

**EFFECT OF MACRO ECONOMIC FACTORS ON SHARE PRICE
VOLATILITY AMONG FIRMS LISTED AT THE NAIROBI SECURITIES
EXCHANGE**

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DECLARATION

This Research thesis is my original work and has not been presented in any other university for grading or evaluation


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LIST OF ABBREVIATIONS

APT	Arbitrage Pricing Theory
CPI	Consumer Price Index
EMH	Efficient Market Hypothesis
GSE	Ghana Stock Exchange
NSE	Nairobi Securities Exchange
PPI	Producer Price Index
SPSS	Statistical Package for Social Sciences
UK	United Kingdom
VIF	Variance Inflation Factors

ABSTRACT

The study sought to determine how the NSE reacts to changes in the macroeconomic variables. Specifically, the purpose to find out how money supply, exchange rates, interest rates, and inflation influence the NSE. The study was anchored on the Arbitrage Pricing Theory, Theory of Efficient Market Hypothesis, and the Present Value Model. The study covered all firms listed on the NSE. The period of analysis was 21 years, which is 2000 to 2020. Data analysis was done using SPSS version 25 using both descriptive analysis methods and inferential analysis. This was done using both descriptive and inferential analysis. Descriptive analysis was used to summarize the data into meaningful form using descriptive measures such as means and standard deviations. Trend analysis was also applied to visualize the data and understand the underlying trends. Regression was used to examine the association between the macroeconomic variables and share price variability. The study showed strong relationship between the variables ($R=0.745$). The R square value obtained, 0.555 indicated that variation in the macroeconomic variables caused 55.5% variation in the NSE performance. From the analysis, CBK is recommended to ensure that the interest rates are stable and favorable to the borrowers in order to encourage borrowing in order to promote investment in the stock market leading to improved performance. The CBK is recommended to strengthen its monetary policies in the country in order to control and regulate inflation at sustainable levels. The CBK is therefore recommended to closely monitor the flow of money in the economy to ensure money demand and supply in the economy is balanced.

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

The securities market provides a suitable investment platform since they provide investors with a platform to trade various securities and stocks. They offer an avenue which offer the listed companies an avenue to access long term capital (Fufa & Kim, 2018). While the share markets are very vital, they are affected by various factors, what makes prediction of the stock behavior a substantial effort. The stock prices are highly sensitive to various factors, primarily the macroeconomic environment. According to Weng et al (2018), the stock prices are highly sensitive to macroeconomic variables and when making investment moves, investors directly or indirectly base their decisions on the changes and trends in the macroeconomic variables in the country. Therefore, the effect of macroeconomic variables on stock prices has received significant consideration and has emerged as subject of growing empirical and theoretical investigation.

The study was anchored on efficient market hypothesis by Fama (1970) and Arbitrage Pricing Model by Ross (1979). According to efficient market hypothesis, the securities prices are a true reflection of the real value of the assets but simply means that the quoted security price takes into consideration all the information in the public domain. According to efficient market hypothesis, the volatility in share prices is partly caused by changes in other variables that are not specific to the firm including the macroeconomic variables. The Arbitrage Pricing Theory argues that all the factors that affect future cash flow and risk are determinants of stock market volatility.

The macroeconomic environment in Kenya has recorded considerable changes in the recent past (Statista, 2021). The huge variability in the macroeconomic variables was accompanied by high volatility in the shares prices of companies quoted under the NSE (Kasaya & Maniagi, 2020). It is worth noting that such the high variability in the macroeconomic variables increases risks and speculations which in turn alters investment patterns in the shares of the listed firms. As a result, the share prices highly fluctuate. It is worth noting that, if excessive, such volatility can lead to negative performance of the NSE.

1.1.1 Macroeconomic factors

Macroeconomic variables are variables that have effects on the general economy of a nation Evusa, Kitati and Maithya (2014). According to World Bank (2012), macroeconomic variables are factors that influence economy of a country at various levels that is both regional and national. These variables impact on the operations of a firm although it doesn't have control over them (Shah, Hiles, & Morley, 2018).

One of the variables is interest rates. This refers to the charges lenders charge borrowers in order for the borrowers to utilize their money for an agreed duration (Ali, 2014). Interest rates are operationalized in terms of the average lending rates by commercial banks. Inflation refers to the general hike in prices of commodities as well as services rates across the board and it is operationalized in terms of Consumer Price Index (CPI) and Producer Price Index (PPI). Exchange rate is the value at which the currency of a nation exchanges with currencies of other nations (Hajilee & Al Nasser, 2014). This rate is highly volatile and keep fluctuating as other macroeconomic variables change (Osabuohien et al, 2018). Money supply includes all the

currency and other liquid instruments in the economy of a nation at a given time (Goodhart, 2017). Changes in money supply causes changes in other macroeconomic factors especially the interest rates.

In the current study, the variables of interest are interest rates, inflation, exchange rates, and money supply. Interest rate will be operationalized in terms of average monthly Central Bank Rate, inflation rate will be operationalized in terms of CPI, exchange rates will be operationalized in terms of average monthly exchange rate of Kenyan Shilling to US Dollar, and money supply will be measured in terms of Kenya's monthly broad money (M2).

1.1.2 Share Price Volatility

Share price volatility was defined by Mgbame and Ikhatua (2013) as the measure of uncertainties experienced in a financial market. Gatuhi (2015) defined share price volatility as unpredictable variability experienced in the stock exchange. Siopis and Lyroudi (2007) defined volatility of stock prices as the frequency in which the shares of the stocks of a given firm varies with time. Based on the definitions, an implication can be made that the price of a volatile share varies rapidly making it impossible to forecast the prices in the future (Khaled, Chijoke & Aruoriwo, 2010).

Share price volatility is measured in various ways. Share price volatility is basically measured using the standard deviation. This shows on average the manner the share prices vary from the mean over a certain time duration. To compute this, the mean price is obtained for a certain duration and the mean is subtracted from each price (Mbaabu, 2018). The differences between

the mean and the prices are then squared, summed and averaged to get the variance. The square root of the variance is then obtained to get the standard deviation. High price differences within a short period of time denotes high share price volatility while small differences in prices denotes low share price volatility.

In this study, the aim is to analyse how macroeconomic variables on share price variability. For the purpose of this study, share price variability will be operationalized in terms of monthly variance in NSE-20 share index.

1.1.3 Macro-Economic Factors and Share Price Volatility

Changes in the macroeconomic factors causes variations in the stock market dynamics (Idrees, Alam & Agarwal 2019). When interest rates change, variability in the stock prices occurs in a manner whereby an increase in interest rates leads to low investment in the share market (Ali, 2014). The shares prices in return reduce as companies seek to attract more investors. Low interest rates on the other increases borrowing which in turn increases investment in stock market. This leads to an increase in share prices.

Inflation is the other macroeconomic variable that influences the stock market. High inflation erodes the purchasing power of the people and reduces investment in the stock market and other avenues (Mukhtarov, Aliyev & Zeynalov, 2020). The increase in inflation reduces investment in the stock market thereby pressuring the share prices downwards. Low inflation, on the contrary increases the investment ability which in turn increases the demand of shares of the quoted firms. The increased demand leads to high stock prices. Inflation also affects the stock market by

disturbing expectations of stock market investors. This fluctuation in the investment patterns alters the behavior of stock prices (Mukhtarov, Aliyev & Zeynalov, 2020). Additionally, growing inflation pressurize interest rates upwards, a situation which may result in investors shifting from the stock market to the bonds market in pursuit of higher returns. This leads to low stock prices.

Exchange rates also influences the stock market performance and share price variability (Hajilee & Al Nasser, 2014). Exchange rates changes can be caused by changes in other macroeconomic variables. Exchange rates volatility can be caused by capital flows liberalization. When the exchange rate of a country depreciates, the trading activities in the stock market reduces. This leads to a reduction in stock prices in a bid to attract more investment.

Money supply is the other macroeconomic variable that cause share prices volatility (Salim, 2019). When money supply increases, the demand for money increases due to an expectation of the economy. When the economic status is expected to improve, companies also anticipate high profits which in turn stimulate high investment in stocks. This causes an increase in the prices. On the other hand, low money supply signifies low demand for money as investors anticipate low economic activities (Barakat, Elgazzar, & Hanafy, 2016). Low economic activities imply low investment returns which in turn affects the investment in the share market. A reduction in the stock market investment leads to low shares prices.

1.1.4 Firms Listed at the Nairobi Securities Exchange

The NSE offers a platform when different securities are listed and traded in Kenya. Currently, the NSE has 64 listed companies listed under different categories (Onguka, Iraya, & Nyamute,

2021). Share price variability is a key trait of companies quoted under the NSE. This changes in prices is different in different sectors with volatility being higher in some sectors than others (Aiyabei, 2021). It is worth noting that, price volatility, if excessive can affect how the stock market functions and can have negative effects on stock market performance (Chege & Kirika, 2021).

The share price volatility in firms quoted in the NSE is attributed to the prevailing macroeconomic environment. The macroeconomic environment in the country has recorded numerous changes in the recent past with notable changes in interest rates, money supply, inflation, exchange rate, and Gross Domestic Product. The huge variability in the macroeconomic variables was accompanied by high volatility in the shares prices of firms listed at the NSE (Capital Markets Authority, 2019). It is worth noting that such the high variability in the macroeconomic variables increases risks and speculations which in turn alters investment patterns in the shares of the listed firms. As a result, the share prices highly fluctuate.

1.2 Research Problem

The stock markets in emerging economies are key targets for investors; what makes the prediction of the behavior of these markets a substantial effort. When predicting the share prices, the investors consider various factors with macroeconomic variables being the key determinants. According to Karthigai et al (2020), the share prices are highly sensitive to macroeconomic environment and investors directly or indirectly base their investment decisions on the trends and changes in the macroeconomic variables and the overall situation in the market. Therefore, the

relationship between macroeconomic variables and stock prices has become a key focus for researchers, practitioners, and economists globally.

Over the recent past, the share prices of companies quoted under the NSE have recorded significant variability (Chepkwony, 2021). Similarly, the macroeconomic environment in the country has greatly changed in the recent past. According to Capital Markets Authority (2019), by December 2019, the inflation rate was 5.82 percent which was considerably high. Interest rates had declined greatly throughout 2019 as well as a huge variability in exchange rates (Koskei, 2021). Likewise, money supply has greatly varied in the recent past. While there has been huge variability in the stock prices and macroeconomic variables, the relationship between the variables is still unclear what warrants this study.

Extensive research has been done to on macroeconomic factors and share prices. Globally Neifar (2021) identified a stable long run nexus between macroeconomic variables and stock market performance in the UK. In another study by Huy, Dat and Anh (2020) identified that an increase in the GDP, reduction in CPI and lending rate led to an increase in the company's stock prices in Sacombank (STB) in Vietnam. In another study, Megaravalli and Sampagnaro (2018) established that the stock market in India, China and Japan was highly dependent on macroeconomic environment in the country. While the studies offered key insights on how macroeconomic factors influence share prices, the geographical settings were different and findings cannot be generalized in Kenya, hence the rationale for the current study.

Regionally, Prempeh (2016) identified that the variability in Ghana Stock Exchange (GSE) was highly influenced by macroeconomic variables. In another study in South Africa, Shawtari et al,

(2016) the changes in stock prices was highly attributed to macroeconomic environment. In another study by Epaphra (2018) conducted in Tanzania, money supply and exchange rates emerged as key determinants of stock market performance. While the studies offered key insights, they were conducted in various geographical settings and the findings cannot be generalized in Kenya, hence the rationale for the current study.

Locally, Mwai (2013) identified that the prevailing macroeconomic environment largely influenced the stock prices. Similarly, Kitatia, Zablonb and Maithyac (2015) identified that macroeconomic variables influence share prices. In another study, Mbaabu (2018) identified that share prices volatility depended largely on the macroeconomic variables. While numerous studies have focused on the effect macroeconomic environment on share prices, there was a need for another study with up to date data including the 2021 data.

1.3 Objectives of the Study

1.3.1 Main Objective

The main aim of the study was to determine how selected macroeconomic factors determine share price volatility among firms quoted under the NSE.

1.3.2 Specific Objectives

The aimed at meeting the following objectives;

- i. To assess the effect of interest rates on share price volatility of firms listed at the NSE.
- ii. To evaluate the effect of inflation on share price volatility of firms listed at the NSE.
- iii. To determine the effect of exchange rates on share price volatility of firms listed at the NSE.

iv. To find out the effect of money supply on share price volatility of firms listed at the NSE

1.4 Value of the Study

The study will provide investors with key insights that will inform and guide their investment decisions at the NSE. This will enable them to be attentive to macroeconomic variables when making investment decision and in diversifying risks while investing in the stock market. The future investors in the NSE will also use this study as a foundation upon which they can gauge how the prevailing macro-economic environment in the country can impact on their investment choices. Secondly, policy makers will benefit from this study particularly the Capital Markets Authority and the NSE.

Thirdly, the study will benefit the government in formulation and implementation of NSE policies. Fourthly, the study will enrich the existing practical and theoretical literature on macroeconomic variables and share price volatility. The will be a crucial reference to researchers and academicians furthering studies on macroeconomic variables and share prices variability. The study will also capture research gaps that other researchers can focus on.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This section covers a review of literature. The sections included here include theoretical framework, macroeconomic factors concepts, and an empirical review. The last section summarizes the reviewed literature and research gaps.

2.2 Theoretical Framework

Arbitrage pricing theory and efficient market hypothesis were used to anchor the study. The theories explained how the share prices at the NSE are determined and influenced by variation in the macroeconomic factors.

2.2.1 Arbitrage Pricing Theory

This model was founded by Ross (1970). This model pinpoints the fair market price of a security that may be mispriced temporarily. According to the theory, the expected assets yields can be forecasted based on the relationship between the asset and the different shares risk factors (Ross, 1976). In this regard, the Arbitrage theory helps to forecast the asset prices based on different macroeconomic variables (Black, Jensen & Scholes, 1972). Therefore, financial analysis and the investors can utilize the assumptions of the APT model to determine the stock prices.

The Arbitrage model has a number of proponents. According to Roll and Ross (1980), there are various expected and unexpected factors that determined the returns investors earn from their assets. The macroeconomic environment of the country is among the factors that influence the

returns the investors earn from the investments. According to Chen, Roll and Ross (1986), the risks directly affect the portfolio returns. However, these returns can also be affected by other different factors. Therefore, investors broaden their investment selections and choose the ones that are not affected directly by the same kind of risks. This would help to enhance the returns earned from the investment.

APT was considered suitable in this study as it argues that the returns that assets earn occur are a result of a linear expression of different factors. In this regard, based on this theory, it was assumed that the changes in the share prices react to variability in the macroeconomic environment of a country. Therefore, as the macroeconomic factors changes, the stock prices also change. Investors in the NSE can therefore use the Arbitrage model to forecast and extrapolate prices of shares of firms quoted under the NSE.

2.2.2 Efficient Market Hypothesis

This theory was founded by Fama (1970). According to the theory, all the information received in the market is reflected in the prices. The theory further holds that the instant variations in the share prices reflect the new information the market received (Malkiel, 2003). The theory proposes that the existing stock prices completely have a bearing of the presented information around the value of the firm. According to this theory, when making investment decisions, all the existing information has to be taken into consideration as a means of avoiding unwarranted earnings.

The EMH has a number of proponents. According to Mishkin and Eakins (2006), for a market to be considered efficient, then the stocks and the shares traded fully reflect all the information available at a point in time. Brealey, Myers and Allen (2011) in support of the EMH argues that a market is considered to be efficient if it is possible for investors to make extreme returns based on the available information. They argued that the returns the investors make are equivalent to the market returns. The value of the company's stocks is therefore considered to reflect the firm's value.

The EMH was considered relevant in determining the influence macroeconomic variables on stock prices. It was hypothesized that the variability in the prices of shares of the listed firms take into consideration all the available information including the variability in the macroeconomic variables. This means that changes in the share prices occur as the macroeconomic variables change.

2.2.3 The Present Value Model (PVM)

The PVM was developed by Fisher (1907). The model is utilized to compute stock prices and to compare them with the rates in the market. It is worth noting that stock price behavior is affected by numerous economic factors and the PVM model explains the relationships between these factors and how they influence the share prices (Sarkar, 2012). In this regard, the model can be used to determine how macroeconomic variables interact with other factors and how share prices react to this. Based on this model, the stock value and stock price behavior is determined using the discount rate and the expected dividends.

The hypothesis has various proponents. According to Frydman, Goldberg and Mangee (2015), the model is practically applicable in predicting share prices premised on the argument that stocks prices changes results from all discounted future dividends. According to Shiller (1992), the expected future dividends determine the behaviors of share prices and the dividends depend on the outcomes from the firm's operations which largely operates in a volatile environment. Basically, this implies that the outcomes a firm record from its operations depend partly on the prevailing macroeconomic environment. The dividends rely on the firms outcomes and the share prices relies on the expected dividends. Therefore, a change in the macroeconomic factors that caused by the microenvironment have spontaneous effect on the expected dividends and consequently the changes in the share prices.

The PVM was considered relevant in this this study. The model hypothesizes that investors in the NSE relies on the dividends they expect from the firms. The dividends depend on the performance of the firms which relied partly on the prevailing macroeconomic environment. In this regard, when the macroeconomic environment is favorable, the firms record good performance which leads to higher dividends. Higher expected dividends increases the stock prices. On the contrary, poor macroeconomic environment leads to poor firm performance which in turns leads to poor dividends expectation in the future. Poor dividends cause low demand for shares which in turns causes a drop in prices.

2.3 Effects of Macroeconomic Variables on Share Prices.

2.3.1 Interest rates

This refers to the charges paid by lenders to borrowers in order to use their money for a specified duration (Ali, 2014). They keep on fluctuating and varying as other macroeconomic variables change. Changes in the domestic and foreign markets as well as changes in inflation and other national economic prospects cause changes in the interest rates. Interest rates are operationalized in terms of average lending rates by commercial banks. When the rates are high, borrowers are discouraged from taking loans leading to low investment in various sectors. When the rates are low, there is increased borrowing which in turn increases investment in different economic sectors (Gama, Duarte, & Esperança, 2017).

2.3.2 Inflation

This is the general hike in the prices. It is mostly measured in terms of consumer price index (CPI) and producer price index (PPI). CPI is computed by taking into consideration price changes for all the items in the basket and getting the average. Change in consumer price index are used to analyse the changes in prices in relation to the cost of living. PPI on the other hand covers the average price of goods used by a firm to change them into final goods. When inflation is high, the resources of a company are depleted, the profits are reduced, and the potential of the company's market to grow is reduced.

2.3.3 Exchange rates

This refers to the value the currency of a given nation compared to the currencies of other nations in a given economic zone (Hajilee & Al Nasser, 2014). Exchange rates exhibit high

volatility and keep on changing in a random pattern. The instability in the exchange rates can occur due to changes in other macroenvironment elements. The volatility can also result from the liberalization of capital flows. When the exchange rates deteriorate, activities among firms reduce accompanied by a reduction in investment (Osabuohien et al, 2018). Such exchange rates change cause changes in the cashflows of a firm to change as well as the general operations of firms to reduce. An increase in the exchange rates increases activities of firms which in turn translates to good performance.

2.3.4 Money Supply

Money supply included all the currency and other liquid instruments in the economy of a nation (Goodhart, 2017). Changes in money supply leads to changes in other macroeconomic variables particularly the interest rates. When money supply increases, the interest rates reduce which in turns contributes to generation of more investment. More investment in turn can contribute to good economic growth. Increased money supply also translates to high income which in turn stimulates more spending (Barakat, Elgazzar, & Hanafy, 2016). To the businesses, increased money supply leads to more product and high profitability. Low money supply on the other hand reduces investments which in turn leads to low production and low money in circulation.

2.4 Empirical Framework

Extensive research has been conducted macroeconomic variables and share prices. Neifar (2021) analysed the influence of macroeconomic factors and share prices in the United Kingdom. The specific focus of the study was to analyse the effects of Interest rate, Consumer Price Index, and Exchange rate on the stock market in the United Kingdom between January 1999 to December

2007 and analysed using Granger and Toda Yamamoto (TY) Causality tests and Johansen Cointegration test. The analysis findings, indicated a long run relationship between the macroeconomic factors and the stock market.

Huy, Dat and Anh (2020) conducted a study to build an econometric model of selected macroeconomic factors that influence the share prices of Sacombank (STB) in Vietnam. Based on the data analysis, it emerged that variability of macroeconomic variables caused changes in the company's share prices. Specifically, the study found out that an increase in the GDP, reduction in CPI and lending rate increases the prices of the company's stock.

Megaravalli and Sampagnaro (2018) examined how the stock markets in China, India, and Japan changes with changes in the macroeconomic variables. Monthly time series data spanning the period between January 2008 and November 2016 was used. From the analysis, as the exchange rates varied, the stock share prices reacted inversely. In another study, Prempeh (2016) analyzed the nexus between macroeconomic variables and stock price variability in the Ghanaian Stock Exchange. The study utilized data for the period 1990-2014 which was obtained from Ghana stock exchange websites and the Bank of Ghana website. From the analysis, the findings indicated that inflation rate, and interest rates did not granger cause stock price variability.

Shawtari et al, (2016) examined the influence of macroeconomic indicators and share prices in South Africa. The data for this study was collected for the period beginning January 1998 to August 2010 and analyzed using vector error-correction models. The analysis findings indicated that industrial production was the most significant cause of changes in stock prices. While

money supply, inflation, and exchange rates were found to influence the stock prices, the effect was lesser compared to industrial production.

Epaphra (2018) examine the effects Treasury bill rate, money supply, exchange rate, and inflation rate on share prices variability in Tanzania. The analysis findings indicated that the selected macroeconomic factors and the share prices are co-integrated. Specifically, exchange rates and money supply positively influenced the share prices while Treasury bill rate negatively influenced the share prices of the firms in the Tanzanian stock market. Inflation did not have significant effect.

Mwai (2013) examined macroeconomic variables and the influence on share prices at the NSE. Based on results, changes in macroeconomic variables caused the share prices of the selected firms to vary significantly. The study identified from 2002 to 2008, the share index had an upward trend which was attributed to stable macroeconomic environment. From 2009, the share index started declining. The decline occurred due to political skirmishes that occurred in the country in 2008.

Kitatia, Zablonb and Maithyac (2015) did a research on macroeconomic factors and the effects on NSE stock prices. Specifically, the study determined the effect of foreign exchange rate of hard currencies, interest rate and inflation rate on share prices fluctuations. The analysis found out that macroeconomic factors impact on stock market prices of the firms. However, the interest rate was found to predominantly influence the share prices than other variables. Fluctuations in the interest rates and exchange rates had negative effect on the stock market prices of the firms.

With regard to interest rates, increased interest rates lowers investment in the stock market which led to a decrease in the share prices. Regarding the exchange rates, a depreciation in the Kenya shilling depreciates leads to a gain in points in the stock market which in turn increases the stock market prices.

Mbaabu (2018) examined the influence of on the effect of economic growth, interest rates, inflation rate, government expenditure and balance of payment position on stock price volatility. The macroeconomic variables of interest covered were. From the findings, variability in macroeconomic factors caused variability in the stock market prices. Economic growth caused an increase in share prices, increased interest rates led to low borrowing which in led to low investment in NSE. A reduction in the stock market investment leads to low demand which in turn leads to low prices to trigger demand. Additionally, inflation rate had negative effect on price.

2.5 Conceptual Framework

This shows the link between the study variables (Britton & McGonegal, 2007). Interest rate, inflation rate, exchange rate and money supply are the independent variables in this study. The dependent variable is share price volatility. The relationship between the variables is presented on figure 2.1;

Independent Variables

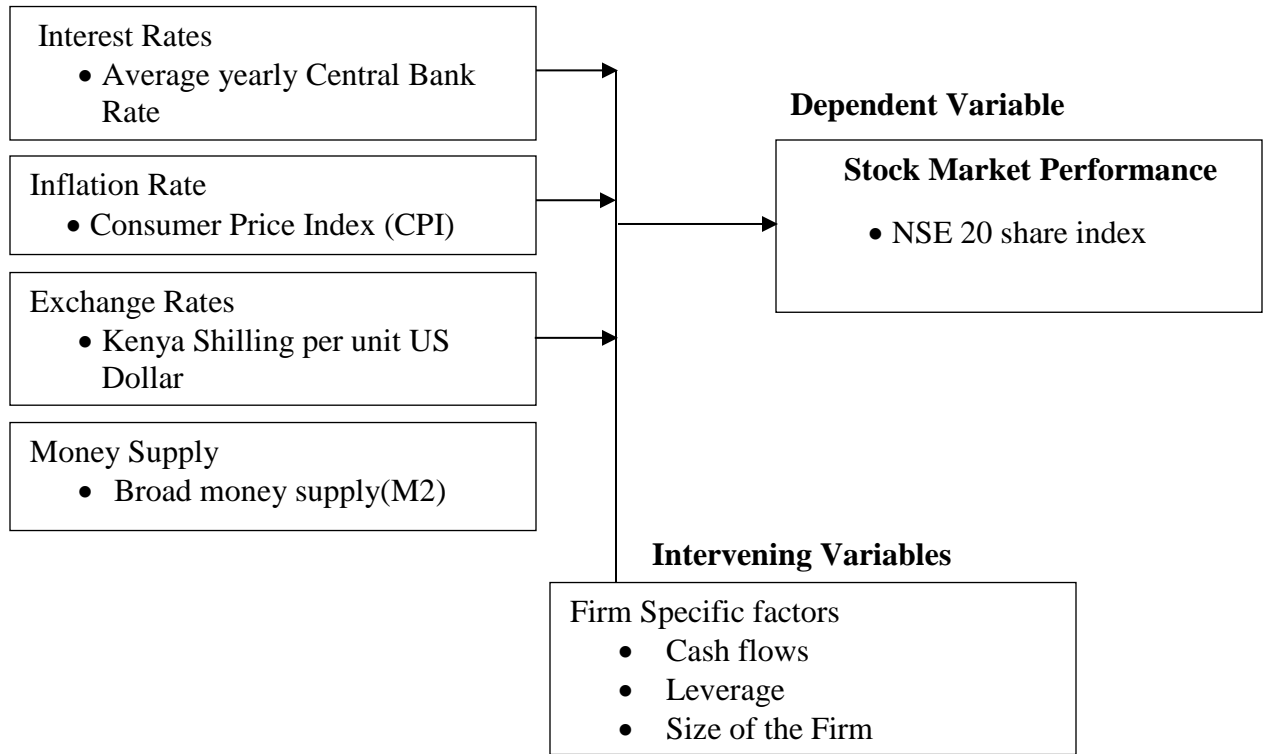


Figure 2.1: Conceptual Framework

2.6 Summary of the literature Review

Table 2.1: Summary of literature review

Author & Year	Focus of the study	Methods	Findings	Research gaps	Focus of the current study
Neifar (2021)	<ul style="list-style-type: none"> The impact of macroeconomic variables on stock market in United Kingdom. 	<ul style="list-style-type: none"> Data was collected between 1999 to 2007 and analyzed using Johansen Cointegration, tests. 	<ul style="list-style-type: none"> Changes in the macroeconomic environment caused changes in the stock market 	<ul style="list-style-type: none"> The geographical settings of the study were setting were different hence the need for a study in Kenya 	<ul style="list-style-type: none"> Macroeconomic variables and share price volatility at NSE for the period 2000-2020.
Huy, Dat & Anh (2020)	<ul style="list-style-type: none"> Selected factors that impact on stock prices of Sacombank (STB) in Vietnam. 	<ul style="list-style-type: none"> Data was collected for the period 2014-2019 and analyzed using regression analysis method. 	<ul style="list-style-type: none"> Changes in GDP, CPI and lending rate lead caused changes in the company's stock prices 	<ul style="list-style-type: none"> The geographical settings of the study were setting were different hence the need for a study in Kenya 	<ul style="list-style-type: none"> Macroeconomic variables and share price volatility at NSE for the period 2000-2020
Megaravalli & Sampagnaro (2018)	<ul style="list-style-type: none"> Macroeconomic factors and the effect on stock markets in China, India, and Japan. 	<ul style="list-style-type: none"> Data covered the period 2008 to 2016 and analysed using Granger causality test. 	<ul style="list-style-type: none"> The macroeconomic variables had negative effect on the stock market. 	<ul style="list-style-type: none"> The geographical settings of the study were setting were different hence the need for a study in Kenya 	<ul style="list-style-type: none"> Macroeconomic variables and share price volatility at NSE for the period 2000-2020
Prempeh (2016)	<ul style="list-style-type: none"> Macroeconomic variables and stock price variability in Ghananian Stock Market 	<ul style="list-style-type: none"> Data was collected for the period 1990-2014 and analyzed using Granger causality test. 	<ul style="list-style-type: none"> Changes in macroeconomic variables led to variation in the stock prices. 	<ul style="list-style-type: none"> The geographical settings of the study were different hence the need for a study in Kenya 	<ul style="list-style-type: none"> Macroeconomic variables and share price volatility at NSE for the period 2000-2020
Shawtari et al, (2016)	<ul style="list-style-type: none"> Macroeconomic determinants of stock prices in South Africa 	<ul style="list-style-type: none"> Data was collected for the period 1998 to 2010 and analyzed using vector error- 	<ul style="list-style-type: none"> The stock prices were highly influenced by macroeconomic variables 	<ul style="list-style-type: none"> The geographical settings of the study were different hence the need for a study in 	<ul style="list-style-type: none"> Macroeconomic variables and share price volatility at NSE

		correction models.		Kenya	for the period 2000-2020
Epaphra (2018)	<ul style="list-style-type: none"> • Macroeconomic variables and stock prices in Tanzanian stock market. 	<ul style="list-style-type: none"> • Data was collected for the period 2012-2016. 	<ul style="list-style-type: none"> • The changes in the share prices was attributed greatly to variability in the macroeconomic variables. 	<ul style="list-style-type: none"> • The geographical settings of the study were different hence the need for a study in Kenya 	<ul style="list-style-type: none"> • Macroeconomic variables and share price volatility at NSE for the period 2000-2020
Mwai (2013)	<ul style="list-style-type: none"> • Macroeconomic determinants of share prices at NSE. 	<ul style="list-style-type: none"> • Data collected covered the period 2002 to 2012 and analysed using regression. 	<ul style="list-style-type: none"> • Macroeconomic variables had an effect on the stock prices. 	<ul style="list-style-type: none"> • Much changes have occurred in the macroeconomic environment between 2012 to date and hence the need for an up to date study. 	<ul style="list-style-type: none"> • Macroeconomic variables and share price variability at NSE for the period 2000-2020
Kitatia, Zablonb and Maithyac (2015)	<ul style="list-style-type: none"> • Macroeconomic factors and stock market prices at NSE. 	<ul style="list-style-type: none"> • The data covered the period 2008 to 2012 and was analyzed using regression method 	<ul style="list-style-type: none"> • The stock prices are highly sensitive to macroeconomic variables. 	<ul style="list-style-type: none"> • Much changes have occurred in the macroeconomic environment between 2012 to date and hence the need for an up to date study. 	<ul style="list-style-type: none"> • Macroeconomic variables and share price volatility at NSE for the period 2000-2020
Mbaabu (2018)	<ul style="list-style-type: none"> • Macroeconomic determinants of share prices at tthe NSE. 	<ul style="list-style-type: none"> • Data was collected for the period 2008 to 2018 and analyzed using a linear regression method. 	<ul style="list-style-type: none"> • The stock market prices were highly sensitive to macroeconomic factors. 	<ul style="list-style-type: none"> • Much changes have occurred in the macroeconomic environment between 2018 to date and hence the need for an up to date study 	<ul style="list-style-type: none"> • Macroeconomic variables and share price volatility at NSE for the period 2000-2020

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

In the previous chapter, the study covered a review of literature. In this section, the study covers the methods and procedures showing how data was collected and analysed.

3.2 Research Design

A descriptive design was utilized for the purpose of the study. This design is preferable when the aim of the study is to ascertain the trends, characteristics, frequencies and categories (Mugenda & Mugenda, 2012). In this study, a descriptive research helped in getting a profound understanding of the research phenomenon which in this study is the reaction of NSE to changes in the macroeconomic environment.

3.3 Population

All the 64 firms listed at the NSE (NSE, 2021) were covered in this study. A census of all the companies was preferable since the population under study is small and definite.

3.4 Data Collection

The period covered by the study was 21 years that is between 2000 and 2020. The NSE data was sourced from the NSE website and other relevant sources. Data on the macroeconomic factors was collected World Bank website.

3.5 Diagnostic Tests

A number of tests were conducted on the data collected to determine if they are suitable for multiple linear regressions. These diagnostic tests included normality, multicollinearity, heteroscedasticity, linearity, autocorrelation. Normality test was done to determine whether the data followed a normal distribution. This was done using the Shapiro-Wilk test of the residuals. Multicollinearity was used to test whether there was correlation amongst the variables. This was done using Variance Inflation Factors (VIF). Heteroscedasticity implies the unequal variability of a variable under study. It occurs due to the large differences of the sizes of the observations. It was tested using a plots. Linearity was done to determine the association between the variables and was done using correlation matrix. Lastly, autocorrelation was done using Durbin-Watson Test. A d-statistic that is greater than 0.05 was taken to imply the absence of autocorrelation (Durbin & Watson, 1971).

3.6 Data Analysis

Data analysis done using SPSS. Descriptive analysis was used to make the data meaningful by use of descriptive measures. Inferential analysis was used to examine the explanatory effect of the macroeconomic factors on share price variability. This was done using regression analysis as follows;

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \varepsilon$$

Where:

Y = Stock Price volatility

β_0 = Regression model intercept

$\beta_1, \beta_2, \beta_3,$ and β_4 = Coefficients of model

X_1 = Interest rates

X_2 = Inflation

X_3 = Exchange rate

X_4 = Money supply

ε = is the error term

The data findings were presented using tables. The significance of the model and the variables was determined at 95% confidence level. Significance values less than 0.005 showed significance of the variables while those greater than 0.05 were considered not significant.

CHAPTER FOUR

DATA ANALYSIS, RESULTS AND DISCUSSION

4.1 Introduction

Chapter four presents data analysis, presentation and discussion. The first section presents the descriptive analysis of interest rates, inflation, exchange rates, and money rates and NSE. The second section covers inferential analysis and the last section in this chapter covered the discussion.

4.2 Descriptive Analysis

From table 4.1, money supply had a mean of 1732136999999.9998. The minimum money supply recorded was 340337000000 while the maximum value was 4414890000000. Regarding the exchange rates, the maximum value recorded was 106.45 while the minimum value was 67.32. The mean value of exchange rate obtained was 85.2169. Regarding inflation, the maximum value obtained was 26.24 while the minimum value obtained was 1.96. The mean value was 8.8234. Regarding interest rates, the minimum value obtained was 2.46 while the maximum value obtained was 17.81. The mean value obtained was 8.5028. Regarding the NSE performance, the minimum value obtained was 1355.05 while the maximum value obtained was 5645.65. The NSE had a mean value of 3488.8664.

Table 4.1: Descriptive analysis

	N	Min	Max	Mean	Std. Deviation
Money supply	21	340337000000	4414890000000.	1732136999999.9998	1340282426017.59
NSE	14	1355.05	5645.65	3488.8664	1376.74292
Exchange rate	21	67.32	106.45	85.2169	12.26404
Inflation	21	1.96	26.24	8.8234	5.11463
Interest rates	21	2.46	17.81	8.5028	4.51948

Data visualization was done to understand the underlying trend in the data over time. This was achieved by use of trend analysis. Regarding NSE performance, there was a fluctuating trend in the NSE performance throughout the study period. The highest value was recorded in 2006 at 5646.65 while the lowest value was recorded was in 2001 at 1355.05. The trend analysis is indicated below;

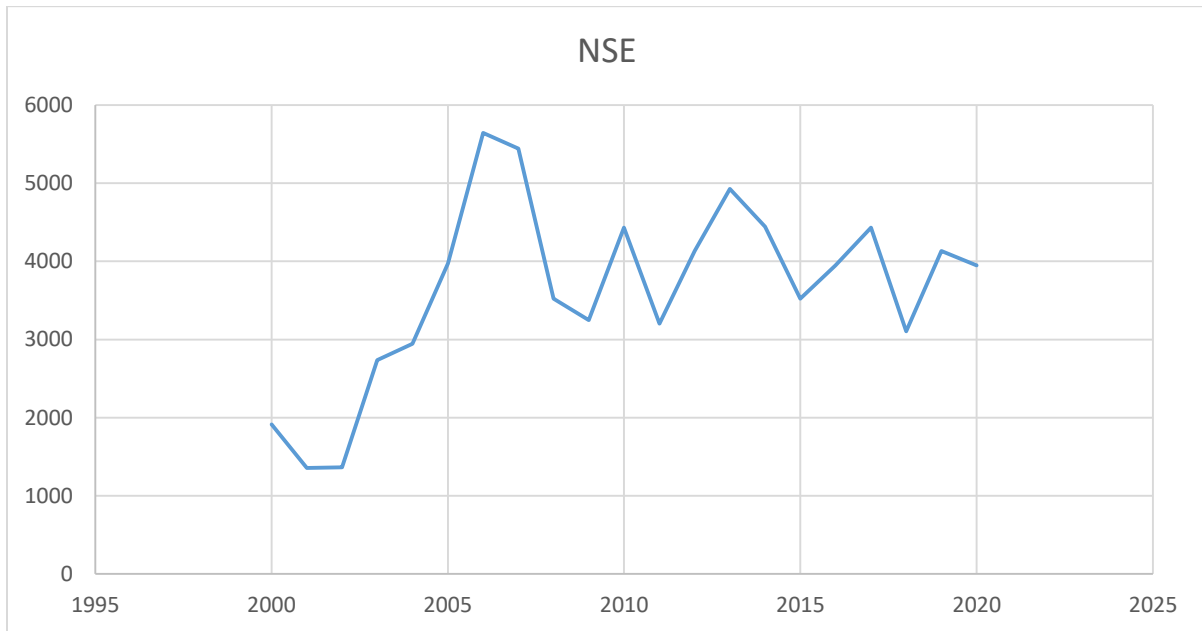


Figure 4.1: NSE Trend

Regarding the interest rates, high volatility was observed throughout the study period. There was a small increase from 15.32 in 2000 to 17.81 in 2001. This was followed by a declining trend all the way to 5.05 in 2004. From 2004 to 2020, the interest rates exhibited an oscillating trend. The minimum interest rate of 2.84 was recorded in 2009 while the maximum value of 17.81 was recorded in 2001.

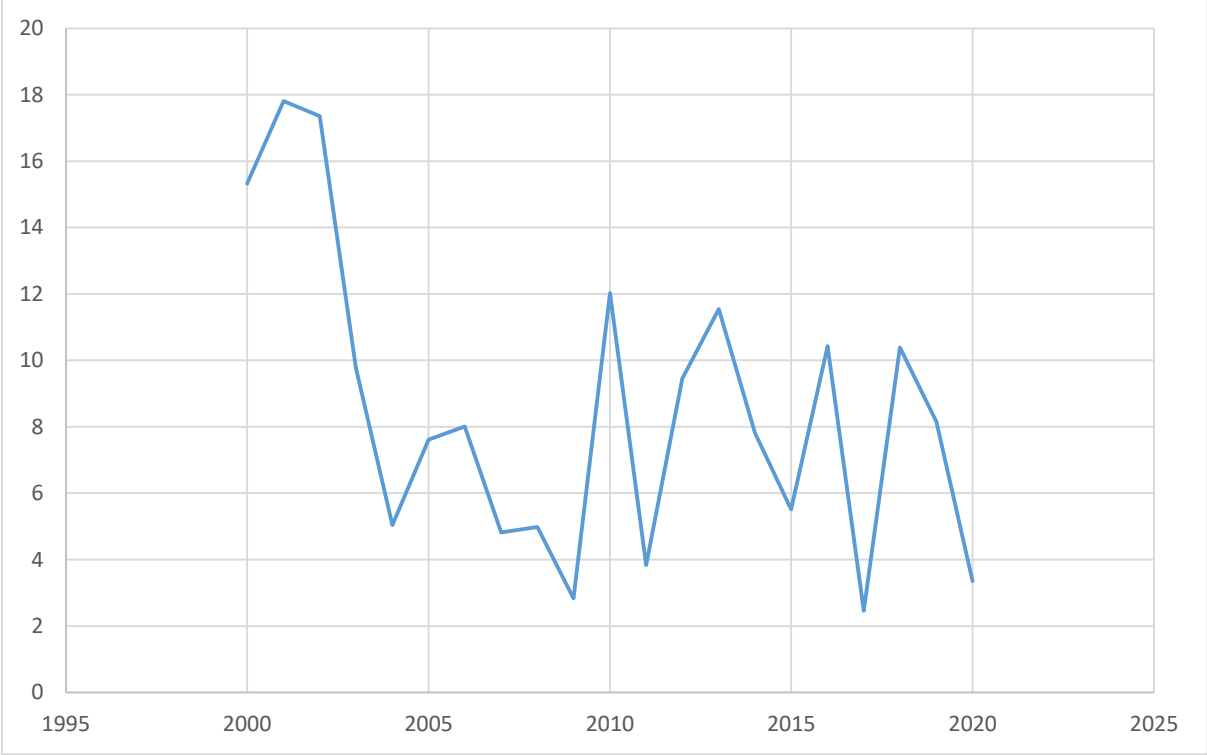


Figure 4.2: Interest rates trend

Regarding the inflation rate, high volatility was also observed throughout the study period. From the trend analysis, there was a decline in inflation rate between the year 2000 and the year 2002 which was followed by an upward trend between 2002 to 2008. This was followed by a decline up to the year 2010 which was then followed by an increased up to the year 2011. From 2011, inflation rate has been exhibiting a declining trend all the way to the year 2020. The minimum inflation rate of 1.9613 was recorded in 2002 while the maximum value of 26.2398 was recorded in 2008. The trend in the inflation rate is shown in the figure below;

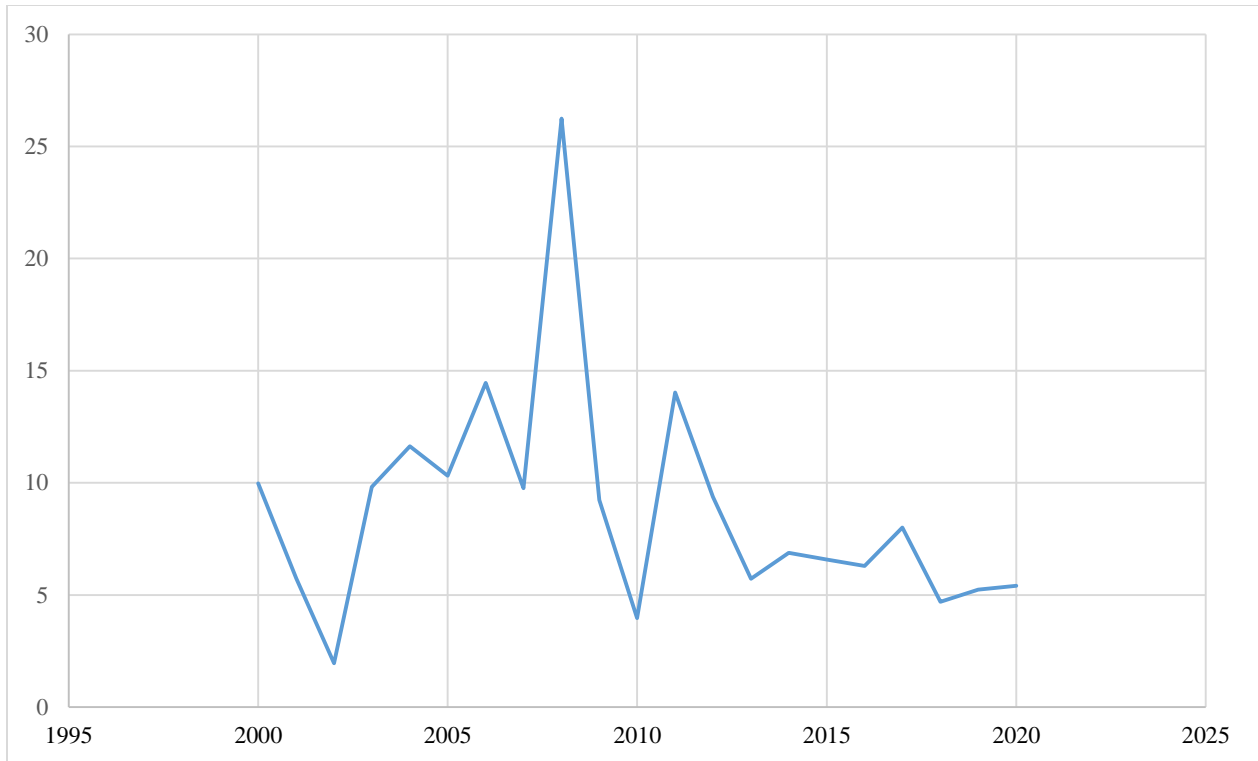


Figure 4.3: Inflation rate trend analysis

Regarding exchange rates, there were fluctuations in the exchange rates between the year 2000 and 2020. There was an increasing trend in exchange rate from 76.18 in the year 2000 to 78.75 in the year 2002. In 2003, there was a decline to 75.93. In 2004, the exchange rates increased reaching 79.17 which was followed by a declining trend reaching 67.32 in the year 2007. From 2007, there was a steady increase in the exchange rates reaching 106.45 in 2020. The minimum value, 67.32 was observed in 2007 while the maximum value, 106.45 was recorded in the year 2020. The trend analysis is indicated on the figure below;

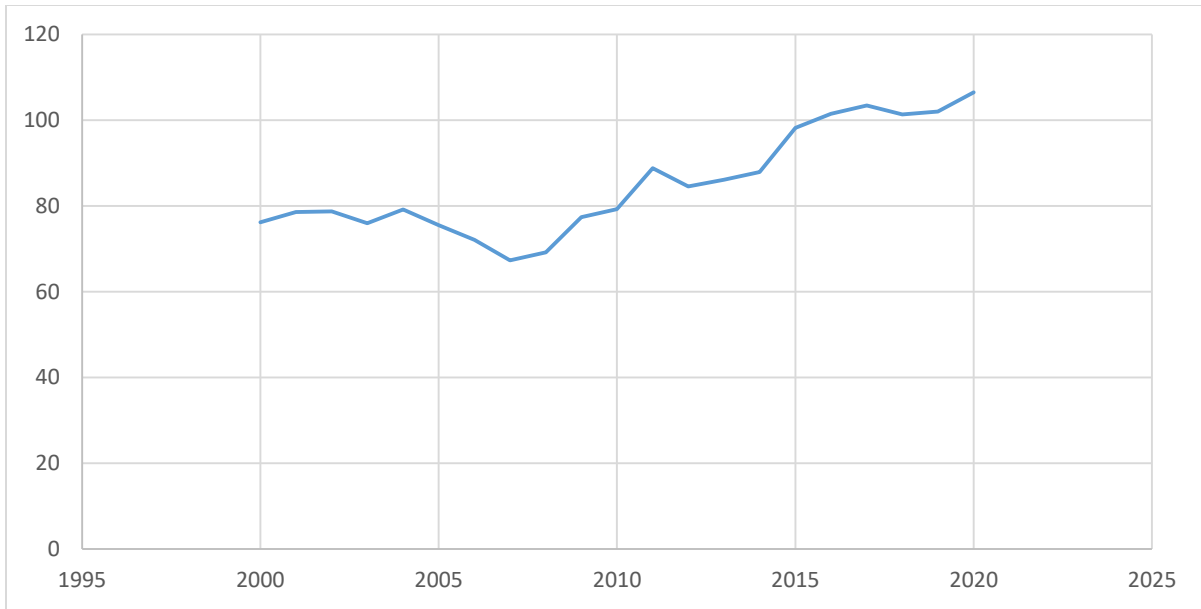


Figure 4.4: Exchange rate trend

Regarding money supply, there was an increasing trend exhibited. The lowest value of 340337217644.95 was recorded in the year 2000 and the highest value of 4414885385927.89 was recorded in 2020. The trend analysis is presented on the figure below;

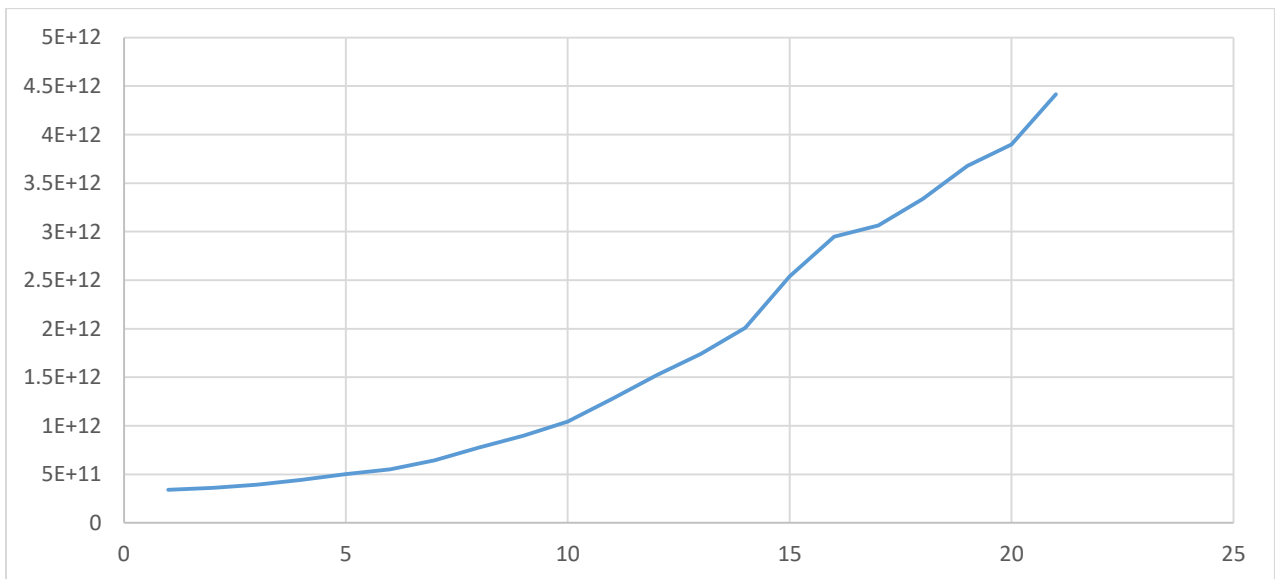


Figure 4.5: Money supply trend

4.3 Inferential Analysis

Inferential analysis was done to examine the association between variables. This was done using correlation and regression methods. The association between the variables was determined using correlation analysis while regression was done to determine the percentage change in NSE caused by variation in the macroeconomic factors.

4.3.1 Diagnostic Tests

A number of diagnostic tests were done to determine the suitability of the data. Shapiro-Wilk test was done to determine normality.

Table 4.2: Shapiro Wilk Test

Variables	Obs	W	V	Z	Prob>z
NSE	120	0.95963	0.989	- 0.022	0.50874
Inflation	120	0.82487	4.292	2.945	0.60162
Interest Rates	21	0.93369	1.625	0.981	0.61321
Exchange Rates	21	0.90752	2.266	1.654	0.54906
Money Supply	21	0.87772	2.997	2.219	0.51325

From the Shapiro-Wilk test, the data was normal as shown by the significance values higher than 0.05 in all the variables.

Multicollinearity was used to test whether there was correlation amongst the independent variables. Variance Inflation Factors (VIF) was used whereby a tolerance value between one and ten was taken to indicate absence of multicollinearity. In all the independent variables, the VIF values were less than which implied that there was no correlation among the independent variables as shown on table 4.3;

Table 4.3: Multicollinearity

Model	Coefficients						Collinearity	
	Unstandardized		Standardized	t	Sig.	Statistics		
	B	Std. Error	Beta			Tolerance	VIF	
(Constant)	15318.033	3723.448		4.114	.001			
Inflation	-50.042	54.080	-.220	-.925	.369	.490	2.041	
Exchange rate	-149.006	48.916	-1.574	-3.046	.008	.104	9.600	
Money supply	1.355E-009	.000	1.564	3.033	.008	.105	9.569	
Interest rates	-104.565	58.454	-.407	-1.789	.093	.537	1.862	

Heteroskedascity implies the unequal variability of a variable under study. It occurs due to the large differences of the sizes of the observations. It was tested using residual scatter plots. From the analysis, the scatter plot did not show any particular pattern which implies that there was no Heteroskedascity. The findings are presented on the figure;

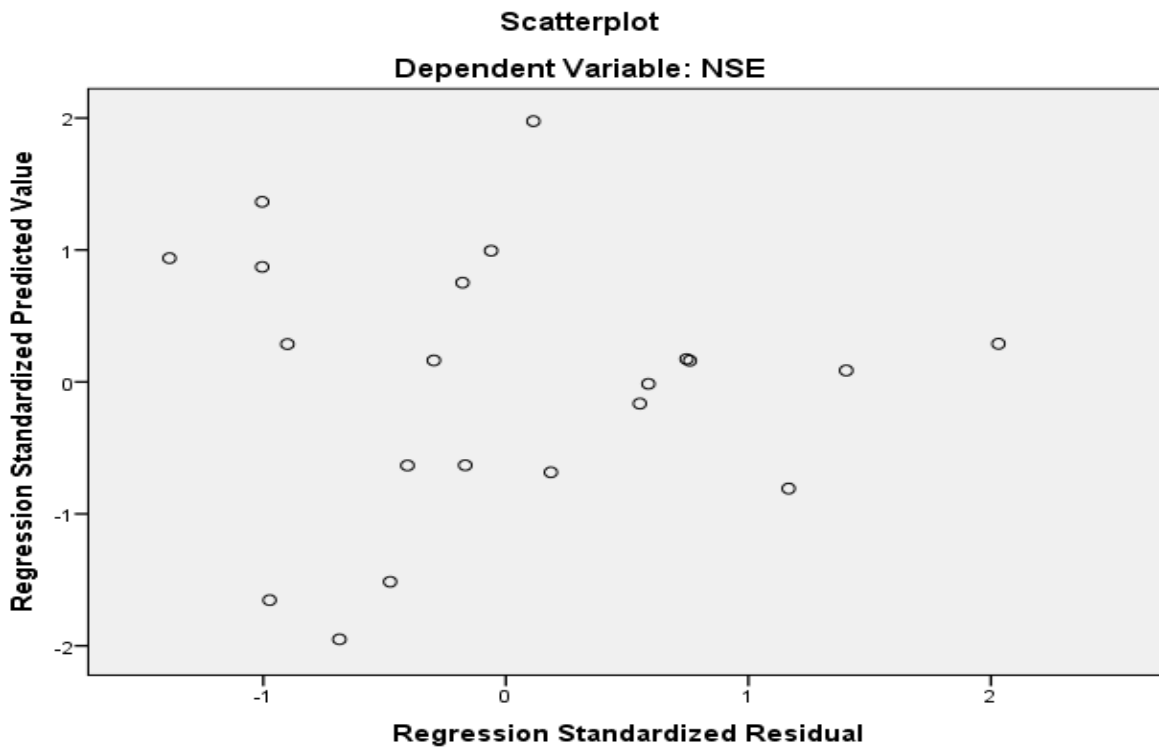


Figure 4.6: Scatter plot

Lastly, autocorrelation was done using Durbin-Watson Test. From the model summary table, the Durbin-Watson value obtained was 1.402 which implies that there was no autocorrelation

4.3.2 Regression Analysis

Regression analysis was done to determine the explanatory effect of macroeconomic factors on the NSE performance. The results are presented as follows;

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.745 ^a	.555	.444	865.90046	1.402

Table 4.4: Model supply

The results on table 4.4 shows an R value of 0.745 which shows strong correlation. The R square value obtained, 0.555 indicates that variation in the macroeconomic variables caused 55.5% variation in the NSE performance.

Table 4.5: ANOVA

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	14971914.653	4	3742978.663	4.992	.008 ^b
Residual	11996537.737	16	749783.609		
Total	26968452.390	20			

From the results on table 4.5, the p value obtained 0.008 signifies the suitability and sufficiency of the regression model used.

Table 4.6: Coefficients table

Model	Unstandardized Coefficients		Standardized	T	Sig.
	B	Std. Error	Coefficients Beta		
(Constant)	15318.033	3723.448		4.114	.001
Inflation	-50.042	54.080	-.220	-.925	.003
Exchange rate	-149.006	48.916	-1.574	-3.046	.008
Money supply	1.355E-009	.000	1.564	3.033	.006
Interest rates	-104.565	58.454	-.407	-1.789	.003

From the coefficients table, -149.006 shows that exchange rates affected the stock prices negatively. The p value obtained (0.008) was less than 0.05 meaning that exchange rate was a key determinant of NSE performance. Regarding inflation, the Beta value (-50.042) shows that changes in inflation caused negative effects on NSE. The p value obtained (0.003) implies that inflation was a key determinant of NSE performance. This implies that when inflation is high, a decline in the stock market returns is established. On interest rates, the Beta value obtained (-104.565) indicates that interest affected the NSE negatively. The coefficient obtained (0.003) implies that the variable had significant effects on stock market. Regarding money supply, the Beta value obtained (1.355E-009) indicates which indicates that money supply leads to an improvement in the NSE. The p value obtained (.006) implies that variable had high influence on the NSE returns. The findings imply that an improvement in the money supply improves the market returns while a decrease in the money supply leads to poor returns.

The regression model obtained was

$$\text{NSE performance} = 15318.033 - 50.042 (I) - 149.006 (ER) + 1.355E-009 (MS) - 104.565 (IR) + \epsilon$$

Where I=Inflation

ER=Exchange rate

MS=Money Supply

IR=Interest Rates

4.4 Discussion of the Findings

The stock market in any country is highly sensitive to the macroeconomic environment. This implies that when the macroeconomic environment changes, there are resultant changes in the country's business environment and business performance. The stock market just like other corporate sectors is highly sensitive to changes in the macroeconomic variables. This was the case identified in this study whereby the NSE performance was found to be change with variation in the macroeconomic variables. Interest rates was one of the macroeconomic variables analysed and it was found to have negative influence on the NSE.

The study results are consistent to findings of Kitatia, Zablonb and Maithyac (2015) who identified that interest rate changes are reflected in the stock prices. The study results also agrees to Prempeh (2016) who identified that increased interest rates caused a decline in the stock market performance in Ghana for the period 1990-2014. Further agreeing findings were obtained by Talla (2013) who identified a negative relationship between the interest rates and Stockholm Stock Exchange performance.

The other variable analysed was inflation. Based on the findings, it emerged the stock market performance was poor as inflation increased. The study results agreed to Epaphra (2018) who in a study in Tanzania identified that inflation negatively affected the stock market. An increase in inflation caused a deterioration in the stock market performance while a decrease in the inflation

caused an improvement in the stock market. Similarly, Mwai (2013) and Kitatia, Zablonb and Maithyac (2015) identified that changes the stock market returns were highly attributed to variation in the inflation rates.

The other macroeconomic variable analysed was exchange rate. The study identified that the uncertainty in the market increases as exchange rates change thereby, discouraging the purchasing of stocks. The study results agree to Megaravalli and Sampagnaro (2018) in a study in China, India, and Japan stock market and a study by Ndunda (2016) on the stock market in Kenya. Further, the findings also agrees to Perera (2016) who established that a decrease in the exchange caused an increase in market returns. Contradicting results were obtained by Nyongesa and Muchoki (2016), Coleman and Agyire-Tetty (2008) and Mugambi and Koech (2016).

Money supply is the other factor studied. From the analysis, the study found out when money supply increases, there is resultant improvement in the stock market. The effects are felt mostly through the effect it has on the interest rates. In this regard, there the money supply is high, the interest rates reduces which in turn boost borrowing and investment in the stocks. This in turn translates to good stock a market performance. Low money supply on the other hand increases interest rates thereby discouraging borrowing and investment in stocks. The study agree to Shawtari et al, (2016) who, in a study in South Africa identified that the market returns were highly sensitive to changes in the money supply. The results also agrees with Epaphra (2018) who identified that money supply affected the stocks prices in the Tanzania in 2012 and 2016.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

In this section, the study summarizes the key results in line with the objectives, the key conclusions, and a number of measures recommended for policy making. The section also suggest various areas for additional research.

5.2 Summary of Findings

The study purposed to determine how selected macroeconomic factors influence the NSE performance. Regarding interest rates, the study established that interest rates were highly volatile throughout the study period. The minimum interest rate was recorded in 2009 at 2.84 while the highest interest rate was recorded in 2001 at 17.8. From regression analysis, it emerged that interest rates was a key determinant of NSE performance. This can be interpreted to mean that borrowing from financial institutions reduced as when the interest rates are high leading to low purchasing of stocks. This leads to poor performance.

Regarding exchange rate, the study identified that exchange rates were highly fluctuating throughout the study period. The lowest exchange rate was recorded in 2007 at 67.32 while the highest recoded was observed in was recorded in 2007 while the maximum value was recorded in 2020 at 106.45. From regression analysis, exchange rates was found to be a key determinant of NSE performance. This is because high volatility in the exchange rates increase uncertainty in the market which in turn affects the market dynamics. Such speculations influences the market

performance. The negative nexus between the variables shows that when the exchange rates are high, the stock market is deteriorated.

Regarding inflation, the study identified that the inflation rates were highly volatile throughout the study period. The lowest inflation was observed in 2002 at 1.9613 while the highest inflation was recorded in 2008 at 26.2398. From regression analysis, inflation was found to be a key determinant of the NSE performance. The analysis shows that high rate of inflation is accompanied by a decline in the stock market performance as many investors are discouraged from investing in the market. On the other hand, a decrease in inflation encourages purchasing of stocks thereby contributing to market performance.

Regarding money supply, the study identified that the money supply had an increasing throughout the study period. The lowest record was 340337217644.95 in 2000 while the highest value was 4414885385927.89 recorded in 2020. From regression analysis, money supply was a key determinant of NSE performance. This implies that when money supply is high, investment in stock market is also high which in turn translates to good market performance.

5.3 Conclusions

All the selected macroeconomic factors were found to be determinants of NSE performance. Regarding interest rates, the study concluded that high interest rates discourage borrowing and buying of stocks thereby leading to poor market returns. Low interest rates on the other encourages borrowing and buying of stocks thereby leading to high market returns. With regard to inflation, the study concluded that high inflation reduced investment in the stock market

leading to poor performance. When inflation is low, investors are encouraged to purchase stocks thereby contributing to stock market performance.

Regarding the exchange rates, a conclusion is made that variations in the exchange rates cause variation in the NSE. High exchange rates discourage foreign investment in the market leading to poor returns. When the exchange rates are low, foreign investors are encouraged to invest in the stock which in turn contributes to good performance. Regarding money supply, the study concludes that high money supply leads to high purchasing of stocks thereby promoting the market performance. On the other hand low money supply discourages purchasing of stocks thereby leading to poor market returns.

5.4 Recommendations

The study recommends a number of policies and measures in line with the findings.

The study identified that high interest rates discourage borrowing and trading in the stocks leading to poor stock market returns. In this regard, CBK is recommended to ensure that the interest rates are stable and favorable to the borrowers in order to encourage borrowing. This will promote investment in the stock market leading to improved performance. Also, the NSE management as well as the Capital Market Authority are compelled to create awareness and encourage investors to invest when the interest rates are favorable.

The CBK is recommended to strengthen its monetary policies in the country in order to control and regulate inflation at sustainable levels. This will help to control its influence on the stock market. Exchange rates were found to have a negative influence on the NSE. Therefore, it is crucial for the CBK to ensure the foreign currency exchange rates are stable and favorable to the foreign

investors in order to encourage them to invest. The study identified that, when there is high money in circulation, investment in stocks increases. It is thus crucial for the CBK to closely monitor the flow of money to balance the demand and supply of money in the economy.

5.5 Suggestion for Further Studies

A number of areas emerge from this study which warrants further studies. To begin with, the studies only focused on four selected variables and the need to conduct another study covering other macroeconomic variables such balance of payment, GDP, and the political environment and the effect they have on the stock market performance. Such a study will offer key insights on how the NSE performance reacts to variations in the macroeconomic factors.

The second research gap pertains to the study period. The study covered a 21 year period that is 2000-2020. In this regard, there is a need for another study covering a longer study period in order to gain better insights on the effects of macroeconomic variables on the stock market performance. Also, there is a need for another study to capture the year 2021 in order to include the most recent changes.

Thirdly, in this study, analysis only focused on the selected macroeconomic variables and hence, another study is recommended to focus on different factors that influence the macroeconomic factors. Further, the study was only conducted at NSE and the findings are therefore confined to the NSE. In this regard, there is a need for other studies to be extended to other stock market regionally and internationally in order to offer a profound understanding on how the stock markets react to changes in the macroeconomic environment.

REFERENCES

- Aiyabei, J. C. (2021). *Effect of Financial Statement Information on Idiosyncratic Volatility of Stock Returns among Listed Firms in Kenya* (Doctoral dissertation, JKUAT-COHRED).
- Ali, H. (2014). Impact of Interest Rate on Stock Market; Evidence from Pakistani Market. *Journal of Business and Management*, 16(1), 64-6.
- Barakat, M. R., Elgazzar, S. H., & Hanafy, K. M. (2016). Impact of macroeconomic variables on stock markets: Evidence from emerging markets. *International journal of economics and finance*, 8(1), 195-207.
- Barakat, M. R., Elgazzar, S. H., & Hanafy, K. M. (2016). Impact of macroeconomic variables on stock markets: Evidence from emerging markets. *International journal of economics and finance*, 8(1), 195-207.
- Black, F., Jensen, M. C., & Scholes, M. (1972). The capital asset pricing model: Some empirical tests. *Studies in the Theory of Capital Markets*, 79-121.
- Brealey, R.A., and S.C. Meyers (2002). *Principles of corporate finance* (7th Edition). New York: McGraw-Hill.
- Chege, G., & Kirika, S. (2021). Effect of Macroeconomic Factors on Trading Volumes of Manufacturing and Allied Companies Listed in Nairobi Securities Exchange. *International Journal of Finance and Accounting*, 6(1), 32-52.
- Chen, N. F., Richard, R., & Ross, S. A., (1986). Economic forces and the stock market. *Journal of Business*, 59(3), 383-403
- Chen, N.F., Roll, R., & Ross, S.A. (1986). Economic forces and the stock market. *Journal of Business*, 59(1), 383-403
- Chepkwony, F. C. (2021). *The Influence of Selected Factors on the Behaviour of Share Prices of Commercial Banks Listed at the Nairobi Securities Exchange* (Doctoral dissertation, Egerton University).
- Creswell, J. W., & Poth, C. N. (2017). Qualitative inquiry and research design: Choosing among five approaches, 65-87.

- Epaphra, M. (2018). The impact of macroeconomic variables on stock prices in Tanzania. *Journal of Economics Library*, 5(1), 12-41.
- Frydman, R., Goldberg, M. D., & Mangesee, N. (2015). New evidence for the present value model of stock prices: Why the REH version failed empirically. Working paper No.2
- Fufa, T., & Kim, J. (2018). Stock markets, banks, and economic growth: Evidence from more homogeneous panels. *Research in international business and finance*, 44(1), 504-517.
- Gama, A. P. M., Duarte, F. D., & Esperança, J. P. (2017). Why discouraged borrowers exist? An empirical (re) examination from less developed countries. *Emerging Markets Review*, 33(1), 19-41.
- Gatuhi, S. K. (2015). Macroeconomic Factors and Stock Market Performance in Kenya. Unpublished Thesis. Jomo Kenyatta University of Agriculture and Technology
- Goodhart, C. A. (2017). The determination of the money supply: flexibility versus control. *The Manchester School*, 85(1), 33-56.
- Hajilee, M., & Al Nasser, O. M. (2014). Exchange rate volatility and stock market development in emerging economies. *Journal of Post Keynesian Economics*, 37(1), 163-180.
- Huy, D. T. N., Dat, P. M., & Anh, P. T. (2020). Building an econometric model of selected factors' impact on stock price: a case study. *Journal of Security & Sustainability Issues*, 9(1), 77-93.
- Idrees, S. M., Alam, M. A., & Agarwal, P. (2019). A prediction approach for stock market volatility based on time series data. *IEEE Access*, 7(1), 17287-17298.
- Jean-Paul, F., & Martine, D. (2018). *Beyond GDP measuring what counts for economic and social performance: measuring what counts for economic and social performance*. OECD Publishing.
- Karthigai Prakasam Chellaswamy & Natchimuthu N & Muhammadriyaj Faniband, 2020. "Stock Market Sensitivity to Macroeconomic Factors: Evidence from China and India," *Asian Economic and Financial Review*, *Asian Economic and Social Society*, 10(2) 146-159.

- Kasaya, E. N., & Maniagi, G. M. (2020). Effect of price earnings ratio on share price volatility of firms listed on Nairobi Securities Exchange. *The Strategic Journal of Business & Change Management*, 7(3), 1444 – 1453.
- Khaled, H., Chijoke, O. M. & Aruoriwo, M. (2010). Dividend Policy and Share Price Volatility: UK Evidence. *Journal of Risk Finance*. Available online at [https:// www.researchgate.net/ publication/22838347](https://www.researchgate.net/publication/22838347)
- Kitatia, E., Zablomb, E., & Maithyac, H. (2015). Effect of macro-economic variables on stock market prices for the companies quoted on the Nairobi securities exchange in Kenya. *International Journal of Sciences: Basic and Applied Research*, 21(2), 235-263.
- Koskei, L. (2021). Exchange rate fluctuations and the performance of Nairobi securities exchange market in Kenya during the coronavirus pandemic. *International Journal of Business*, 8(1), 1-9.
- Malkiel, B. G., & Fama, E. F. (1970). Efficient capital markets: A review of theory and empirical work. *The journal of Finance*, 25(2), 383-417.
- Maqsood, A., Safdar, S., Shafi, R., & Lelit, N. J. (2017). Modeling stock market volatility using GARCH models: A case study of Nairobi Securities Exchange (NSE). *Open Journal of Statistics*, 7(2), 369-381.
- Mbaabu, N. K. (2018). *Selected Macroeconomic Variables and Stock Price Volatility at the Nairobi Securities Exchange* (Doctoral dissertation, University of Nairobi).
- Mbaabu, N. K. (2018). *Selected Macroeconomic Variables and Stock Price Volatility at the Nairobi Securities Exchange* (Doctoral dissertation, University of Nairobi).
- Megaravalli, A. V., & Sampagnaro, G. (2018). Macroeconomic indicators and their impact on stock markets in ASIAN 3: A pooled mean group approach. *Cogent Economics & Finance*, 6(1), 1432450.
- Mgbame CO, Ikhatua OJ (2013) Accounting Information and Stock Volatility in the Nigerian Capital Market: A Garch Analysis Approach. *International Review of Management and Business Research*, 2(1), 265-281.

- Mishkin, F. S., & Eakins, S. G. (2006). *Financial markets and institutions*. London: Pearson Education.
- Mugenda, O. M., & Mugenda, A. G. (2012). *Research Methods: Quantitative and Qualitative Approaches*. Nairobi: Acts Press.
- Mukhtarov, S., Aliyev, S., & Zeynalov, J. (2020). The Effect of Oil Prices on Macroeconomic Variables: Evidence from Azerbaijan. *International Journal of Energy Economics and Policy*, 10(1), 72-80.
- Mwai, A. M. (2013). *The relationship between macroeconomic variables and share prices of companies listed at the Nairobi securities exchange* (Doctoral dissertation, University of Nairobi).
- Neifar, M., Dhouib, S., Bouhamed, J., Ben Abdallah, F., Arous, I., Braiek, B., & Mrabet, D. (2021). The impact of macroeconomic variables on Stock market in United Kingdom.
- Onguka, D., Iraya, C., & Nyamute, W. (2021). Impact of Corporate Governance on Corporate Value for Companies Listed at the Nairobi Securities Exchange. *International Journal of Economics and Finance*, 12(12), 1-70.
- Osabuohien, E. S. C., Obiekwe, E., Urhie, E. S., & Osabohien, R. (2018). Inflation rate, exchange rate volatility and exchange rate pass-through nexus: The Nigerian experience. *Journal of Applied Economic Sciences*, 2(56), 574-585.
- Ramadan, I. Z. (2013). Dividend Policy and Price Volatility. Empirical Evidence from Jordan. *International Journal of Academic Research in Accounting, Finance and Management Sciences*, 3(2), 15–22
- Salim, A. (2019). Macroeconomic determinants of interest rate volatility in Indonesia: a structural var analysis. *International Journal of Applied Economics, Finance and Accounting*, 5(2), 101-108.
- Sarkar, A. (2012). *Functional instability or paradigm shift: A characteristic study of Indian stock market in the first decade of the new millennium*, New Delhi: Springer
- Shah, I. H., Hiles, C., & Morley, B. (2018). How do oil prices, macroeconomic factors, and policies affect the market for renewable energy? *Applied Energy*, 215(1), 87-97.

- Shawtari, F. A., Salem, M. A., Hussain, H. I., and Hawariyuni, W. (2016) Long Run Relationship between Macroeconomic Indicators and Stock Price: The Case of South Africa. Availableat: <http://www.icommercecentral.com/open-access/long-run-relationship-between-macroeconomic-indicators-and-stock-price-the-case-of-south-africa.php?aid=66383>
- Shiller, R. J. (1992). Market volatility, London: The MIT Press Cambridge
- Siopis, A. & Lyroudi, K. (2007). *The Effects of Derivatives Trading on Stock Market Volatility: The Case of the Athens Stock Exchange*. (Unpublished Thesis). University of Liverpool, United Kingdom.
- Weng, B., Lu, L., Wang, X., Megahed, F. M., & Martinez, W. (2018). Predicting short-term stock prices using ensemble methods and online data sources. *Expert Systems with Applications*, 112(1), 258-273.

APPENDICES

Appendix I: Data Collection Template

Years	Macroeconomic Variables				
	Interest rates	Inflation rate	Exchange rates	Money Supply	NSE20 Index
2000					
2001					
2002					
2003					
2004					
2005.....2020					

Appendix II: Dataset

Year	Inflation	Exchange rates	Money Supply	Interest rates	NSE
2000	9.98	76.18	3.40337E+11	15.33	1913.35
2001	5.74	78.56	3.59533E+11	17.81	1355.05
2002	1.96	78.75	3.95087E+11	17.36	1362.85
2003	9.82	75.94	4.41657E+11	9.77	2737.59
2004	11.62	79.17	5.01156E+11	5.05	2945.58
2005	10.31	75.55	5.50812E+11	7.61	3973.04
2006	14.45	72.10	6.44295E+11	8.01	5645.65
2007	9.76	67.32	7.7588E+11	4.82	5444.83
2008	26.24	69.18	8.9652E+11	4.98	3521.18
2009	9.23	77.35	1.04406E+12	2.84	3247.44
2010	3.96	79.23	1.27753E+12	12.03	4432.60
2011	14.02	88.81	1.52221E+12	3.84	3205.00
2012	9.38	84.53	1.74129E+12	9.46	4133.00
2013	5.72	86.12	2.00733E+12	11.55	4926.97
2014	6.88	87.92	2.5397E+12	7.82	4444.83
2015	6.58	98.18	2.94782E+12	5.51	3521.18
2016	6.30	101.50	3.0625E+12	10.43	3947.44
2017	8.01	103.41	3.33839E+12	2.46	4432.60
2018	4.69	101.30	3.67633E+12	10.39	3105.00
2019	5.24	101.99	3.89755E+12	8.16	4133.00
2020	5.40	106.45	4.41489E+12	3.36	3949.44