by the NEPSE Index, this study aims to evaluate particular hypotheses derived from economic theory and actual data from both local and global contexts.

**Table 1***Hypotheses with expected sign*

| Hypothesis No. | Variable                    | Existing Hypothesis   | Expected Sign             | Literature Support  |
|----------------|-----------------------------|---|---------------------------|---|
| 1.             | Real GDP                    | There is a significant and positive relationship between GDP and stock prices.                | Positive (+)              | Fama (1981), Geske and Roll (1983), Chen et al. (1986), Mukherjee and Naka (1995) |
| 2.             | Inflation                   | There is a significant and positive relationship between inflation and stock prices.          | Positive (+)              | Maysami et al. (2004), Sharma and Neupane (2020)                                  |
| 3.             | Interest Rate               | There is a significant and negative relationship between interest rates and stock prices      | Negative (-)              | Mishkin (2001), Pilinkus (2010), Abdullah and Hayworth (1993)                     |
| 4.             | Broad Money Supply          | There is a significant and positive relationship between broad money supply and stock prices. | Positive (+)              | Chen et al. (1986), Maysami and Koh (2000), and Hsing (2011)                      |
| 5.             | All Macroeconomic Variables | There is a long-run relationship between macroeconomic variables and stock prices             | Cointegrated Relationship | Engle and Granger (1987), Mukherjee and Naka (1995), Joshi (2012)                 |

The purpose of this study is to examine the following hypotheses based on the existing hypotheses:

The first hypothesis

H<sub>1</sub>: There is significant and positive relationship between GDP and stock prices.

The second hypothesis

H<sub>1</sub>: There is significant and positive relationship between inflation and stock prices.

The third hypothesis

H<sub>1</sub>: There is significant and negative relationship between interest rate and stock prices.

The fourth hypothesis

H<sub>1</sub>: There is significant and positive relationship between broad money supply and stock prices.

The fifth hypothesis

H<sub>1</sub>: There is long run relationship between macroeconomic variables and stock prices.

### **1.5 Rationale of the study**

The scarcity of empirical studies looking at the impact of macroeconomic variables on stock prices in Nepal reveals a considerable gap in both academic literature and real-world financial decision-making. While extensive research has been performed in established and emerging economies to investigate how factors such as GDP, inflation, interest rates, and money supply affect stock market performance, Nepal has yet to provide a substantial body of empirical information on the subject. The absence of specialized research makes it difficult for investors, politicians, and financial institutions to make informed judgments based on Nepal's specific economic characteristics and market behavior. Furthermore, without a thorough understanding of how macroeconomic dynamics affect the Nepal Stock Exchange (NEPSE), it is difficult to design effective investment plans, monetary policies, or regulatory frameworks that promote capital market development. This study seeks to fill this gap by offering a systematic and complete analysis, thereby contributing to the growth of Nepal's stock market and overall economy. This research will pave the path for more informed investment and policy decisions by addressing the particular issues and dynamics of Nepal's stock market, promoting long-term economic growth and financial stability.

This research is valuable for various reasons. First, it seeks to fill a significant gap in the academic literature by presenting empirical data on how key macroeconomic indicators influence stock price behavior in Nepal. Unlike larger and more liquid markets, the Nepal Stock Exchange (NEPSE) has distinct characteristics such as low market depth, a small

investor base, and a strong concentration of banking and insurance equities. These considerations may cause macroeconomic variables to affect NEPSE differently than in more mature economies, emphasizing the necessity for context-specific research.

Second, the study's findings are likely to have practical applications for market participants. Understanding macroeconomic impacts can help both individual and institutional investors improve their investment strategies and portfolio management. Recognizing the direction and intensity of interest rate-stock price connections, for example, might assist investors in adjusting their positions in anticipation of monetary policy changes.

Furthermore, the study adds to the broader discussion about market efficiency in emerging nations. Using time series econometric techniques such as correlation analysis, regression, and cointegration models, the study can determine if NEPSE efficiently integrates macroeconomic information over time, providing value to both theory and empirical finance.

Finally, the findings of this study will lay the foundations for future research into Nepal's financial system. Given the limited area and mixed conclusions of prior local research, this thesis provides a more comprehensive and up-to-date perspective by using longer time series data and various variables. It is expected to spark more scholarly attention.

### **1.6 Limitations of the study**

While this study aims to provide thorough insights, a few limitations must be acknowledged:

- i. Macroeconomic and stock market data in Nepal may be inconsistent, partial, or delayed, compromising the robustness.
- ii. The small size, liquidity, and diversification of Nepal's stock market may limit the applicability of findings to other contexts or emerging markets.
- iii. The study may not fully account for global economic trends, external shocks, and geopolitical events that have an indirect impact on Nepal's stock market.
- iv. The chosen timeframe for the analysis may omit long-term trends or recent changes that could affect the observed association.
- v. The econometric models used in the study may have underlying assumptions and constraints, that may affect the accuracy of the results.

## **CHAPTER II**

### **LITERATURE REVIEW**

#### **2.1 Introduction**

One of the main areas of study in financial economics has been the connection between stock prices and macroeconomic factors. The movements of the stock market are significantly influenced by macroeconomic factors like GDP, inflation, interest rates, exchange rates, and the money supply. These factors affect investor expectations and market performance and act as stand-ins for a country's economic health. Policymakers, investors, and scholars must understand the effects of these factors in Nepal, where the stock market is still in its infancy. This overview of the literature combines research from both Nepal and around the world to provide readers with an in-depth understanding of the subject.

#### **2.2 Theoretical Concept**

(Fisher, 1930) marked the beginning of current research on this topic, which describes the impact of interest rates and inflation on stock market prices. This model has been extended to include macroeconomic and structural variables that impact stock market pricing. Some models describe stock valuation and movements. Dow Theory, Random Walk Theory, and the Efficient Market Hypothesis are key models.

##### **2.2.1 Dow Theory**

Dow theory is an important study in the technical analysis of stock pricing. Long-term economic cycles, which a few traders may influence, drive the primary trend. The equilibrium between supply and demand, which establishes stock prices, is influenced by all market participants. Despite criticisms of the theory, Dow's essential notion remains true: the simplest approach to profit in the market is to follow the primary trend, which is the easiest to identify and foresee. While some traders may earn money on shorter trends, most do not make enough owing to the effort invested.

(Dow, 1900) created the Dow Theory, a framework for assessing and comprehending changes in the stock market. This is one of the oldest and most significant types of technical analysis. The concept is founded on the idea that the stock market reflects the overall health of the economy. The economy follows two basic primary trends: bullish

(upward) and bearish (downward). By examining changes in stock market index prices, Dow Theory detects and forecasts these patterns (Benjamin, 1942).

### **2.2.2 Random Walk Theory**

(Malkiel, 1973) invented Random Walk Theory, which implies that stock values fluctuate at random, making future movements impossible to forecast. This hypothesis is founded on the belief that markets are efficient and cannot be beaten or predicted. According to Malkiel's hypothesis, stocks follow a random and unpredictable course, with the likelihood of a stock's future price rising or falling being equal. He believes that technical and fundamental analysis are usually ineffective and that long-term purchase and hold methods work best. Some believe that the financial scene has evolved dramatically since Malkiel's time, with easy access to news and market quotes, making investing no longer a game for the wealthy.

### **2.2.3 Efficient Market Hypothesis**

(Fama, 1970) invented the phrase efficient market to define a market price that incorporates all available information. According to the efficient-market hypothesis (EMH), financial markets are informationally efficient, which means that it is impossible to consistently outperform average market returns on a risk-adjusted basis. However, empirical research has mostly inferred market efficiency based on the observed independence of successive price adjustments. There are three stages of the EMH: weak, semi-strong, and powerful. In weak-form efficiency, future prices cannot be predicted by evaluating past prices, and prices move randomly. In semi-strong-form efficiency, share prices respond quickly and fairly to publicly available new information, preventing excess returns from being obtained. In strong-form efficiency, share prices represent all information, both public and private, and no one can generate excessive profits. The strong form of the Efficient Market Hypothesis (EMH), which maintains that all information, both public and private, is fully reflected in stock prices, is more widely accepted in theory and policy discourse, despite the mixed and frequently inconclusive evidence of the weak and semi-strong forms of the EMH.

The EMH, first proposed by Fama in 1970, states that stock prices fairly represent all available information. Therefore, stock prices should take into account macroeconomic factors as information sources.

### **2.2.4 Theories related to macroeconomic variables**

(Keynes, 1936) carried out research where higher GDP implies more aggregate demand, which leads to increased output and employment. As GDP rises, so do firm revenues and profits, which have a favorable impact on stock prices due to enhanced investor mood and greater predicted dividends. A fall in GDP, on the other hand, signifies economic contraction, which lowers investor confidence and leads to lower stock prices (Barrows & Naka, 1994).

Inflation is the widespread increase in prices throughout an economy. (Fisher, 1930) claimed that nominal interest rates and anticipated inflation were directly correlated. As inflation rises, nominal interest rates rise to preserve real returns, raising the discount rate used to estimate future cash flows and frequently lowering stock prices (Sharpe, 2002). According to Keynesian theory, mild inflation can promote production in the short run by raising corporate profits. However, high inflation reduces consumers' purchasing power and boosts input costs, ultimately reducing company profitability and depressing stock prices (Mishkin, 2007). Furthermore, rising inflation frequently drives central banks to implement contractionary monetary policies, lowering stock values (Fama, 1981).

Interest rates are a major factor determining stock values. The liquidity preference theory, developed by Keynes in 1936, highlighted the role of interest rates in determining investment levels. High interest rates make borrowing more expensive, preventing company investment and lowering predicted future earnings, potentially leading to lower stock prices (Modigliani & Cohn, 1979). Lower interest rates, on the other hand, cut borrowing costs, promote investment, and enhance consumption, often leading to an increase in stock values. Rising interest rates, according to the Discounted Cash Flow (DCF) model, increase the discount factor, reducing the present value of future cash flows and, as a result, lowering stock valuations (Humpe & Macmillan, 2009).

Exchange rates reflect the worth of one country's currency in comparison to others and can have an impact on stock prices, particularly in trade-dependent economies. According to Purchasing Power Parity (PPP), exchange rates adapt to account for price variations across nations (Madura, 2011). A decrease in the home currency can improve export competitiveness, raise foreign revenues for multinational corporations, and so boost stock prices (Aggarwal, 1981). Currency appreciation, on the other hand, might raise the cost of

exports, reduce company profitability and lower stock prices (Jorion,1990). Keynesian approaches also acknowledge the impact of exchange rates on trade balances, which can alter national revenue and, as a result, stock market performance.

The money supply refers to the entire amount of monetary assets available in the economy. According to Keynesian economics, increasing the money supply reduces interest rates, promoting investment and consumption, resulting in higher output and employment (Keynes, 1936). This, in turn, can increase business profits and raise stock prices. In the long run, however, the Quantity Theory of Money (QTM), which is championed by classical economists such as Fisher, implies that excessive money supply expansion causes inflationary pressures. Higher inflation may generate uncertainty and have a negative influence on stock prices if not accompanied by equivalent economic growth (Fama, 1981).

### **2.3. A Review of Empirical Evidence**

Empirical research on the effects of macroeconomic factors on stock prices is reviewed in this section.

#### **2.3.1 Macroeconomic Variables and Stock Prices**

The stock market's price is influenced by macroeconomic variables that represent the state of the economy. Industrial production, inflation, risk premiums, and term structure all have a considerable impact on stock returns.

#### **Examining Key Research on Macroeconomic Factors Up to 2000:**

A summary of the key findings from the major studies on macroeconomic factors influencing stock prices up until the year 2000 is provided. (Fisher, 1930) carried out research on how stock market prices behaved and described how inflation and the market interest rate impacted stock prices. The nominal rate of interest increases in accordance with the rate of inflation. As a result, over time, the real rate of interest stayed constant. Therefore, it was determined that the rate of inflation and stock prices had a positive one-to-one relationship. (Schwert, 1981) carried out an analytical investigation on how stock prices responded to fresh information regarding inflation. By analyzing the daily returns from 1953 to 1978, the author expanded the body of evidence supporting the link between stock returns and inflation. Although the size of the reaction was humble, the study found

that stock markets reacted negatively to the news of unexpected inflation in the CPI. It made the assumption that the stock markets did respond to unexpected inflation around the time of the CPI release, but not during the CPI sampling period, which was a few weeks before the announcement date. Gertler and Grinols (1982) examined the monthly returns on 712 securities traded on the New York Stock Exchange between January 1970 and January 1980 in order to determine the risk premium for common stock returns linked to inflation and unemployment. The study found a statistical correlation between the macroeconomic environment and expected security returns. The regressions' explanatory power was greatly increased by including inflation and unemployment. Additionally, on average across the period, every macroeconomic element was statistically significant. The findings specifically showed a negative correlation between stock returns and inflation, encompassing the market as a whole. (Gultekin,1983) examined monthly inflation rates for each of the 26 countries from January 1947 to December 1979 in an effort to examine the relationship between inflation and common stock returns. The percentage changes in the consumer price indices recorded in the International Monetary Fund's International Financial Statistics (IFS) were used to compute the inflation rates.

Bittlingmayer (1998) interrogated stock volatility and product after a German political shock. The study examined how political events affected stock prices during and after World War I. The study analyzed data using multiple regressions. Both output and stock values are impacted by political unpredictability. Political outcomes have an impact on both the business cycle and the stock market.

The Swiss-based investing service Capital International Perspective (CIP) and the IFS report on stock market indexes were the sources of the stock market returns. Since most of the regression coefficients were negative, the study's use of time series regressions for the January 1947-December 1979 period showed no obvious positive relationship between nominal stock returns and inflation rates. Additionally, the analysis found no consistent correlation between inflation and stock gains over time. Between 1953 and 1984, (Chen et al.,1986) discovered a long-term equilibrium link between stock prices and pertinent macroeconomic variables, including inflation, industrial production, and interest rate structure. The analysis found that the projected stock returns could be substantially explained by industrial production and a measure of unexpected inflation. Cozier and Rahman (1988) examined quarterly data on inflation and real activity for the

years 1958 to 1983 in an effort to assess the link between stock returns and these variables in the setting of Canada. The study's findings demonstrated a negative correlation between inflation and real stock returns. According to the study, if such a relationship were systematic, it might indicate non-neutrality and indicate that common stocks are not a suitable inflation hedge. Likewise, it investigated the causality of the relationship and discovered no proof that real stock returns were influenced by inflation. The causality tests specifically indicated that real stock returns were unstable in relation to inflation rates. (Schwert, 1989) investigated the connection between stock volatility and actual and macroeconomic volatility. The study investigated whether the volatility of financial assets could forecast macroeconomic volatility or vice versa using the daily estimates of returns from February 1885 through December 1927 on the Dow Jones composite portfolio and the monthly standard deviation of stock returns on Standard and Poor's composite portfolio from January 1928 through December 1987. The study employed monetary base growth, industrial production growth, Producer's Price Index (PPI) inflation, and other macroeconomic indicators. The analysis found a substantial correlation between PPI inflation and stock returns for the 1953 to 1987 subperiod. It was determined that the PPI lacked the ability to explain the return on financial assets for the remainder of the time. Thus, the study found limited evidence that the volatility of stock and bond returns could be predicted by macroeconomic volatility. (Chen, 1991) examined the connection between shifts in financial investment possibilities and shifts in macroeconomic variables in the context of the US. Macroeconomic factors, including the term structure, the default spread, the dividend yield, the T-bill rate, and the lagged production growth rate, might all be used to predict the market excess returns, according to the study. Mukherjee and Naka (1995) presented an empirical investigation of the dynamic interaction between macroeconomic variables and the Japanese stock market.

Six macroeconomic variables and seven equations were used in the study, and a vector error correction was applied. They observed that there is a long-term equilibrium relationship among the Japanese stock market and the six macroeconomic factors: exchange rate, money supply, inflation, industrial production, long-term government bond rate, and call money rate. In many nations, including Nepal, inflation has become a more pressing issue in recent history. Solnik (1983) studied the connection between inflation and stock prices both theoretically and empirically.

There has been much discussion and debate over the dynamic linkages between macroeconomic factors and stock market results. The use of models that claim that share prices can be expressed as predicted discounted cash flows is essentially the main topic of discussion. Accordingly, the required rate of return and anticipated cash flows is what determine share prices (Elton & Gruber, 1991). Therefore, it is reasonable to assume that economic factors that affect necessary returns and future cash flows will also affect share values.

Hill and Schneeweis (1983) assessed how the Three Mile Island nuclear accident affected publicly available companies stock returns. According to their analysis, non-nuclear companies were less affected by the catastrophe than nuclear-based utilities were.

A study by Barrett et al. (1987) looked at how the stock market responded to 78 fatal commercial aircraft incidents that occurred between January 1962 and December 1985. The study discovered a notable drop in the stock price on just one full trading day following the occurrence using a market model. Even if the crash happens in a far-off place, the market seems to absorb the new knowledge quickly.

Shelor et al. (1990) looked at how the California earthquake affected the stock value of companies in the real estate sector. The results demonstrated that the market receives crucial new information from earthquakes, which is reflected in statistically significant negative stock returns for companies that operate in the affected area. The earthquake largely had no effect on real estate-related businesses that operated in other locations. The response of the US market to the Chernobyl nuclear accident was studied. This study indicates that utility investors rightly saw Chernobyl as the beginning of a new age for nuclear power in the United States, and the stock market promptly realized the implications for utility stocks.

According to 1996 research on the Challenger catastrophe by Blose et al., there was a notable negative strange return on the stocks of NASA contractors on the day of the explosion, and any spreading effect was restricted to a small group of NASA contractors.

Angbazo and Ranga (1996) examined the impact of Hurricane and a subsequent change in the regulatory landscape on the stock prices of 48 publicly traded property-liability insurers. Regardless of whether these companies had any loss exposure in the hurricane-affected areas, Angbazo discovered that Hurricane and the associated laws had a

significant impact on the majority of insurers, causing a contagion effect across the industry.

Amoako-Adu (1983) explored how taxes affected stock prices. Using the event study approach, the researchers examined the effects of capital gains taxes in Canada. The influence of the implementation of capital gains taxes in 1971 and later modifications in 1977 on stock prices was investigated in the study using monthly data. According to the study, portfolios with high and low dividend yields listed on the Toronto Stock Exchange (TSE) in Canada were affected differently by changes in the proportionate taxation of dividends and capital gains. The value of high-dividend stocks increased significantly, but the impact of tax adjustments on low-dividend equities was negligible. The findings indicate that while setting stock prices, investors take the personal tax adjustments into account.

The findings of the Bosch et al. (1998) study provided unmistakable proof that the stock market causes companies, particularly airlines implicated in crashes, to lose value when unfavorable product safety information is released. However, the source of the disaster airline's stock reaction is still up for debate, and air crash studies have so far shown little to no evidence of effects on other airlines.

(Lamb,1998) investigated hurricane-related market efficiency. The findings suggest that the stock market demonstrated the capacity to differentiate between property and casualty companies according to their level of loss risk and the severity of hurricanes.

Pethe and Karnik (2000) investigated the connections between stock prices and key macroeconomic factors, including the prime lending rate, exchange rate, narrow and broad money supply, and industrial output index, in the context of the Indian stock market. According to the findings, not a single pair of variables under investigation showed cointegration. The study also discovered a slight link between the industrial production index and the stock market index. According to the study, stock prices may be impacted by shifts in the economy as measured by the industrial output index, but not the other way around. There was no proof that a stock market bounce back, as measured by rising share prices, could serve as a build-up to the economy.

### **Examining Key Research on Macroeconomic Factors After 2000**

The main conclusions of the research on the impact of macroeconomic factors on stock market performance after 2000 are compiled here. Maysami and Koh (2000) came to the conclusion that shifts in macroeconomic factors could forecast changes in the stock market. The substantial impact of macroeconomic factors on the stock market index is very objectively demonstrated for industrialized nations, according to Maysami and Koh's examination of the cases of the United States, Singapore, and Canada. However, the actual results remain unclear in the case of developing economies. Although there is a unidirectional causal relationship between economic activity and the stock market, a sizable number of studies also demonstrate a strong relationship between economic variables and the stock market.

Ataullah (2001) assessed APT in the Pakistan stock market based on predetermined macroeconomic factors. The author discovered that Pakistan's equity returns are influenced by four macroeconomic factors: unexpected inflation, exchange rates, trade balance, and oil prices. Nishat and Shaheen (2004) studied the impact of money market rates, interbank market rates, consumer price indexes, industrial production indexes, and money supply (M1) on KSE equities prices. The study found a positive and negative correlation between the industrial production index and stock prices.

Chauque and Rayappan (2018) employed the ADF, Ganger Causality, and OLS tests to examine the impact of inflation and exchange rate factors on Malaysian equities market returns. The Kuala Lumpur equities exchange's performance was negatively impacted by inflation and exchange rates, according to empirical research. The Granger causality test revealed a unidirectional relationship between stock returns and inflation, suggesting that past stock market performance might predict future inflation levels in Malaysia. According to Bahmani-Oskooee and Sohrabian (1992) research, there is a bidirectional causal relationship between the S&P 500 stock price index and effective dollar exchange rates. Ajayi and Mougoue (1996) discovered that rising stock prices in the US and UK markets lead to currency depreciation, particularly in the short term. The study found that increasing stock markets indicate a bigger economy and stronger inflation expectations. Foreign investors underestimate this signal, leading to a decrease in demand for the currency of the flourishing country, causing it to decline.

Asaolu and Ogunmuyiwa (2010) examined how macroeconomic variables affect Nigerian share prices. The dependent variables were the average share price of the Nigerian Stock Exchange, while the independent variables included external debt, inflation rate, fiscal deficit, exchange rate, foreign capital inflow, investment, and industrial production.

The Granger Causality test found that Average Share Price (ASP) did not cause any of the nine macroeconomic variables in Nigeria during the sample period. When examined in pairs, only the exchange rate Granger determines the average share price. The Johansen co-integration test revealed a long-term correlation between share price and macroeconomic variables. The error correction method revealed a poor link between share price and macroeconomic variables. Stock prices in Nigeria are not a leading indicator of macroeconomic variables, with macroeconomic variables accounting for approximately 60% of the volatility (R-squared value).

Ari et al. (2012) examined the short-term impact of the money supply on Canadian stock prices, which is negative. Saeed (2013) analyzed how interest rates, money supply, currency rates, oil prices, and industrial production affect sectoral indices of the KSE 100 Index. The findings demonstrate that the money supply and interest rates have a negative relationship with the majority of sector performance. Industrial production, oil prices, and currency rates provide mixed results. According to Bansal et al. (2014), fluctuations in macroeconomic conditions have an inverse impact on discount rates, leading to a fall in equity values in US stock markets. Gupta and Modise (2013) found that data mining can anticipate South African stock returns based on factors such as interest rates, money availability, and global oil production growth. Kalyanaraman and Al-Tuwajri (2014) found an unfavorable relationship between interest rates and Saudi stock returns, while money supply and industrial production have a positive impact.

Ali (2011) examined how changes in microeconomic and macroeconomic variables affect stock returns at the Dhaka Stock Exchange (DSE). A Multivariate Regression Model based on the Standard OLS Formula was used to estimate the association. The regression coefficient indicates that inflation and foreign remittances have a negative impact on the industrial production index, whereas market P/Es and monthly percent average growth in market capitalization have a positive impact on stock returns. The independent factors explain 44.48 percent of the volatility in the DSE all-share price index. No unidirectional Granger Causality is identified between stock prices and all the predictor variables,

except one unidirectional causal relation from stock price and market P/Es. Lastly, there is no Granger connection between stock price and the selected microeconomic indicators.

Geyser and Lowies (2001) looked at a sample of companies listed on the Johannesburg and Namibian Stock Exchanges to see how share prices and inflation related to each other. Their research showed a significant positive relationship between Namibian company stock prices and inflation. While the stock prices of corporations in other sectors have a minor positive correlation with inflation, mining companies in South Africa cannot be used as an inflation hedge.

Amtiran et al. (2017) studied the correlation between macroeconomic conditions and stock returns in Indonesia's capital market. This study uses secondary data from 2007-2014. The study employed purposive selection and comprised 80 companies posted on the Indonesian stock exchange. The data was examined using the OLS regression approach. The study found that stock returns are positively correlated with exchange rates and interest rates, but negatively correlated with inflation.

Gunasekarage et al. (2004) examined the impact of CPI, money supply, and T-bill rate on the equity index market in Colombo, Sri Lanka. He found a substantial relationship (short and long term) based on research findings. Adam and Tweneboah (2009) used quarterly data to analyze the relationship between macroeconomic variables and equity market returns in Ghana, both short and long term. The empirical data indicate a significant correlation between inflation and equity returns. Variance decomposition revealed that inflation hindered the favorable influence of variables such as exchange rates, FDI, and interest rates on stock returns.

Khan (2004) utilized the Theory of Cointegration and ECM to analyze the correlation between inflation and stock market development (via market capitalization and stock turnover index). To ensure stationarity, the ADF and PP tests are used first. When variables are integrated in the same order, a cointegration test is performed using the Johansen Maximum likelihood approach to determine a long-term link between inflation and MCAP or inflation and the stock turnover index. The estimated test result suggests a negative correlation and potential relationship between the data over time. Inflation affects the stock market's performance. The ECM test results indicate that 65 percent of the adjustment towards equilibrium happens within a year.

Kotha and Sahu (2016) used monthly data from July 2001 to July 2015 to analyze the relationship between the Indian stock market and key macroeconomic indices, both in the long and short term. Using Johansen's co-integration analysis and Granger-causality tests, the study found that WPI, money supply, and T-bill rate were three of the four most significant long-run components. In the short run, the analysis found a bi-directional relationship between the Sensex and the currency rate. Stock returns were positively and significantly correlated with inflation and money supply, but negatively and insignificantly with interest rates.

Kuwornu and Victor (2011) evaluated the link between macroeconomic indices and stock market returns using monthly data from January 1992 to December 2008. The study found a substantial negative correlation between Ghana's stock market returns, exchange rate, and Treasury bill rate using full information maximum likelihood estimation.

Ewing (2002) used data spanning from January 1988 to September 2000 to examine how the NASDAQ Financial 100 index responded to macroeconomic news. The study employed real production, inflation, risk, and monetary policy shock as macroeconomic variables. The findings showed that monetary policy shocks had a major initial influence on financial sector returns, which persisted for about two months. Although they were not persistent, unexpected shifts in economic development were found to have a favorable impact. Similar to this, an inflation shock was linked to an initial, statistically significant negative impact that persisted for up to one month following the shock.

Murcia (2014) conducted a study to identify macroeconomic factors influencing Philippine stock market indexes. Monthly data on macroeconomic variables were collected from 2006 to 2012. Multiple regression analysis shows that exchange rates have a significant impact on stock market returns. Remittances had an insignificant positive correlation with stock returns, while exchange rates had a negative correlation.

During the 1980-1996-time frame, Flannery and Protopapadakis (2002) assessed how macroeconomic factors affected the daily returns to a wide equity market index. Daily returns for the value-weighted NASDAQ, AMEX, and NYSE market indices were included in the analysis and were sourced from CRSP. It revealed that market value-weighted returns were significantly impacted by the money supply, PPI, and consumer price index. Higher than expected inflation or the money supply lowered equity values, as

indicated by the three coefficients' strong negative values. The study also showed that volatility is significantly impacted negatively by real gross national product.

Additionally, Perotti and Oijen (2001) note that shifts in political risk generally have a significant impact on the growth of local stock markets and excess returns in emerging economies.

Wongbangpo and Sharma (2002) explored the connection between stock prices and a few macroeconomic variables in five ASEAN nations: Indonesia, Malaysia, the Philippines, Singapore, and Thailand. The findings indicated a positive long-term relationship between stock prices and output growth. It is discovered that, in the short term, stock prices depend on the historical and present values of macroeconomic factors.

Ibrahim and Aziz (2003) examined the widely used and recognized techniques of co-integration and vector auto-regression in an effort to create a dynamic relationship between stock prices and macroeconomic factors in the context of Malaysia. The study took into account how four macroeconomic factors real output, money supply, price level, and exchange rate interacted with the Malaysian equities market. The study analyzed data from January 1977 to August 1997 and found a positive long-term link between industrial production and stock prices. Since this outcome was expected, the study concluded that actual industrial production growth has a favorable impact on the firm's anticipated future cash flow. In the context of Malaysia, it also noted a strong correlation between inflation and stock prices.

Durham (2003) explored how monetary policy affected stock returns in 16 nations (Sweden, South Africa, Canada, Finland, Germany, Italy, the Netherlands, Austria, Switzerland, Ireland, Belgium, the UK, France, Japan, New Zealand, and the United States). The elements include a discount rate substitute for monetary policy and stock returns. Regression research reveals a significant negative correlation between monetary policy and stock returns across countries.

Ngoc and Hussainey (2009) conducted an empirical investigation into how macroeconomic issues affect stock prices in Vietnam. The findings indicate a significant correlation between stock prices and Vietnam's industrial production and money supply. The effect of macroeconomic variables on Taiwan 50 Index stock returns, including GDP, employment rate, exchange rate, and money supply, was examined by Singh et al. (2011).

While the money supply and employment rate are significant factors, GDP and the exchange rate have a significant impact on stock returns.

Izedonmi and Abdullahi (2011) used monthly time series data from 2000-2004 to analyze Nigeria's stock market performance under APT constraints using the OLS method. Variables analyzed included market capitalization, inflation, and currency rate. The statistical research found no correlation between these characteristics and the success of Nigeria's stock market.

Maghayereh (2003) used Johansen's co-integration analysis and monthly time series data from January 1987 to December 2000 to examine the long-term relationship between the prices of Jordanian stocks and a few macroeconomic variables, including interest rates, inflation, and industrial production. The findings revealed a long-term equilibrium relationship with the stock price index and demonstrated that the index co-integrated with macroeconomic variables. The study also found that macroeconomic factors may play a substantial role in stock price prediction, indicating a fundamental relationship between economic factors and stock price volatility.

Mashayekh et al. (2011) studied the relationship between economic variables and stock market indicators in Iran from April 1998 to March 2008. They used the VAR model and the Johansen co-integration test to analyze the connection between variables. Researchers found a significant correlation between inflation and increased stock transaction volume and returns. The study found a negative association between deposit interest rates and stock market indicators.

GDP and an economy's growth in industrial production are strongly linked. As a result, in addition to GDP, industrial output growth is thought of as an additional indicator of actual sector activity and shows how the nation's industrial sector is expanding overall. It is anticipated that rising industrial productivity will boost stock market activity and, consequently, stock returns. McMillan (2005) examined the relationship between stock prices and industrial production volatility in the US market. The study found a strong positive correlation between stock returns and real sector activity, as measured by GDP and industrial production growth. An expansion in the real sector raises future cash flow, which in turn generates a greater future dividend. This is the essential truth of this relationship. Investors are always eager to pay more for shares of common stocks because

they anticipate receiving larger dividends. Similar findings were also obtained by Nasseh and Strauss (2000) when they examined a group of six European nations. As a result, research has indicated a favorable correlation between domestic stock prices and real gross domestic product (RGDP).

Adel (2004) examined the possibility of a long-term equilibrium relationship between stock prices and specific macroeconomic variables. The study employed real economic activity, money supply, inflation, and interest rate as macroeconomic variables. The vector error correction model was used to assess how these macroeconomic factors influenced the Amman Stock Exchange (ASEX). For every variable, there were 92 quarterly observations over the sample period, which ran from March 1980 to December 2003. The analysis found a consistent inverse relationship between inflation and stock prices, while real economic activity had a positive impact on stock prices. The findings also suggested that stock prices may benefit from an increase in the money supply. The study hypothesized, among other things, that industrial production was one of the factors that positively determined stock prices, which is in line with the findings of Mukherjee and Naka (1995) and Chen et al. (1986).

Maysami et al. (2004) used yearly time series data to look into the long-run equilibrium link between macroeconomic variables and the Singapore stock market indicator. The investigation discovered a strong positive link between the Singapore stock performance and inflation. The government's proactive role in preventing price increases while the economy continued to recover from the 1997 crisis could be one reason for the positive association, as the study suggested. According to Chen et al. (1986), the study also suggested a strong positive correlation between stock returns and actual economic activity as measured by the industrial production index. Chen et al. (2005) researched the term structure effect on Taiwanese hotel stock returns using the yield spread. Their yield differential is calculated by subtracting the yield on 10-year government bonds from the rate on 3-month Treasury bills. Their findings indicate that yield spread has little to no effect on stock prices. This may be in line with Mukherjee and Naka (1995) prediction that shifts in short- and long-term rates should have a comparable impact on the discount rate.

Gan et al. (2006) used time series data on inflation, long-term interest rates, short-term interest rates, real gross domestic product, and narrowly defined money supply to

investigate the relationship between the New Zealand Stock Exchange (NZSE) index and a set of macroeconomic variables from January 1990 to January 2003. The co-integrated test showed that the macroeconomic variables and the NZSE index have a long-term link. The study discovered that the money supply, interest rates, and real GDP can all predict New Zealand stock returns.

Coleman and Tettey (2008) used the Ghana Stock Exchange as a case study to evaluate how macroeconomic variables influence the performance of the stock market. In order to determine both short-term and long-term associations, the study employed cointegration and error correction techniques on time series data spanning the years 1991-2005. The study indicated that lending from deposit money banks had a negative impact on stock market performance and was a substantial barrier to Ghanaian businesses' ability to expand. Once more, the results showed that the inflation rate had a negative impact on stock market performance, but that this effect would take time to manifest because of a lag period, and that investors would profit from exchange-rate losses brought on by the depreciation of the domestic currency.

Kandir (2008) looked into how macroeconomic variables affected Turkish stock prices. The study's macroeconomic variables included the growth rate of the narrowly defined money supply, the change in the consumer price index, the growth rate of the industrial output index, the interest rate, and the change in the exchange rate. All non-financial companies' data from July 1997 to June 2005 were considered in the study. Three portfolios were created based on the firms' rankings by leverage ratio, earnings yield, and book-to-market equity. The analysis found that interest rates and currency rates had a major impact on stock returns. In a similar way, a positive relationship between inflation rates and stock prices was established. According to the study, there is a negative correlation between interest rates and stock returns, which means that as interest rates rise, investors tend to buy fewer stocks, which lowers stock prices.

Liu and Shrestha (2008) looked into the connection between a number of macroeconomic factors and Chinese stock market indexes. The study used the following variables: inflation, interest rates, industrial production, money supply, and exchange rates. In the highly speculative Chinese stock market, the results demonstrated that there was a cointegration link between stock prices and macroeconomic factors using heteroscedastic cointegration analysis using monthly data spanning January 1992 to December 2001. A

thorough investigation revealed a long-term favorable correlation between the macroeconomic and stock market performance. The study specifically showed a negative correlation between stock prices and inflation, interest rates, and exchange rates, and a positive correlation between stock prices and money supply and industrial production.

Adjasi (2009) examined how macroeconomic uncertainty affected the volatility of stock prices on the Ghana Stock Exchange (GSE). The GSE provided data on the stock market price index, while the International Monetary Fund's Statistical CD-ROMS provided data on macroeconomic factors such as the money supply, interest rates, exchange rates, and consumer price index (a stand-in for inflation). Because financial returns vary over time, the study employed volatility models to quantify the impact of macroeconomic volatility on stock returns. The study discovered significant ARCH effect parameters for all variables aside from cocoa prices, inflation, and oil prices using the autoregressive conditional heteroscedasticity (ARCH) model. The presence of a considerable leverage effect for interest rates and inflation was shown by the asymmetric parameter. A positive shock to inflation could raise volatility more than a negative shock, according to the inflation case's positive indication. The exchange rate, stock prices, money supply, and interest rates all showed a notable volatility persistence effect, according to the study.

In order to determine if stock prices are a leading indicator of macroeconomic variables in the Lithuanian economy or vice versa, Pilinkus (2009) examined the relationship between a set of macroeconomic indicators and the Lithuanian stock market index. To estimate the association between the Lithuanian stock market index and forty macroeconomic indicators that represent the state of the Lithuanian economy between December 1999 and March 2008, the study used Granger causality tests. The study found that while the stock market index led some indicators like GDP, material investment, and construction volume index, other macroeconomic variables, including the GDP deflator, net export, and foreign direct investment, might lead stock market returns. Lastly, it was discovered that the money supply, payment balance, and stock market results were all related to one another.

Abu-Libdeh and Harasheh (2011) explored the reasons and relationship between stock prices and many macroeconomic variables in Palestine. To ascertain the correlations, two approaches were employed. In their initial regression study of 10 years' worth of quarterly data (40 observations), five macroeconomic variables (inflation, GDP, exchange rate,

Libor rate, and balance of trade) were used as independent variables, with the quarterly market index serving as the dependent variable. Second, the causal relationship was evaluated using the Granger causality test. Overall, the regression analysis's findings showed a strong correlation between stock prices and macroeconomic factors. Furthermore, any causal connections between any specific macroeconomic variable and stock prices were disproved by the causality study.

Osamwonyi and Osagie (2012) investigated the connection between macroeconomic factors and the Nigerian capital market index. The study attempted to determine the relative impact of a number of macroeconomic variables on the All-Share Index of the Nigerian capital market by taking into account annual data on interest rates, inflation, currency rates, fiscal deficit, GDP, and money supply from 1975 to 2005. The short and long-term correlations between the stock market index and the selected macroeconomic variables were evaluated using the Vector Error Correction Model (VECM).

The main conclusion was that Nigeria's stock market index is influenced by macroeconomic factors. It was suggested that the stock market would benefit from the implementation of suitable economic policies, which would then lead to the necessary expansion of the capital market.

Using month-based data from 2000 to 2014, Shrestha and Subedi (2014) conducted empirical research on the factors influencing stock prices in Nepal. Regression study results showed that stock prices had a negative relationship with interest rates and a positive relationship with inflation and the broad money supply. This suggests that Nepalese investors perceive stocks as a substitute financial vehicle. The research on how various macroeconomic factors affect stock prices appears to differ depending on the data at hand. Only a few works of literature of this kind exist in Nepal, compared to the large amounts of literature found in wealthier countries. Therefore, our analysis represents an effort to investigate the relationship between macroeconomic factors and the value of Nepali stocks over the 2011-2021 timeframe.

Research by Sohail and Zakir (2011) examined the return of Pakistan's Karachi Stock Exchange (KSE-100) from 2002 to 2012. Regression analysis, vivid statistics, and Pearson's correlation were used in this work to analyze secondary data. The results indicated that the exchange rate and GDP had negligible positive links with the stock

market and inflation, but GDP and Treasury Bills had marginal negative relationships with the KSE stock market.

Salma et al. (2021) used a number of micro econometric techniques, including the Granger and Toda Yamamoto (TY) Causality tests, VAR Granger non-Causality/Block Exogeneity Wald Test, ARDL, and ECM, to examine the relationship between the return of the stock and political economic factors in the United Kingdom between January 1999 and December 2007. Their findings showed no correlation between the variables and the stock.

Ahmed (2008) used quarterly data from March 1995 to March 2007 to examine the nature of the short- and long-term correlations between Indian stock prices and a range of macroeconomic variables. These factors included the principal stock index of the Indian National Stock Exchange, the Bombay Stock Exchange index, exports, foreign direct investment, interest rates, money supply, and exchange rates. The causality test, Forecast Error Variance Decomposition (FEVD) analysis, Impulse Response Function (IRFs) analysis, and Johansen and Juselius (1990) co-integration technique were all applied. The findings revealed that interest rates and stock returns had only a short-term link, whereas stock prices and money supply had a long-term relationship.

Using data from June 1998 to June 2008, Hasan and Javed (2009) conducted a second analysis that investigated the long-term link between Pakistani equity prices and monetary variables. The money supply, foreign exchange rates, Treasury bill rate, and CPI were among the monetary variables. Evidence of a long-term link and unidirectional Granger causality between monetary and equity market factors was presented by the Johansen and Juselius (1990) co-integration test. Similarly, impulse response research showed that while the money supply has a beneficial effect on equity returns, interest rate and exchange rate shocks have a negative effect.

Bilson et al. (2002) looked into the relationship between stock returns and political risk in the context of Pacific-Basin emerging markets. Their results show that while political risk does not explain return variance in developed markets, it does play a significant role in individual emerging nations, especially in the Pacific Basin. Political risk is the possibility that politics or political figures will negatively affect a company's earnings, expenses, or asset prices.

(Vuchelen, 2003) looked into the potential effects of Belgian elections and the ideological makeup of the government on the Brussels stock market's performance. Elections and the formation of new administrations are events that provide information about future financial and economic policies, according to the author's analysis using the multiple regression model. The findings suggest that one significant factor influencing the stock market is the ideological makeup of the government. According to the study, the returns on common stock are influenced by the government partners' electoral and ideological makeup.

Additional evidence on the political event (i.e., elections) is provided by Martinez and Santiso (2003). The relationship between politics and financial markets in emerging economies is the main topic of this article. More specifically, it looks at Wall Street's response to significant political developments in Latin America. The topic of this study concentrates on the Brazilian presidential election of 2002. These connections are robust for emerging markets, as demonstrated by the particular case study of Brazil, which was examined from the viewpoints of Wall Street experts as well as from a historical and quantitative economic standpoint. Indeed, this complex relationship between political unpredictability and financial volatility, which may be referred to as the economic fog of democratic uncertainty, is what gives emerging economies their fundamental identity.

By comparing the stock returns before and after the election, Li and Born (2006) examined the connection between the uncertainty surrounding the US presidential election and common stock returns. The authors note that during the approximately three months leading up to a US presidential election, when the election's outcome is unknown, the mean daily return of common stocks increases. Similarly, when the outcome is unknown, the analysis offers shaky evidence that the presidential election cycle is linked to greater return variability. But volatility is almost the same as it is at times when there is no uncertainty about the outcome. This data supports the theory that investors believe political unpredictability and the creation of common stock returns are causally related. It implies that the equity market recognizes and values political volatility. An objective framework that is in line with the market efficiency theory reveals this connection between politics and the stock market.

The short-term impact of the Quebec referendum on October 30, 1995, on the common stock returns of 102 Canadian companies was studied by Beaulieu et al. (2006). The

GARCH model was employed in the study to quantify the volatility of stock prices. According to the analysis, the outcomes of the election influenced the portfolio returns of Quebec enterprises. For each of the four portfolios, the impact of the referendum outcomes on these stock returns is positive and statistically significant. The stock market reacts more strongly to indigenous companies than to multinational ones. The study found that when the financial market is unable to predict political uncertainty, it may have an impact on the short-term stock returns of Canadian and Quebec companies.

Maloney and Mulherein (2003) analyzed the stock return and trading volume following the Challenger space shuttle disaster, demonstrating the speed and accuracy of price discovery. They demonstrated that a significant portion of price discovery took place during a trading halt of the company in charge of the defective component, and that price discovery happened without significant trading profits.

Following the September 11 attacks, Carter and Simkins (2004) looked into how airline stock values responded. Their research indicates that the stock market distinguished between different airline companies and backs the rational pricing hypothesis.

According to Sireesha (2016), India's stock, gold, and silver returns are interdependent. The study examines the impact of macroeconomic variables on stock returns in India over 20 years, from January 1993 to December 2012. The study found that inflation, GDP, and exchange rate all had a significant influence on stock returns. Venkatraja (2014) found that the wholesale price index, gold price, foreign institutional investment, industrial production index, and effective exchange rate all had an impact on the Sensex of the Bombay Stock Exchange in India. The study used time-series data from April 2010 to June 2014. The earthquake was an unexpected and chaotic occurrence. Event analysis was done by Papadakis (2006) on how the four equities (i.e., PC manufacturers, Dell, Gateway, Compaq, and IBM) performed following the September 21, 1999, earthquake in Taiwan. Following unexpected increases in component prices and decreases in share prices, the examination showed declining profitability. It has been shown that the stock market responds right away to the incident.

In conclusion, market efficiency was the main topic of the literature review in the early 19th and 20th centuries. Overall, the studies have reached the same conclusion: stock prices are impacted by significant social, economic, and political events as well as fresh,

unexpected information. Despite inconsistent findings, numerous studies have shown that macroeconomic factors do affect stock market prices and, consequently, stock returns. While some discovered that real sector activity, as measured by GDP, accounts for a large portion of the fluctuation, others discovered that inflation had a substantial impact on stock market returns. The impact of macroeconomic data on the Nepalese stock market is still unclear, despite the fact that these findings are available in many developed foreign stock markets. This study will examine the link between these variables in order to forecast stock prices in Nepal.

### **2.3.3 Examining Nepalese Research**

Few empirical studies have been conducted in the context of Nepal, despite the fact that there are many studies on macroeconomic volatility of stock returns and examination of the effects of significant events in the setting of the US and other developed capital markets.

(Pradhan, 2003) was the first to investigate the relative relevance of retained earnings and dividends on the share's market price. He used 93 observations overall from cross-sectional data from 29 companies between 1994 and 1999. The outcome demonstrated the typical strong dividend effect and relatively moderate retained earnings effect, suggesting that dividends are appealing to Nepalese investors.

G.C. and Neupane (2006) carried out a study titled "Stock Market and Economic Development: A Causality Test" in an effort to investigate the presence of a causal relationship. Its foundation was the Granger causality test applied to time series data from 1988 to 2005. The study discovered empirical proof of the causal relationship and long-term integration of Nepal's stock market indicators and macroeconomic variables. It illustrates how the stock market influences economic growth and vice versa. The significance of stock market growth for promoting economic development was emphasized in the report.

(Baskota, 2007) used regression analysis to examine the impact of trading days, trading volumes, base money supply, interest rates, inflation, and industrial production on the NEPSE data from 1994 to 2006. According to the study's findings, the Nepalese stock market does not exhibit persistent volatility, and macroeconomic factors cannot account for changes in stock prices. Additionally, the study carried out event analysis for a few

chosen political situations and came to the conclusion that politics is not the only element explaining Nepal's stock price movement.

(Dangol, 2008) used the event analysis methodology to examine how the Nepalese stock market responded to news of unexpected political developments and stock price adjustments. His analysis was conducted between 2001 and 2006. He discovered that political events that bring good or bad news produce abnormally high or low returns in the time after the event. Important evidence about how quickly stock prices adjust to new political information, that is, within two to three days of the announcement date, was reported by the study. According to this analysis, political unpredictability and common stock returns in Nepal are strongly correlated, yet the Nepalese stock market is inefficient at a semi-strong level.

Bhattarai and Joshi (2009) studied the constant interaction between market indices and macroeconomic variables in the context of the Nepalese stock market. The study found that the stock index and a few macroeconomic indicators were interdependent in the short and long terms. The estimated results support the commonly held belief that stock returns are a hedge against inflation by indicating a unidirectional short-run (positive) causal relationship from consumer price index (CPI) to stock index but reverse causation in the long run (from stock index to CPI).

Karki (2017) investigated the connection between Nepal's stock market performance and macroeconomic factors, using the NEPSE Index as a stand-in for stock prices. According to the study, there is a negative association between interest rates and stock prices, but a positive correlation with real GDP, inflation, and the money supply. Also, there is no long-term association between macroeconomic variables and stock prices.

The multivariate results similarly revealed a positive, unidirectional relationship that flows from the money supply to the stock index in the near term, but they also verified the lack of long-term causality. However, the multivariate results showed no short-term correlation but long-term causality between the stock index and the rate on Treasury bills. While the impulse response graphs demonstrated that the stock index's response to shocks in macroeconomic variables did not last for an extended period of time, the variance decomposition results demonstrated a substantial relative exogeneity of the stock index. The study's policy implications were that Nepal's monetary authority could only have a

short-term, but not long-term, impact on the stock market. This could be done directly through the money supply, which is its intermediate target, and its effect on inflation, or indirectly through easier access to financial services.

Using month-based data from 2000 to 2014, Shrestha and Subedi (2014) conducted empirical research on the factors influencing stock prices in Nepal. Regression study results showed that stock prices had a negative relationship with interest rates and a positive relationship with inflation and the broad money supply. This implies that Nepalese investors regard stocks as an alternative financial vehicle. The research on how various macroeconomic factors affect stock prices appears to differ depending on the data at hand. In contrast to the vast bulk of literature available in prosperous nations, Nepal has only a few works of this kind. Therefore, our analysis represents an effort to investigate the relationship between macroeconomic factors and the value of Nepali stocks over the 2011-2021 timeframe.

Niraula (2022), who looked at government policy and how it affected the price movement of the Nepal Stock Exchange, found that while price increases, CRR, exportation, and annual percentage rate have a positive relationship with stock price movement, GDP and imports have an inverse relationship with stock price movements. In this study, which only used secondary data and SPSS software, descriptive and inferential statistics were employed.

Gaire (2017) discovered a long-term association among Nepal's gold prices, short-term interest rates, and the NEPSE index. Unit root and co-integration tests were used in the study, which ran from January 2006 to January 2016. The findings show that interest rates have a long-term impact on both gold prices and the NEPSE index. The analysis finds a unilateral causal relationship between the short-term interest rate and the NEPSE index. Finally, it is determined that the short-term interest rate has a significant impact on Nepal's stock price.

Phuyal (2016) used a vector error correction model to analyze the long-term movement of the stock market using a variety of macroeconomic variables, including the money supply, foreign exchange rate, interest rate, CPI, and the quantity of remittances received. The findings show that the Nepse and a collection of macroeconomic variables have a long-term equilibrium relationship.

According to Karki (2018), there is no long-term equilibrium between Nepal's stock price and macroeconomic variables. It is asserted that the long-term fluctuations in stock prices cannot be explained by macroeconomic factors. However, the empirical conclusion derived from OLS estimation showed that macroeconomic variables had a positive and significant impact on the Nepse index link between the money supply, GDP, and inflation, as well as the stock market price, but a negative relationship with interest rates.

An ARDL model was used by Shrestha and Pokhrel (2019) to investigate the relationship between the stock index and the consumer price index, the broad money supply, the rate on 91-day Treasury bills, and changes in politics and policy. The findings showed a negative correlation with interest rates and a high positive correlation with the money supply. The study's findings also indicate a weak positive correlation between inflation and beneficial policies and political stability.

Devkota and Dhungana (2019) investigated the connection between four macroeconomic factors in Nepal and the stock market index. Time series data spanning 24 years, from 1994 to 2018, was used by the researcher. According to the study, which used the ARDL bound test approach, there is a long-term correlation between Nepal's stock market and macroeconomic factors. They also asserted that while the price of gold and the currency rate have no such effects on the Nepalese stock market, the money supply has a positive impact, and interest rates have a negative one. The study came to the conclusion that the Nepalese stock market is unstable and that investors have no other options due to the absence of derivative products.

Paudel (2008) came to the conclusion that NEPSE performed better and that the index exhibited a consistent increase in the latter months of the study period. During the study period, stock market performance was lower when the capital market was in a steady position overall.

There is no unidirectional or bidirectional causal relationship between interest rates and stock market returns, according to Rana (2013). From 1994/95 to 2011/12, the study included 18 annual observations, which were then evaluated using the Granger (1969) causality test.

This shows that investors in Nepal appear to view stocks as an alternative financial instrument and view equities as a hedge against inflation. Additionally, low interest rates

and liquidity availability boost the Nepalese stock market's performance. More significantly, it has been discovered that political shifts have an impact on stock market performance, which is consistent with Dangol (2008) findings and NRB policy. The stock market index is positively impacted by the optimistic forecast for political stability. Similar to this, changes to the NRB's lending policies involving share collateral have a big effect on how the stock market index moves. These results aid in the development of strategies aimed at stabilizing or boosting Nepal's stock market.

## **2.4 Research Gap**

Several studies have looked into the dynamic link between macroeconomic variables and stock market performance. For example, Fama (1981) suggested that macroeconomic variables, particularly inflation and interest rates, had a major impact on stock returns. Chen et al. (1986) investigated the US market and discovered that factors such as industrial production, inflation, interest rates, and money supply had explanatory power over stock prices. Mukherjee and Naka (1995) conducted an analysis of Japan's stock market and found a long-term association between stock prices and macroeconomic conditions. Similarly, studies by Adam and Tweneboah (2008) in Ghana and Nishat and Shaheen (2004) in Pakistan found that variables such as money supply and exchange rate are significant determinants of stock movement.

Few of these studies, however, have concentrated on smaller developing nations like Nepal, the majority are based on developed or sizable emerging economies. Additionally, different approaches frequently produce different outcomes, ranging from basic correlation analysis to sophisticated cointegration and vector error correction models. This emphasizes the necessity of conducting country-specific studies with suitable econometric models.

The literature specifically about Nepal is still limited and underdeveloped, despite the fact that the relationship between macroeconomic factors and stock market performance has been extensively researched in both industrialized and large emerging economies. Although some significant studies have made an effort to investigate this connection in the Nepalese context, there are still a number of important gaps in terms of the quality of methodology, variable selection, and data coverage.

For instance, Paudel (2005) focused at how macroeconomic factors like interest rates and inflation affected the NEPSE Index, however, the study only looked at just a short period and using simple correlation methods, which limited the breadth of the results. Similar to this, Shrestha and Subedi (2014) used linear regression to examine how GDP, interest rates, and money supply affected stock prices; however, the study lacked long-term analysis and failed to take causality or possible cointegration into consideration. Baral (2005) employed limited econometric methods and did not include GDP or money supply, but he did include more general factors like inflation and exchange rates.

Furthermore, the majority of this research have relied on bivariate or basic regression analyses without checking for cointegration or structural discontinuities, and they have utilized tiny sample sizes (usually less than 15 years). This reduces the validity of their conclusions in describing the actual dynamics of the Nepalese stock market, which has changed dramatically over the previous thirty years. Additionally, variable selection varies from study to study, which makes comparison analysis challenging.

Given these gaps, a thorough and present study is obviously needed to evaluate the short- and long-term effects on Nepalese stock prices. This study should use a larger dataset, incorporate important macroeconomic variables, and use contemporary econometric tools (like regression and cointegration analysis). This study aims to close that gap and offer significant new perspectives to the field of economic and financial studies in Nepal.

## **CHAPTER III**

### **RESEARCH METHODOLOGY**

#### **3.1 Introduction**

Research methodology outlines the entire plan for a study. This chapter outlines the methodologies used for the study to establish the impact of macroeconomic variables on stock prices.

This chapter has been separated into six parts. The first section presents the research design used in the study, while the second section describes the population and sampling used in the study. Section three covers the nature and sources of data. Section 4 explains methods of data analysis incorporating empirical models. Section 5 explains the conceptual framework. Section 6 covers the variables and measurement conditions.

#### **3.2 Research Design**

The descriptive and causal comparative research design is conducted to investigate the impact of macroeconomic variables on stock prices in Nepal. Throughout the study period, the main characteristics and trends of the macroeconomic variables and stock market performance are methodically described and summarized using the descriptive design, including mean, median, standard deviation, coefficient of variation, skewness, kurtosis, minimum, and maximum. The causal comparative research design examines the direction and strength between variables under examination. Economic indicators such as Broad Money Supply, GDP, inflation rate, and interest rate were analyzed to determine their correlation with stock prices in Nepal.

#### **3.3 Population and Sampling**

This study analyzes time series data of macroeconomic variables such as gross domestic product, inflation, interest rate and broad money supply, and stock market values. Nepal Stock Exchange Ltd (NEPSE), established in 1993, is the country's only capital market that began trading on January 13, 1994. This study intends to cover the time series data for the period of 30 years from fiscal year 1994 to 2024. These indicators reflect the country's general economic and financial market conditions.

### 3.4 Nature and Sources of Data

The empirical investigation using secondary time series data is conducted. Secondary data is used to analyze how macroeconomic variables affect stock prices. A brief literature assessment indicates that macroeconomic factors such as inflation, interest rates, broad money supply, and real GDP have a greater impact on stock market prices. Annual macroeconomic data is gathered from Nepal Rastra Bank's current macroeconomic and financial indicators data and the World Bank. Stock market indices are sourced from Nepal Stock Exchange Ltd. (NEPSE). Real GDP data is taken from the World Bank. Nepal Rastra Bank's current macroeconomic and financial indicators data on macroeconomic indicators is the source for interest rates, inflation, and broad money supply. The interest rate shows the annual interest rate on a 91-day Treasury bill. The consumer price index (CPI) is used to measure inflation, taken from the Nepal Rastra Bank.

Table 2 displays data on how the Nepalese stock market responds to macroeconomic dynamics.

**Table 2**

*Variables and Description*

| <b>Variable</b> | <b>Description</b>                             | <b>Unit</b>  | <b>Expected Sign</b> | <b>Source</b>           |
|-----------------|--|--------------|----------------------|-------------------------|
| NI              | NEPSE Index                                    | Index Points | Dependent            | Nepal Stock Exchange    |
| GDP             | Annual real GDP at basic price                 | Billion \$   | Positive (+)         | World Bank              |
| Inflation       | Annual growth of consumer price inflation      | Percent      | Positive (+)         | Nepal Rastra Bank (NRB) |
| Interest Rate   | Annualized weighted average 91-day T-bill rate | Percent      | Negative (-)         | Nepal Rastra Bank (NRB) |
| M2              | Annualized Broad Money Supply                  | Percent      | Positive (+)         | Nepal Rastra Bank (NRB) |

### 3.5 Methods of Data Analysis

(Zikmund,1997) suggested that statistical analysis methods are chosen based on three factors: the type of inquiry, the total number of variables, and the measurement scale. Based on these criteria, descriptive statistics, correlational analysis, regression analysis, and cointegration analysis will be used to test the long run equilibrium. This study aims to evaluate the long-term relationship between stock market prices and macroeconomic variables. To investigate long-run equilibrium, we will apply the unit root test, the cointegration test, and the Error Correction Model (ECM).

The regression (OLS) equation will be determined:

$$NI = \alpha + \beta_1 RGDP + \beta_2 INF + \beta_3 IR + \beta_4 M_2 + \varepsilon \dots \dots \dots (1)$$

Where,

NI = NEPSE Index

RGDP = Real Gross Domestic Product

INF = Inflation

IR = Interest Rate

M2 = Broad Money Supply

$\alpha$  = Constant term

$\varepsilon$  = Stochastic error term having typical statistical features

$\beta_1, \beta_2, \beta_3$  and  $\beta_4$  are the values of the parameters for estimating the explanatory variables.

#### 3.5.1 Long Run Equilibrium Analysis

Here are the stages for analyzing the long-run equilibrium link between stock prices and macroeconomic variables:

##### i) Unit Root Test

Regression of non-stationary variables may result in false regression problems. To ensure stationarity, the augmented Dickey-Fuller (ADF) test will be applied to both the levels and first differences of the variables (Dickey & Fuller, 1981).

A d-order integrated series (I(d)) can become stationary by changing it d times.

$$\Delta y_t = \beta + \delta_t + \alpha y_{t-1} + \sum_{i=1}^k \varphi_i \Delta y_{t-1} + \varepsilon_t \dots \dots \dots (2)$$

### ii) Cointegration Test

The cointegration test identifies long-term relationships. Engle and Granger (1987) stated that stationarity in regression residuals indicates cointegration.

$$Y_t = \beta X_t + \varepsilon_t \dots \dots \dots (3)$$

$Y_t$  and  $X_t$  are nonstationary variables with order one integration.

(i.e.  $Y_t \sim I(1)$  and  $X_t \sim I(1)$ )

For  $Y_t$  and  $X_t$  to be cointegrated, the predicted residuals from Eq. (3) must be stationary (i.e.,  $\varepsilon_t \sim I(0)$ ). Cointegration refers to a long-term equilibrium link between variables.

### iii) Error Correction Model (ECM)

The ECM measures the rate at which variables change to restore long-term equilibrium in response to short-term problems.

The Granger representation theorem (Engle & Granger, 1987) states that if a set of variables is cointegrated, there is a possible error-correction method. The presence of an error correction mechanism (ECM) is both necessary and sufficient for cointegration to occur.

If the dependent variable NI is indicated as  $y_t$  and the whole explanatory variables in equation (2) are denoted as  $x_t$  an error-correction representation of the type follows:

$$\Delta NI_t = \alpha_1 + \beta_1 \Delta GDP_t + \beta_2 \Delta INF_t + \beta_3 \Delta INT_t + \beta_4 \Delta M2_t + \alpha_2 ECT_{t-1} + u_t$$

Where,

$\Delta$  = First differences

$\alpha_2$  = Speed of adjustment coefficient

$ECT_{t-1}$  = Lagged Error Correction Term

The equation's estimated coefficient,  $\alpha_2$  ought to be statistically significant and have a negative sign. The Granger Representation Theorem (GRT) states that for the variables to be cointegrated, a negative and statistically significant  $\alpha_2$  is required.

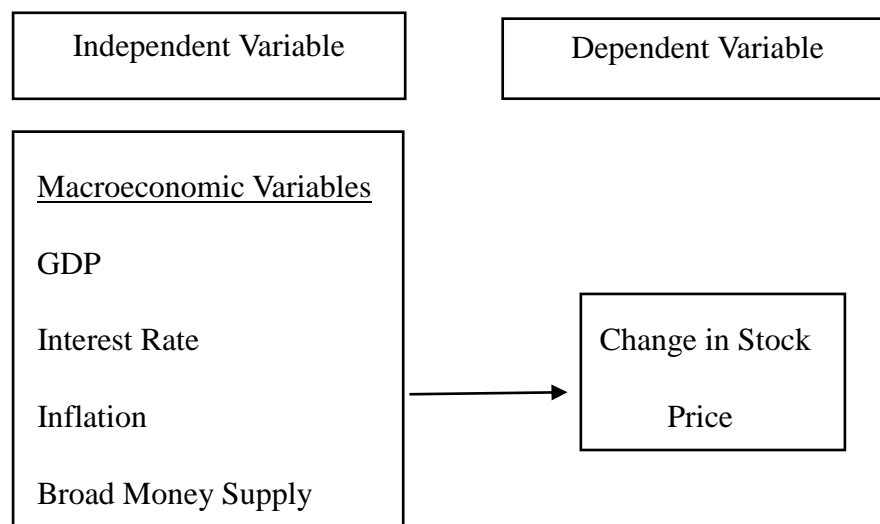
### 3.6 Conceptual Framework Base

The market index (measured by NEPSE), GDP growth, inflation rate, interest rate and broad money supply is used in our correlation analysis to examine the association between variables. The NEPSE index represents the stock price.

The figure displays the study's conceptual framework in relation to its goal.

**Figure 1**

*Conceptual Framework for the factors that influence stock market prices.*



Source: (Karki, 2017)

### 3.7 The Description of Variables

The essential variables utilized in the models mentioned above are defined and justified below.

#### 3.7.1 Dependent Variable

##### a. NEPSE Index (NI)

The NEPSE Index (NI) is a market value-weighted index that includes shares of listed firms from various sectors on the Nepalese stock exchange. It provides investors with an overview of market trends and performance. Abu-Libdeh and Harasheh (2011) employed

stock indexes to study the correlation and causality between macroeconomic factors. The stock index is computed by dividing the current market value of all publicly traded businesses by the previous period's total market value. NEPSE has utilized this indicator since 1994, using average closing prices from that session as a reference point. This study will use the NEPSE Index to assess the impact of macroeconomic conditions on stock prices.

For the duration of the study, the NEPSE Index is taken annually. It functions as the main indicator of Nepal's stock market performance.

### **3.7.2 Independent Variables**

This study will employ the following generally used macroeconomic factors as independent variables:

#### **a. Real Gross Domestic Product (RGDP).**

RGDP is a measure of a country's real economic activity. Higher RGDP levels indicate a country's economic prosperity, which is projected to positively impact stock returns. A number of studies, including Gan et al. (2006) and Abu-Libdeh and Harasheh (2011), have demonstrated a positive association between GDP and stock returns. The projected sign of this measure is positive.

Economic production is measured using annual real GDP data expressed in billion dollars (\$) at basic prices.

#### **b. Inflation (INF)**

In the literature, inflation has been utilized as a macroeconomic variable to predict stock prices. Ibrahim and Aziz (2003) and Alagidede and Panagiotidid (2010) discovered a positive long-term correlation between stock prices and inflation. The intended sign for this variable is positive.

The annualized percentage change in the Consumer Price Index (CPI) is used to calculate inflation. The annual inflation rate is derived using the year-on-year percentage change in CPI.

### **c. Interest Rate (IR)**

Interest rate risk is a significant financial and economic element influencing the value of common equities. Lower interest rates encourage expansion by making borrowing more affordable. This will positively impact the firm's future predicted returns. Increased interest rates can increase the cost of stock transactions, as many investments are done with borrowed funds. Investors typically seek a better rate of return before investing. Reduced demand for stock investment will result in lower stock prices. (Kandir,2008) found a negative correlation between stock returns and interest rates. The predicted sign of this measure is negative.

The interest rate is proxied by the 91-day Treasury Bill (T-bill) rate, representing the short-term risk-free interest rate in Nepal. The annual average yield of the 91-day T-bill rate is used to capture the prevailing short-term interest rate in the market.

### **d. Broad money supply (M2)**

The money supply can impact stock prices in three ways: predicted effect, investment combination effect, and intrinsic value growth effect. Overall, the three effects are positive, indicating that increasing the money supply leads to higher stock market values. Stock market prices can influence the money supply in two ways via the wealth effect, transaction effect, asset portfolio effect, and substitution effect. The wealth, transaction, and asset portfolio effects are positive, but the substitution effect is negative. The wide money supply (M2) includes currency held by the public, demand deposits (DD), and time deposits (TD) in the banking sector.

$$M2 = C + DD + TD$$

The anticipated sign of this variable is positive. Broad money supply (M2) includes currency in circulation and all deposits (demand and time) held by the public with banks. It shows the entire liquidity in the economy. Annual data on broad money supply is used, expressed in Nepalese Rupees (NRs).

## CHAPTER IV

### RESULTS AND DISCUSSION

#### 4.1 Introduction

This chapter presents the study's empirical findings and analytical discussion, which examine the impact of selected macroeconomic variables, Gross Domestic Product (GDP), Inflation Rate, Interest Rate, and Broad Money Supply (M2) on the NEPSE Index, which measures stock market performance in Nepal. The purpose of this chapter is to interpret the findings of various econometric analyses and examine their implications in the context of Nepal's economy and financial sector. The study starts with descriptive statistics, which give a summary of the data's basic qualities such as descriptive analysis, followed by correlation analysis, which identifies early relationships between variables. These early findings establish a basis for improved economic approaches. The empirical data are reviewed in detail, emphasizing the significance and direction of correlations. This chapter aims to bridge the gap between theoretical concepts and empirical evidence. It provides a complete study of the data and interprets the statistical results using economic reasoning. The chapter concludes by summarizing the important findings and their implications for investors, market regulators, and policymakers, so adding to a better understanding of stock price behavior in connection to macroeconomic fundamentals in Nepal.

#### 4.2. The Analysis of the Relationship between Macro-economy and Stock Prices

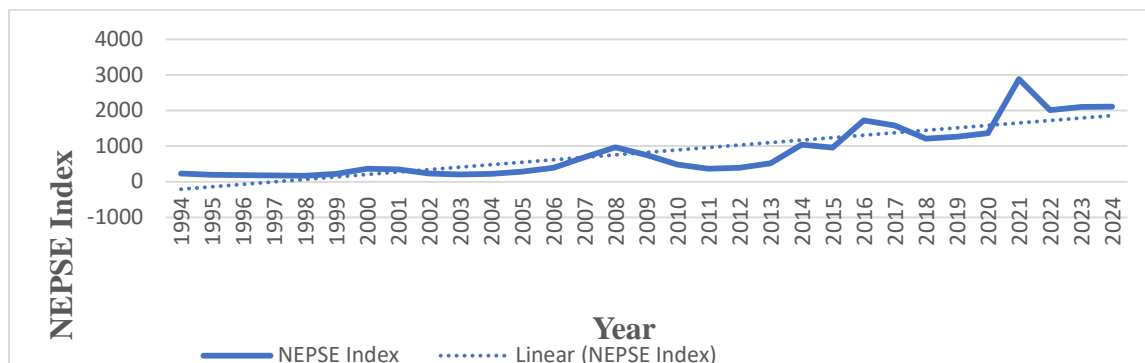
This section examines the causal relationship between macroeconomics and stock prices using secondary data. GDP plays a significant role in fostering a competitive corporate climate and influencing stock prices. Inflation, interest rates, and money supply all have an impact on stock values (represented by the NEPSE index). Descriptive statistics, correlational analysis, regression analysis, and cointegration analysis are utilized to determine long-run equilibrium. The sections provide detailed information on data analysis findings.

##### 4.2.1 Trend Analysis

The trend of stock market index and other variables: gross domestic product, interest rate, inflation and broad money supply were observed.

**Figure 2**

*Trend of Stock Market Index (NI)*



The NEPSE index trend from 1994 to 2024 is depicted in Figure 2, which demonstrates a generally rising tendency. Up until 1999, the index was essentially flat. From 2004 to 2007, it increased steadily. From 2008 to 2011, there was a significant drop, and from 2012 to 2016, there was a comeback. Following a little increase from 2018 to 2020, the index reached its highest point in 2021-2022, hovering between 2,500 and 3,000, before falling and leveling out around 2,000 in 2023 and 2024.

**Figure 3**

*Trend of Gross Domestic Product*

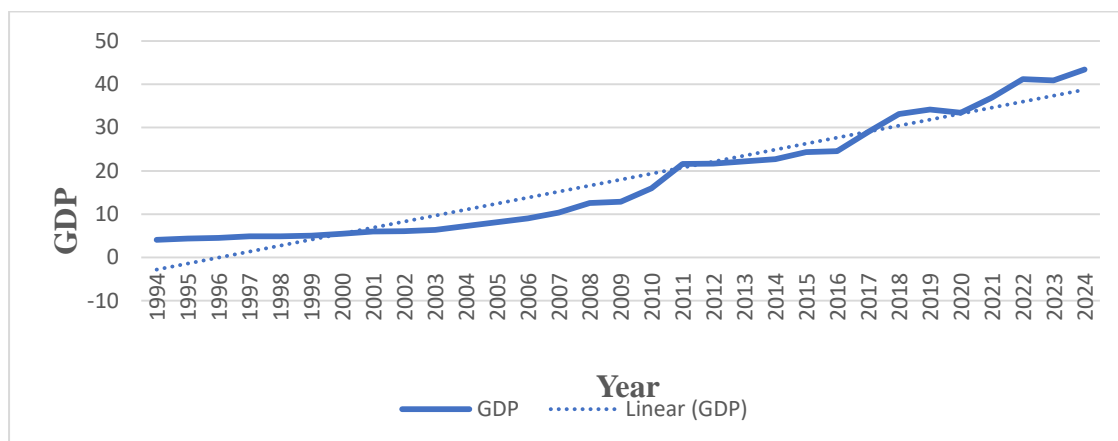
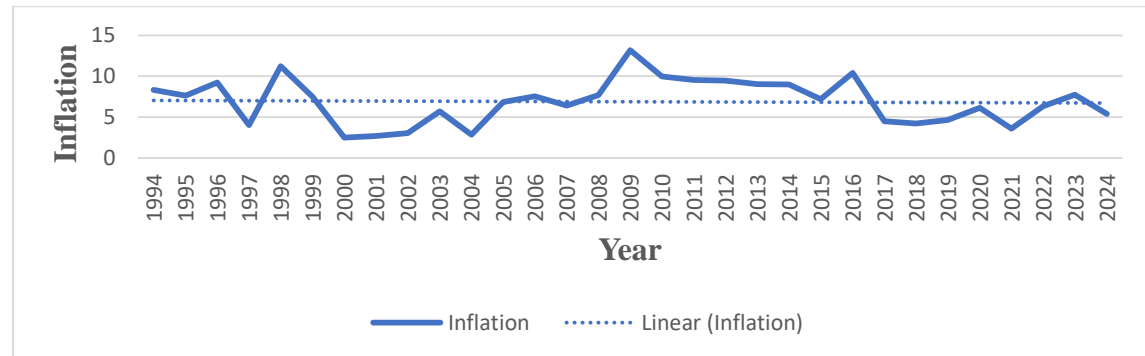


Figure 3 shows the real gross domestic product trendline. The trendline shows a gradual upward slope over the 30-year period. The trendline begins relatively flat, reflecting the weak or unpredictable GDP growth rates from 1994 to 2000. A noticeable upward slope in the trendline typically indicates structural development and investment growth

from the year 2000 to 2010. The trendline remains steady upward, suggesting economic resilience and recovery. The slope rises, indicating stronger average growth in 2024.

**Figure 4**

*Trend of Inflation Rate*



Nepal's inflation rate fluctuated a lot from 1994 and 2002, peaking at nearly 11% in 1998 and falling to roughly 3% in 2000 to 2001. Between 2003 and 2007, it stayed comparatively low. From 2008 to 2015, it fluctuated, reaching a peak of more than 13% in 2009. After that, inflation gradually decreased, reaching about 4% in 2017 and 2018. Before reducing slightly in 2024, a minor rising trend resurfaced in 2022 to 2023, topping 6%.

**Figure 5**

*Trend of Interest Rate*

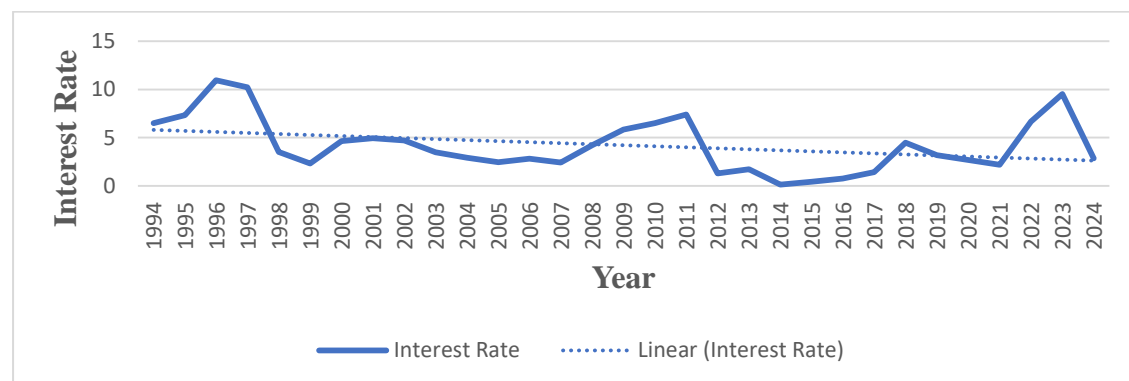


Figure 5 shows the interest rate trendline. The trendline is downward sloping, which indicates a long-term decline in interest rate. From year 1994 to 1997 interest rates is

relatively high, indicating a tighter monetary policy or underdeveloped financial markets. From year 1998 to 2008, interest rates significantly fall. Interest rate gradually rises from 2008 and drops from year 2011 to 2014. Interest Rate spikes from year 2021 to 2023. Interest rates stays relatively constant or low in year 2024.

**Figure 6**

*Trend of Broad Money Supply*

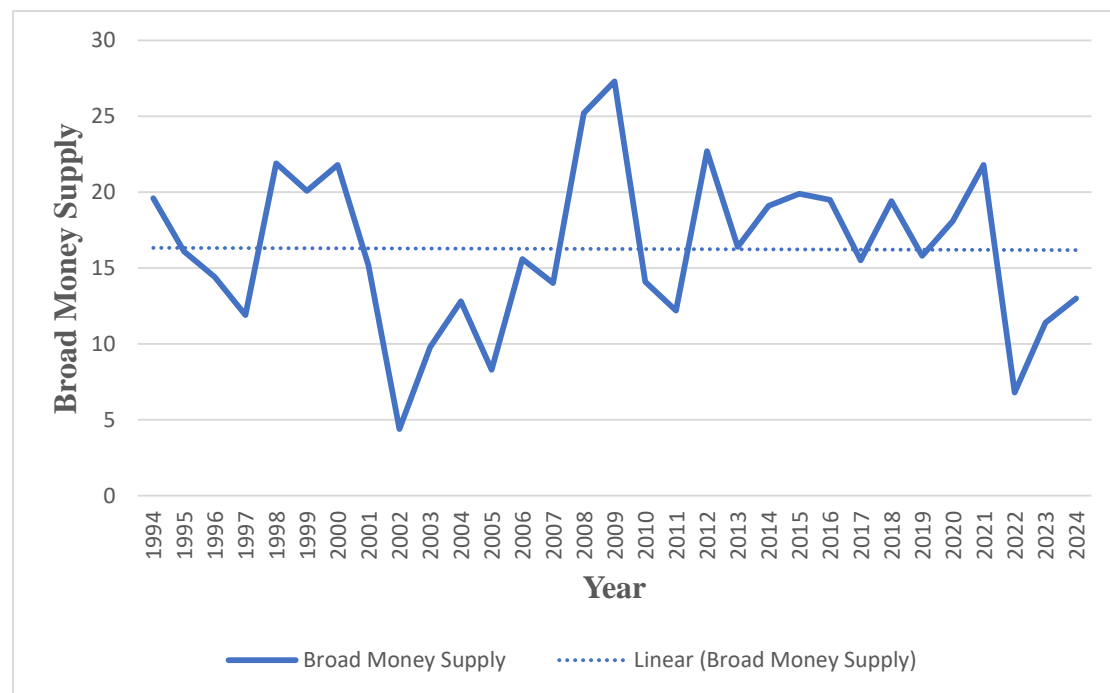


Figure 6 displays broad money supply trendline from year 1994 to 2024. There are fluctuations in the early years (1994- 2000). The growth of the broad money supply was moderately volatile, ranging between 10% and 20%. Some drops occurred, most notably between 2000 and 2002. There is a general increasing trend, with higher peaks from 2003-2009. The broad money supply continues to rise, with a noticeable peak around 2021. A modest reduction is noticed in 2021-2022, whereas there is a gradual rise from 2022-2024.

#### 4.2.2 Descriptive Statistics

Table 3 provides descriptive data for the macroeconomic variables and NEPSE index for the sample period (1994-2024 A.D.). The variables include stock prices as measured by the NEPSE index (NI), real GDP, inflation (INF), interest rates (defined as the annualized weighted average 91-day T-bills rate), and broad money supply (M2).

**Table 3***Descriptive Statistics of Macroeconomic Variables and Stock Index*

| Statistics         | NEPSE<br>Index | RGDP<br>(billion) | Inflation | Interest<br>Rate (IR) | M2     |
|--------------------|----------------|-------------------|-----------|-----------------------|--------|
| Mean               | 825.04         | 10.12             | 6.89      | 4.23                  | 16.28  |
| Median             | 477.73         | 10.11             | 7.44      | 3.74                  | 15.80  |
| St. Deviation      | 731.49         | 0.36              | 2.77      | 2.99                  | 5.31   |
| Coef. of variation | 0.887          | 0.036             | 0.402     | 0.706                 | 0.326  |
| Skewness           | 1.195          | -0.024            | 0.128     | 0.688                 | -0.143 |
| Kurtosis           | 0.665          | -1.6              | -0.615    | 0.045                 | -0.150 |
| Minimum            | 163.40         | 9.61              | 2.48      | 0.02                  | 4.4    |
| Maximum            | 2883.38        | 10.64             | 13.20     | 10.93                 | 27.3   |

Source: Appendix A

Log values have been used to smooth the data for Real GDP (RGDP).

It demonstrates that during the sample period, the NEPSE index has a mean value of 825.04 and varies from a minimum of 163.40 to a maximum of 2883.34. Real GDP has a mean value of 10.12 and varies from a minimum of 9.61 to a maximum of 10.64. The price index exhibits substantial volatility, as evidenced by the NEPSE index's coefficient of variation, which was recorded at 0.887 for the time. With an average of 6.89 for the time, the inflation rate varies from the lowest 2.48 to the highest of 13.20. In a similar way, interest rate changes within the range of 0.02 to 10.93 percent, with a coefficient of variation of 0.706 during the period. M2 has an average of 16.28 and varies from a minimum of 4.4 to a maximum of 27.3. The volatility with regard to real GDP is 0.036, and the volatility with regard to broad money supply(M2) is 0.326. When compared to all other variables, the volatility in relation to real GDP is at a minimum of 0.036.

#### **4.2.3 Correlation Analysis**

This section has shown the relationship between the stock market index and macroeconomic indicators. The macroeconomic variables are Real GDP, Inflation, Interest Rate, and Broad Money Supply. The correlation matrix that explains the direction and strength of the relationship between various pairs of macroeconomic variables from 1994 to 2024 with the NEPSE Index is summarized in Table 4, with Pearson correlation coefficients in the lower left triangle and Spearman rank correlation coefficients in the upper right triangle.

**Table 4***Pearson and Spearman Correlation Matrix*

| Variables | NI      | l_RGDP  | INF    | IR     | M2     |
|-----------|---------|---------|--------|--------|--------|
| NI        | 1       | 0.935** | -0.052 | -0.272 | 0.1    |
| l_RGDP    | 0.828** | 1       | -0.050 | -0.280 | -0.039 |
| INF       | -0.131  | 0.027   | 1      | 0.033  | 0.306  |
| IR        | -0.118  | -0.272  | 0.048  | 1      | -0.295 |
| M2        | 0.061   | 0.034   | 0.336  | -0.314 | 1      |

Source: Appendix A

*Note:* The top right triangle displays the Spearman rank correlation coefficients, while the lower left triangle displays the bivariate Pearson correlation coefficients. Stock prices and macroeconomic factors are among the variables. NI stands for market index of stock prices, l\_RGDP for real GDP log value, INF for inflation (annual consumer price inflation), IR for interest rate (annual weighted average of 91-day T-bills rate), and M2 for broad money supply growth rate. The sign "\*\*\*" denotes correlation is significant at the 1 percent level.

The findings show a high positive association between the NEPSE Index and real GDP, with both the Pearson and Spearman coefficients being statistically significant at the 1% level (0.828 and 0.935, respectively). This suggests that the stock market index tends to climb in line with real GDP growth, emphasizing the significance of economic expansion in boosting investor confidence and stock market activity in Nepal. Its robustness is further supported by the Spearman correlation's strength, which indicates that this association is consistent throughout GDP levels. On the other hand, there seems to be less of a correlation between the NEPSE Index and other macroeconomic factors. Higher inflation may marginally lower stock returns, probably as a result of greater uncertainty and diminished purchasing power, according to the small but negative connection between inflation and stock prices (Pearson: -0.131; Spearman: -0.052).

Additionally, interest rates and the NEPSE Index have a negative association (Pearson: -0.118; Spearman: -0.272), suggesting that rising interest rates may deter stock market investment by increasing the value of fixed-income assets. Nevertheless, this association is not statistically significant and is somewhat small. The money supply (M2) and stock market have a positive but weak association (Pearson: 0.061; Spearman: 0.1), suggesting that the money supply has little short-term effect on stock prices. Other inter-variable correlations that support traditional economic theory and draw attention to underlying

macroeconomic dynamics include the negative correlation between money supply and interest rate (Pearson: -0.295) and the positive correlation between inflation and money supply (Pearson: 0.306).

All things considered, the correlation matrix shows that real GDP has the greatest impact on Nepalese stock prices among macroeconomic variables, with inflation, interest rates, and money supply having comparatively small or indirect effects. These results offer a solid basis for additional regression and error correction modeling in the study and support the hypothesis that economic growth has a major impact on stock market performance.

#### 4.2.4 Regression Analysis

Table 5 shows the results of the OLS regressions. The model I-IV specifications provide the findings of a simple regression in which stock prices, as assessed by the NEPSE index (NI), were regressed on each of the key macroeconomic factors separately. Specification V reports the complete model, in which every macroeconomic variable is employed as an explanatory variable.

**Table 5**

*Estimated Relationship from Regression of Stock Prices (NI) on Macroeconomic Variables with Observations during the Period 1994 to 2024*

$$\text{Model: } NI_t = \alpha + \beta_{1t}RGDP_t + \beta_{2t}INF_t + \beta_{3t}IR_t + \beta_{4t}M2_t + \varepsilon_t$$

| Dependent Variable: NEPSE Index |                       |                     |                      |                    |                         |
|---------------------------------|-----------------------|---------------------|----------------------|--------------------|-------------------------|
| Model                           | I                     | II                  | III                  | IV                 | V                       |
| Intercept                       | -16416***<br>(-7.574) | 1063.830<br>(2.956) | 947.18***<br>(4.071) | 689.140<br>(1.578) | -17603.4***<br>(-7.948) |
| I_RGDP                          | 1702.85***<br>(7.959) |                     |                      |                    | 1805.04***<br>(8.482)   |
| INF                             |                       | -34.654<br>(-0.714) |                      |                    | -57.380<br>(-2.029)     |
| IR                              |                       |                     | -28.831<br>(-0.639)  |                    | 44.47<br>(1.643)        |
| M2                              |                       |                     |                      | 8.346<br>(0.327)   | 22.098<br>(1.422)       |
| F                               | 63.344                | 0.509               | 0.408                | 0.107              | 18.891                  |
| Adj.R <sup>2</sup>              | 0.675                 | -0.017              | -0.020               | -0.031             | 0.705                   |
| SEE                             | 416.93                | 737.55              | 738.82               | 742.63             | 397.56                  |
| DW                              |                       |                     |                      |                    | 1.178                   |

Source: (Appendix A)

*Note:* The regression findings, which take the form of simple and multiple regressions, include several model parameters. With t-statistics in parentheses, the provided values are

the intercepts and slope coefficients of the corresponding explanatory variables. The NEPSE Index (NI), which represents the stock price, is the dependent variable. The real gross domestic product (RGDP), inflation (INF), interest rate (IR), and broad money supply (M2) are the independent variables. The adjusted coefficient of determination (Adj. R<sup>2</sup>), standard error of estimates (SEE), and F-statistics (F) values are also included in the results that are provided. A triple asterisk (\*\*\*) denotes a significant result at the one percent level.

For every regression model, the variable's previously anticipated sign is maintained for RGDP (1702.85), IR (-28.83), and M2 (8.346). Both the model specification and the coefficients show that GDP is statistically significant.

This demonstrates how the chosen macroeconomic factors significantly affect fluctuating stock prices. Real GDP (RGDP) is the only variable in the multiple regression model V that maintains statistical significance at the 1% level. We could explain that the stock index fluctuates by 22.098 points for every 1% change in the broad money supply. Real GDP is one of the key macroeconomic factors that influences how stock values change, according to the statistical significance of the regression coefficient RGDP.

It may be assumed that other factors that absorb their effects are the cause of the inflation, interest rate, and broad money supply variables failure to demonstrate statistical significance in the whole model. Even if Nepal's GDP has not grown at a promising rate, previous research has shown that GDP positively influences stock values. Additionally, this study's comprehensive model revealed a statistically significant positive correlation between GDP and stock prices.

Contrary to a priori expectations, the simple regression result indicates a negative correlation between inflation and stock prices. Regarding the interest rate effect, it is thought that lowering interest rates (IR) stimulates the economy by bringing in more liquidity, which could then be directed toward the stock market and raise demand and stock prices. In contrast, boosting interest rates is expected to have the opposite impact. The current study's observed sign is negative, which is consistent with presumptions.

Increased domestic borrowing or a larger money supply is associated with future economic activity. The positive correlation between stock prices and the broad money supply (M2) has been observed, as anticipated. The money supply and stock prices do not statistically significantly correlate.

#### 4.2.4 Test for long run equilibrium

The cointegration test is the methodology utilized in this study to evaluate long-run equilibrium, and the modeling approach taken is based on the popular Engle-Granger methodology (Engle & Granger, 1987). The following is a description of the steps involved in the cointegration test:

##### a. Stationarity/Unit Root Test

Table 6 shows the unit root tests of the macroeconomic variables from 1994 to 2024 using the Augmented Dickey-Fuller (ADF) test.

Real gross domestic product (RGDP), inflation rate (INF) which is annualized consumer price inflation rate, interest rate (IR) which is the yearly weighted average of the 91-day Treasury bill rate, the NEPSE Index (NI), and the growth rate of the broad money supply (M2) are the variables.

**Table 6**

*Augmented Dickey-Fuller Test for Unit Root Test of Variables*

| Variables              | With Constant and no Trend |                       | With Constant and Trend |                       |
|------------------------|----------------------------|-----------------------|-------------------------|-----------------------|
|                        | Level(t)                   | First Difference      | Level(t)                | First Difference      |
| NI                     | 2.837<br>(1)               | -1.589<br>(0.472)     | -3.199<br>(0.104)       | -5.135***<br>(0.002)  |
| I_RGDP                 | -0.245<br>(0.922)          | -4.616***<br>(0.0010) | -1.658<br>(0.745)       | -4.530***<br>(0.006)  |
| INF                    | -3.417<br>(0.0182)         | -7.832***<br>(0.000)  | -3.351<br>(0.076)       | -7.679***<br>(0.000)  |
| IR                     | -2.729<br>(0.081)          | -5.989***<br>(0.000)  | -2.782<br>(0.214)       | -6.327***<br>(0.0001) |
| M2                     | -3.898<br>(0.0057)         | -5.643***<br>(0.0001) | -3.830<br>(0.029)       | -5.579***<br>(0.0005) |
| <b>Critical Values</b> |                            |                       |                         |                       |
| 1%                     |                            | -3.76                 |                         | -4.324                |
| 5%                     |                            | -2.99                 |                         | -3.581                |
| 10%                    |                            | -2.64                 |                         | -3.225                |

*Note:* A model without a trend or constant is avoided, as the data figure indicates. E-views software has been used to do unit root tests. The sign (\*\*\*) denotes that the variables are stationary.

Finding out if the variables being used are stationary or non-stationary is the first step. Tests for each variable are conducted on both levels and first differences, taking into account that unit root tests are sensitive to the presence of predictable regressors. The Augmented Dickey Fuller (ADF) test results for the models with or without constants and no trends are shown in Table 5.

According to table 5 none of the variables were stationary at the level and became stationary after the first order difference which examines the stationary of variables using the ADF test. As a result, it is determined that the variables have an order one I (1) integration.

### **b. Cointegration Test**

Testing the order of integration of the relationship's error term is necessary to check for cointegration, or long-run equilibrium. Therefore, testing for cointegration for the purposes of this study entails testing for stationarity in the regression equation's residuals. Finding the VAR model's ideal order utilizing lag determining criteria is the first step in estimating the long-term association between variables using the Engle-Granger integration technique.

**Table 7**

*Number of optimal lag using Schwarz Bayesian Criteria*

| Number of Lags | Schwarz Bayesian Criteria |
|----------------|---------------------------|
| 3              | 30.529                    |
| 2              | 29.658                    |
| 1              | 27.511*                   |

\*Denotes the optimal lag

Table 7 shows that the best lag for the VAR model based on the Schwarz-Bayesian criteria is one.

Engle and Granger (1987) residuals-based approach was used to perform the cointegration test. This state that if the residuals from the static regression above are stationary, cointegration exists between variables. Therefore, even though the variables may wander or drift away individually, there is a tendency for them to move together over the long term. Table 8 displays the findings from the Engle and Granger Cointegration test.

**Table 8***Cointegrating Regression**OLS Estimates of the Long Run Model*

| Dependent Variables           | Independent Variables      | Coefficients       | t-Statistics | Probability       |                        |
|-------------------------------|----------------------------|--------------------|--------------|-------------------|------------------------|
| NI                            | Constant                   | -18371.39          | -6.994       | 0.000             |                        |
|                               | l_GDP                      | 1905.660           | 7.507        | 0.000             |                        |
|                               | INF                        | -86.812            | -2.647       | 0.014             |                        |
|                               | IR                         | 56.136             | 1.779        | 0.087             |                        |
|                               | M2                         | 19.418             | 1.069        | 0.295             |                        |
|                               | R <sup>2</sup>             | 0.719              |              |                   |                        |
|                               | Adj.R <sup>2</sup>         | 0.674              |              |                   |                        |
|                               | SD. Dep.Var                | 735.35             |              |                   |                        |
|                               | DW                         | 1.897              |              |                   |                        |
|                               | S.E. of Reg                | 419.94             |              |                   |                        |
| Stationarity Test of Residual |                            |                    |              |                   |                        |
| Test Variable                 | Null Hypothesis            | Test Statistics(t) | p-value      | Null Hypothesis   | Result                 |
| u                             | Residual is not stationary | -3.503             | 0.0015       | Could be rejected | Residual is stationary |

Given that the p value is 0.0015, the result in Table 8 shows that the unit root hypothesis of no stationarity (null hypothesis of no cointegration) could be rejected for the residuals (u). This demonstrates that there is proof that the variables utilized have a cointegrating relationship and, as a result, sustain long-term equilibrium. This suggests that, in the case of Nepal, there is cointegration and long-term equilibrium between stock prices and the macroeconomic factors considered.

**c. Error Correction Model**

The presence of ECM, shows the rate of adjustment in the event that the variables are cointegrated, is a necessary and sufficient condition for cointegration. ECM exist when cointegration is present. Thus, we need to undertake further ECM testing. In order to test ECM, the variables whose first differences are taken into consideration must undergo ordinary least square regression with the residual from OLS regression. The independent variables used to run the model are given a lag value of order 1. The dynamic model's rate of adjustment to return to equilibrium is determined by the estimated coefficient of error correction term. The data provide the predicted negative sign for the residual, or (ECT<sub>t-1</sub>)

= -0.481, which is a requirement for the error correction model. Table 9 contains the ECM's complete model and findings.

**Table 9**

*Error Correction Model (ECM) for stock prices*

| Dependent variable | Independent Variables | Coefficient | t-Statistics | Probability |
|--------------------|-----------------------|-------------|--------------|-------------|
| $\Delta NI_t$      | Constant              | 155.109     | 1.557        | 0.1319      |
|                    | $\Delta I\_GDP_{t-1}$ | -2633.068   | -1.166       | 0.255       |
|                    | $\Delta INF_{t-1}$    | -39.829     | -1.842       | 0.078       |
|                    | $\Delta IR_{t-1}$     | 57.096      | 1.866        | 0.074       |
|                    | $M2_{t-1}$            | 28.061      | 2.569        | 0.017*      |
|                    | $(ECT_{t-1})$         | -0.481      | -2.574       | 0.017       |
|                    | $R^2$                 | 0.387       |              |             |
|                    | Adj. $R^2$            | 0.259       |              |             |
|                    | F-statistics          | 3.033       |              |             |
|                    | P-value(F)            | 0.029*      |              |             |
|                    | DW                    | 2.218       |              |             |
|                    | S.E. of Regression    | 333.39      |              |             |

\*Denotes that estimates are significant at 5 percent.

With an F-statistic of 3.033 and a corresponding p-value of 0.029, the entire model is statistically significant at the 5% level.

With a p-value of 0.017, the findings indicate that the broad money supply (M2) has a positive and statistically significant effect on stock prices at the 5% level, indicating that a rise in the money supply has a short-term positive effect on the NEPSE index. There is no clear short-term impact of GDP on stock prices, although inflation and interest rates have p-values that are just over 0.05 (0.078 and 0.074, respectively).

The existence of a long-term correlation between stock prices and macroeconomic factors, specifically the money supply, is supported by the model.

### 4.3 Major Findings

- i. The correlation coefficients showed that the stock market prices (NI) have a negative correlation with interest rates and inflation but a positive correlation with real GDP, and broad money supply. It showed that when market interest rates rise, stock returns continue to decline. Investors will be hesitant to take out loans with higher interest rates and utilize them to purchase stocks.

- ii. According to the statistical significance of the regression coefficient RGDP (1805.04) among other macroeconomic variables like inflation, interest rate and broad money supply, real GDP is crucial in influencing changes in stock prices.
- iii. The residual p-value in cointegrating regression was found to be 0.0015, not rejecting the cointegrating link between the variables and indicating that they sustain long-term equilibrium. The findings of Chen et al. (1986), Maysami and Koh (2000), Ibrahim and Aziz (2003), Abu-Libdeh and Harasheh (2011), Osamyoni and Osagie (2012), are all in support of this outcome.

**Table 10***Summary of the Results*

| Hypotheses        | Independent Variables   | Dependent Variable | Hypothesized Relationship | Findings     |
|-------------------|-------------------------|--------------------|---------------------------|--------------|
| First Hypothesis  | Real GDP                | NEPSE Index        | Positive                  | Supported    |
| Second Hypothesis | Inflation               | NEPSE Index        | Positive                  | Contradicted |
| Third Hypothesis  | Interest Rate           | NEPSE Index        | Negative                  | Supported    |
| Fourth Hypothesis | Broad Money Supply      | NEPSE Index        | Positive                  | Supported    |
| Fifth Hypothesis  | Macroeconomic Variables | NEPSE Index        | Long Run                  | Supported    |

**4.4 Discussion**

This study's main goal was to investigate how several macroeconomic factors real GDP, inflation rate, interest rate, and broad money supply (M2) affect Nepali stock prices as measured by the NEPSE Index. The next section discusses the results of descriptive statistics, regression models, correlation analysis, and cointegration tests in light of pertinent empirical research and economic theories.

Real GDP (in log form) and the NEPSE Index have a positive and statistically significant association, according to the empirical findings of both correlation and regression analysis. This outcome is in line with the theoretical prediction that GDP-measured economic growth raises investor confidence and business profits, which in turn raises stock prices. The cointegration test and the multivariate regression model, which show real GDP to be the only consistently significant explanatory variable, further support the

considerable long-run link. This result is consistent with earlier research that demonstrated long-term correlations between GDP and stock prices, including Fama (1981) and Mukherjee and Naka (1995). Tripathi and Sethi (2010) in India and Gan et al. (2006) in New Zealand have both shown similar results in the South Asian environment. These consistent results imply that, in both developed and emerging countries, economic production has a significant role in determining investor sentiment and business profitability.

In every model, there was a negative but statistically insignificant correlation between inflation and the NEPSE Index. Although the sign is in line with the Fama proxy hypothesis and the Fisher Effect, which contend that inflation negatively affects real returns and, consequently, stock prices, the lack of significance may be explained by Nepal's inconsistent and unpredictable inflationary trends throughout time. Similar mixed findings have been reported in a number of earlier studies. For example, Pilinkus (2010) and Aydemir and Demirhan (2009) discovered that in some emerging economies, inflation had little to no impact on stock markets. Shrestha and Subedi (2014) found that inflation had a negative effect on NEPSE in the Nepalese setting, however, this effect was not always significant.

As anticipated, although not statistically significant, the bivariate model showed a negative connection between interest rates and NEPSE. It's interesting to note that the interest rate coefficient became positive and somewhat significant in the short-run dynamics in the multivariate and ECM models. These results are consistent with those of Dimitrova (2005), who found that several emerging markets had comparable poor or even conflicting outcomes.

In both regression and error correction models, the broad money supply (M2) coefficient is positive, and in the short-run dynamic model, it is statistically significant. This gives support to the liquidity hypothesis, which contends that a larger money supply can boost stock values by lowering interest rates and boosting liquidity, both of which in turn stimulate investment in stocks. This result is in line with research by Adam and Tweneboah (2008) and Maysami et al. (2004), which found a positive correlation between M2 and stock prices in emerging countries. However, there is a statistical insignificance of the long-term association between M2 and NEPSE, which indicates that the money supply's impact is just temporary.

A long-term equilibrium relationship between NEPSE and the macroeconomic variables, particularly real GDP and inflation, is confirmed by the cointegration test. The market corrects around 48.1% of the previous year's disequilibrium in the current year, according to the significant and negative error correction term in the ECM (-0.481), indicating a reasonably fast adjustment pace. This result suggests that even though there are short-term fluctuations, the NEPSE Index eventually returns to its macroeconomic foundations.

Of the macroeconomic factors that were chosen, the study clearly shows that real GDP is the most important and consistently dependable factor affecting Nepalese stock values. Higher real GDP generally indicates economic growth, higher corporate earnings, and enhanced investor confidence, all of which have a favorable effect on stock market performance, so this conclusion is consistent with theoretical assumptions. Furthermore, the outcome is consistent with a significant amount of prior empirical research showing a high positive correlation between real GDP and stock market indices, both internationally and within comparable developing economies. The strength of this correlation in the Nepalese context implies that GDP growth is an important metric for both policymakers and stock market participants.

The money supply (M2) exhibits short-term significance, supporting the market's liquidity-driven behavior. However, although having the theoretically proper indications, inflation and interest rates are statistically weak, most likely as a result of inefficient markets and low investor awareness. The conflicting findings highlight the fact that Nepal's stock market is still in the early stages and that, while macroeconomic fundamentals do have an impact, structural, institutional, and behavioral variables frequently moderate or distort this impact.

## Chapter V

### Summary and Conclusion

#### 5.1 Summary

This chapter looks at how important stock markets are to economic growth and how important macroeconomic factors like GDP, inflation, interest rates, and money supply impact stock prices, especially when considering Nepal's changing financial sector. There is little empirical research on the impact of macroeconomic issues, despite the growing interest in Nepal's stock market. By examining how these factors affect NEPSE, the study seeks to close this gap and provide information to investors and policymakers. It highlights the need for context-specific analysis to help well-informed decision-making and improve market efficiency in Nepal by outlining the research objectives, hypotheses, justification, and constraints.

Markowitz (1952) outlined the foundations of stock price implications in portfolio selection. Research has shown that macroeconomic conditions can predict stock market performance. The goal of this study is to find evidence of cointegration between macroeconomic determinants and stock market performance. The literature shows a significant correlation between macroeconomic conditions and stock prices both internationally and in Nepal, but the findings highlight the complex relationships and their impact on country characteristics.

The thorough study technique utilized to investigate how macroeconomic factors affect Nepalese stock prices is described. The chapter begins with a conceptual framework defining the basic macroeconomic indicators of GDP, inflation, interest rates, and the broad money supply, as well as their suggested link to the NEPSE Index. Correlation, regression, and cointegration analysis are among the statistical and empirical techniques used in this descriptive-analytical study design. World Bank, NEPSE, and Nepal Rastra Bank provided the secondary time-series data used in the study, which spans the years 1994 to 2024. After verifying data stationarity using the Augmented Dickey-Fuller test, it analyzes long-term equilibrium relationships using the Error Correction Model and the Engle-Granger cointegration test.

## 5.2 Conclusions

This study looks at the economic aspects of Nepal's stock market performance, which has fluctuated recently. This study looks into the impact of macroeconomic circumstances on stock returns because the stock market can be extremely sensitive and volatile at times.

Several significant conclusions may be made in light of the main findings of the study, looking at how macroeconomic factors affect stock prices in Nepal. The NEPSE Index and a few chosen macroeconomic indicators have a complicated but important link, according to the analysis. First, the correlation results show that inflation and interest rates have a negative relationship with stock prices, indicating that rising levels of these factors may stifle investor excitement and lower stock market performance. Higher interest rates make borrowing more expensive, which deters people from investing in stocks. However, the broad money supply and real GDP have a positive correlation with the stock market, suggesting that the expansion of the economy and more financial system liquidity support the rise of the stock market. The importance of real GDP in explaining variations in stock prices is highlighted by the regression analysis. Real GDP is a significant factor in determining changes in Nepal's stock price, with a statistically significant coefficient of 1805.04. This result lends credibility to the idea that business profits rise in line with economic expansion, boosting investor confidence and stock prices. The cointegration analysis also supports the evidence for a long-term equilibrium relationship between stock prices and macroeconomic factors.

The existence of a steady and enduring relationship throughout time is confirmed by the low residual p-value (0.0015). This gives validity to the hypothesis that macroeconomic fundamentals and stock market performance are closely tied in the long run. These findings support the findings generalizability and dependability because they are consistent with a large body of literature, including research by Chen et al. (1986), Maysami and Koh (2000), and regional scholars like G.C. and Neupane (2006).

The study concludes that macroeconomic factors in particular, real GDP, interest rates, inflation, and the broad money supply have a significant impact on the dynamics of the Nepali stock market. Policymakers and investors can use this information to help them make well-informed economic and investment decisions.

### 5.3 Implications

The following key implications have been made based on the findings of the study:

- i. This study is significant for both practitioners and scholars of finance. Analyzing the macroeconomic variables that influence the stock market return over the short and long terms may also be helpful to investors in the Nepali stock market. The long-term cointegration of stock prices and macroeconomic factors suggests that the growth of the capital market depends on macroeconomic stability. Researchers studying related subjects in other developing economies might use the Cointegration and Error Correction Model (ECM) as a methodological foundation.
- ii. The study emphasizes how important macroeconomic factors in Nepal shape the general state of the economy, investor sentiment, and company profitability, all of which have a substantial impact on stock market results. To better evaluate market circumstances, spot possibilities and hazards, and make wise investment decisions, investors should thus keep a constant eye on these signs.
- iii. This study evaluated a small number of macroeconomic factors to assess how the macroeconomy affects stock prices. The dynamic relationship between stock prices and economic development may be better understood by including a few additional variables, such as exchange rates, foreign direct investment.
- iv. Since simple models like regression and cointegration might not adequately capture nonlinear patterns, time-varying correlations, or structural shifts, future research should use advanced econometric models to better capture the complex connections between macroeconomic variables and stock market behavior.
- v. In order to promote sustainable stock market development, policymakers should concentrate on long-term economic planning and maintain macroeconomic consistency, as cointegration analysis validates a long-run equilibrium relationship between macroeconomic variables and stock prices.
- vi. Improving the availability and dependability of market and economic data is crucial for making precise predictions about how macroeconomic shifts will impact the stock market. Research and forecasting are less effective in Nepal because data is frequently unpredictable, outdated, or hard to obtain. Standardized, prompt, and transparent reporting procedures would improve data quality and strengthen the basis for analysis.

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## APPENDIX

### Appendix A

#### *Data on Macroeconomic Variables and Stock Index*

The table displays statistics on stock market prices and selected macroeconomic factors from 1994 to 2024. The variables include stock prices (proxied by NEPSE Index), real GDP (RGDP), inflation rate (INF) (as consumer price index), interest rate (IR) (as annualized weighted average 91-day treasury bills rate), and broad money supply growth rate (M2).

| Year | NEPSE<br>Index (NI) | Inflation<br>Rate%(INF) | Interest<br>Rate%(IR) | Real GDP<br>(RGDP)\$ | Broad Money<br>Supply(M2) % |
|------|---------------------|-------------------------|-----------------------|----------------------|-----------------------------|
| 1994 | 226                 | 8.35                    | 6.5                   | 4.07                 | 19.6                        |
| 1995 | 195                 | 7.62                    | 7.35                  | 4.40                 | 16.1                        |
| 1996 | 185.60              | 9.22                    | 10.93                 | 4.52                 | 14.4                        |
| 1997 | 176.30              | 4.01                    | 10.22                 | 4.92                 | 11.9                        |
| 1998 | 163.40              | 11.24                   | 3.52                  | 4.86                 | 21.9                        |
| 1999 | 216.90              | 7.45                    | 2.33                  | 5.03                 | 20.08                       |
| 2000 | 360.70              | 2.48                    | 4.66                  | 5.49                 | 21.8                        |
| 2001 | 348.40              | 2.69                    | 4.96                  | 6.01                 | 15.2                        |
| 2002 | 227.50              | 3.03                    | 4.71                  | 6.05                 | 4.4                         |
| 2003 | 204.90              | 5.71                    | 3.48                  | 6.33                 | 9.8                         |
| 2004 | 222                 | 2.84                    | 2.93                  | 7.27                 | 12.8                        |
| 2005 | 286.67              | 6.84                    | 2.46                  | 8.13                 | 8.3                         |
| 2006 | 386.86              | 7.56                    | 2.84                  | 9.04                 | 15.6                        |
| 2007 | 683.95              | 6.40                    | 2.42                  | 10.33                | 14                          |
| 2008 | 963.36              | 7.70                    | 4.22                  | 12.55                | 25.2                        |
| 2009 | 749.10              | 13.20                   | 5.83                  | 12.85                | 27.3                        |
| 2010 | 477.73              | 9.98                    | 6.50                  | 16                   | 14.1                        |
| 2011 | 362.85              | 9.55                    | 7.41                  | 21.57                | 12.2                        |
| 2012 | 389.74              | 9.45                    | 1.31                  | 21.70                | 22.7                        |
| 2013 | 518.33              | 9.04                    | 1.74                  | 22.16                | 16.4                        |
| 2014 | 1036.11             | 9                       | 0.13                  | 22.73                | 19.1                        |
| 2015 | 961.23              | 7.20                    | 0.43                  | 24.36                | 19.9                        |
| 2016 | 1718.15             | 10.40                   | 0.79                  | 24.52                | 19.5                        |
| 2017 | 1582.67             | 4.5                     | 1.45                  | 28.97                | 15.5                        |
| 2018 | 1212.36             | 4.2                     | 4.48                  | 33.11                | 19.4                        |
| 2019 | 1259.01             | 4.64                    | 3.20                  | 34.19                | 15.8                        |
| 2020 | 1362.34             | 6.15                    | 2.69                  | 33.43                | 18.1                        |
| 2021 | 2883.38             | 3.60                    | 2.19                  | 36.92                | 21.8                        |
| 2022 | 2009.46             | 6.32                    | 6.67                  | 41.18                | 6.8                         |
| 2023 | 2097.10             | 7.74                    | 9.51                  | 40.91                | 11.4                        |
| 2024 | 2108.70             | 5.44                    | 2.85                  | 43.42                | 13                          |

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