EFFECT OF SELECTED MACRO-ECONOMIC VARIABLES ON SECURITIES PERFORMANCE AT THE NAIROBI SECURITIES EXCHANGE, KENYA

BY

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DECLARATION

Declaration by Candidate

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DEDICATION

This Research Thesis is dedicated to my Family; my spouses- Linneth Jemeli Kiprop and Damacline Kemunto Nyangaresi; children – Godwin Kiplimo Chelang'a, Austin Kipng'etich Chelang'a, Fiona Jepkoech Chelang'a, Lyan Jebii Chelang'a , Scarlette Jemutai Chelang'a , Ethan Kiprotich Chelang'a and not forgetting my dear mother Flomena Jebii Yano for their tremendous support and advice that enabled to complete this work.

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ABSTRACT

The equity securities market is an integral component of any country's financial system, and its performance is intertwined with the broader macro-economic environment. Equity securities market determines the state of the economy; this is through stock and asset prices fluctuations as well as company earnings with corresponding dividend policies, and multiple macroeconomic variables. The inherent problem has been how do changes in specific macro-economic variables affect the performance of the equity securities market at the Security Exchange. This study sought to establish the influence of the selected macro-economic variables on equity securities market performance at Nairobi Securities Exchange (NSE). The specific objectives were to establish the effects of exchange rate; interest rate; inflation rate; money supply; and Gross Domestic Product on equity share prices fluctuations based on the NSE-20 from when the economy was liberalized. The study was guided by the Capital Asset Pricing Model, the Arbitrage Pricing Theory and the Efficient Market Hypothesis. An explanatory research design was used to determine the effect of selected macro-economic variables on securities exchange market performance. Annual time series secondary data for the periods 1986 to 2022 was used. Findings of diagnostic test demonstrated that there was no multicollinearity among the independent variables (VIF=8.27), residuals were homoscedastic (p=0.9740>0.05), and there was no autocorrelation among the residuals (p=0.7874>0.05). The results of Shapiro wilk normality test showed that the study's variables were normally distributed. The Augmented dickey fuller unit root test both showed that there was no unit root and that the variables had a short run relationship. The study findings were: the exchange rate (β =-0.0147, *p =0.0000*) indicating negative and significant effect on equity security indices; the interest rate (β =-0.3469 *p =0.001*,) indicating negative and significant effect on equity security indices; inflation rate (β =0.2377, *p =0.002*) indicating positive and significant effect on equity security indices; money supply (β =-1.51e-13, *p =0.0000*) which indicates a negative and significant effect on equity security indices; and gross domestic product (β =1.10e09, *p =0.00368*) had a positive and significant effect on equity security indices. The ARDL model used in the analysis yielded an adjusted R-squared =0.9998 (99.98%), Prob > F = 0.0000. This means that interest rate, exchange rate, inflation rate, money supply and gross domestic product explained 99.98% of the equity security indices. The study concluded that exchange rate, interest rate and money supply significantly affect equity security indices negatively while inflation rate and gross domestic product significantly affect equity security indices positively. The study therefore recommends the Central bank of Kenya to employ measures intervening foreign exchange markets to stabilize the currency, implement appropriate interest rate policies, and maintaining adequate foreign exchange reserves. The policy makers should prioritize price stability and monitor the growth of money supply to ensure it remains in line with the country's economic fundamentals. Policy makers should also strike a delicate balance between controlling inflation and supporting economic growth by closely monitoring economic indicators and adjusting interest rates accordingly.

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ABBREVIATIONS AND ACRONYMS

ADF	Augmented Dickey Fuller
AIC	Akaike Information Criteria
APT	Arbitrage Pricing Theory
AR	Autoregressive model
ARDL	Auto-Regressive distributed Lag
ATS	Automated Trading System
CAPM	Capital Asset Pricing Model
CDS	Central Depository System
CDSC	Central Depository and Settlement Corporation
CMA	Capital Markets Authority
CPI	Consumer Price Index
EMH	Efficient – Market Hypothesis
EU	European Union
FPE	Final Prediction Error
GDP	Gross Domestic Product
HQIC	Hannan Quinn Information Criteria
KNBS	Kenya National Bureau of Statistics
NSE	Nairobi Securities Exchange
SIC	Shwartz Information Criteria
USA	United States of America
VECM	Vector Error Correction Model
VIF	Variance Inflation Factor

DEFINATION OF OPERATIONAL TERMS

Exchange Rate: The exchange rate is the value of one country's currency in terms of another currency, influencing international trade and investment flows (IMF, 2023).

GDP: Gross Domestic Product (GDP) measures the total value of all goods and services produced within a country over a specific period, indicating economic health (Krugman & Wells, 2020).

Inflation: Inflation is the rate at which the general level of prices for goods and services rises, eroding purchasing power (Blanchard, 2018).

Interest Rate: The interest rate is the cost of borrowing or the reward for saving, typically expressed as a percentage of the principal (Mankiw, 2019).

Money Supply: Money supply refers to the total amount of monetary assets available in an economy at a specific time, influencing inflation and interest rates (Friedman, 1968).

Securities Performance: Securities performance refers to the return on investment from financial instruments like stocks and bonds, reflecting market conditions and economic factors (Fabozzi, 2013).

CHAPTER ONE

INTRODUCTION

1.0 Overview of the Study

This chapter encompasses the background of the study, problem statement, objectives, hypotheses, significance of the study and the scope.

1.1 Background to the Study

The performance of securities is influenced by a variety of macroeconomic factors. During periods of economic expansion, securities generally perform well as investor confidence and corporate profits rise (Erlando et al., 2020). Conversely, high inflation can erode returns by decreasing purchasing power (Basu, 2011). Additionally, market volatility, often triggered by external shocks, plays a critical role in shaping short-term securities performance (Wu et al., 2020). Overall, the interplay of these factors determines the dynamic nature of securities markets globally. Securities performance is closely tied to market volatility, which refers to the degree of price fluctuations in financial instruments (Liu, Umair & Gao, 2023). Volatile markets can present both opportunities and risks (Wu, et al., 2020). Investors often seek to balance risk and return, aiming for securities that offer potential gains while mitigating losses (Laplane & Mazzucato, 2020). Assessing the historical volatility of securities provides insights into their potential future performance and aids in constructing diversified portfolios. The performance of securities is intricately linked to macroeconomic factors such as interest rates, inflation, and GDP growth (Kalbouneh et al., 2023). These factors influence investor sentiment and market trends. In times of economic expansion, securities performance tends to be positive as companies' earnings grow (Erlando, Riyanto & Masakazu, 2020). Conversely, economic downturns can lead to reduced

securities performance due to lower corporate profits and increased risk aversion among investors.

For individual stocks, factors like company earnings, revenue growth, debt levels, and competitive positioning impact securities performance (Ullah et al., 2020). Fundamental analysis involves evaluating these company-specific variables to estimate the intrinsic value of a security. For the purpose of helping in making investment decisions, investors check if a security is undervalued or overvalued by comparing its market price to its intrinsic value (Koski, 2020). To forecast the future performance of securities, technical analysis looks at past price patterns, trading volume, and market movements.

Traders use technical indicators and chart patterns to make short-term investment decisions, attempting to profit from price movements. Technical analysis also aids in market timing, helping investors identify potential entry and exit points. The regulatory environment significantly impacts securities performance. Regulations ensure fair practices, prevent market manipulation, and enhance transparency. Efficient markets, where securities' prices reflect all available information, are a cornerstone of modern finance theory. Investors and researchers study the efficiency of markets to understand the implications of publicly available information on securities performance.

Securities performance can also be influenced by psychological factors. Behavioral finance studies how investor emotions, biases, and cognitive errors impact decision-making and securities performance. Investor sentiment, fear of missing out, and herding behavior can drive market trends and contribute to securities' overvaluation or undervaluation. The Nairobi Securities Exchange is confronted with a significant challenge in the form of stock return volatility, as highlighted in the sessional document

No. 10 of 2012 on Kenya Vision 2030. The volatility of the NSE 20 share index has had an impact on the stock returns of the publicly traded companies listed on the Nairobi Securities Exchange (Kamande, 2015).

The existence of volatility in the Nairobi Securities Exchange was confirmed by Kalui (2004), who linked it to various market causes. Nairobi Securities Exchange stock returns are extremely volatile, which makes investors wary of putting their money there. There is empirical evidence linking macroeconomic variables to stock return volatility, and some theories of finance, such the Arbitrage Pricing Theory, take macroeconomic variables into account as possible predictors of stock return volatility. Results from the many empirical studies that have looked at how macroeconomic variables affect stock returns have been all over the outline. The effect of macroeconomic variables on stock returns is thus a topic of debate. Researchers Ouma and Muriu (2014) and Kirui (2014) used Ordinary Least Squares (OLS) theory to determine that interest rate had no statistically significant effect on stock return. A negative effect was, however, noted by Olweny and Omondi (2014) and Gatebi (2013). Olweny and Omondi (2014) and Ouma and Muriu (2014) both confirmed that inflation is significant, however Kirui (2014) came to the opposite conclusion. The study by Olweny and Omondi (2014) found that exchange rates positively correlated with stock returns, while the study by Kirui (2014) found no such correlation. By including a large number of macroeconomic variables, this study hoped to rectify the aforementioned shortcomings and provide solid results.

1.1.1 Macroeconomic Variables

Macroeconomic variables refer to the underlying economic factors that possess the capacity to influence the performance of a nation's economy, as well as the returns of the stock market and the volatility of stock prices (Kitati et al., 2015). Illustrative instances encompass the level of employment or unemployment, rates of foreign

exchange, gross domestic product, money supply, interest rate, rate of industrial production, and inflation rate. According to Olukayode and Akinwande (2009), macroeconomic variables refer to the variables that exert control over the macro-economy, including the whole of the economy. The existence, conduct, and outcomes of organizations are influenced by macroeconomic conditions. These factors can have a direct impact on competitors or an indirect effect on the business climate. According to Atanda (2012), the variables that exert significant influence on the economy include Gross Domestic Product (GDP), unemployment, exchange rate, and inflation. The present study employed many economic indicators, including exchange rate, rate of inflation, money supply, gross domestic product, as well as interest rate.

The selection of these macroeconomic factors was determined through an empirical review, which did not include any previous combinations. This review aims to contribute to the existing body of knowledge.

Inflation, as defined by Basu (2011), refers to a general increase in the prices of goods and services. The consumer price index and producer pricing index are widely employed as the primary indices for assessing inflation. The Price Performance Index (PPI) measures the mean cost of a collection of goods that a company utilizes to convert them into final products. According to Barnor (2014), the impact of inflation rates on securities indexes can be either beneficial or negative. Increased producer inflation leads to a decrease in firm earnings, a reduction in market expansion, and a subsequent rise in unemployment when companies stop hiring people. Stock prices fluctuate in response to indications from production indexes. The correlation between disposable income and inflation, as well as the subsequent decline in the production of vital goods and services, has been observed. Inflation diminishes the purchasing power of

individuals with low income, resulting in their inability to obtain necessary goods and services.

The value of one currency relative to another is determined by the exchange rate, which is described by Schiller (2008) as a quotation that evaluates this value directly or indirectly. It measures how much money would have to change hands in another country to buy the same assortment of products and services as in one's own. The exchange rate affects both the relative worth of domestic and foreign items and the demand for domestic goods from outside (Ncube & Ndou, 2011).

Numerous studies have examined the utilization of nominal exchange rates as a means to assess fluctuations in international exchange rates, despite the possibility of evaluating them in real terms as well. There is a widespread belief that there is an inverse relationship between stock returns and exchange rates. As a result, an increase in exchange rates is believed to result in a decrease in stock returns, while a reduction in exchange rates is believed to lead to an increase in stock returns. This is demonstrated by good market theory. An increase in the value of the local prices causes a decrease in the demand for a nation's products because other countries are going to pay more. As a result, the stocks of companies in that nation will fall because investors will not be willing to invest in such businesses. This is in accordance with the theory of the market.

The portfolio balance theory elucidates the correlation between the stock markets and the exchange rate market, however the extent of this correlation remains uncertain and occasionally yields conflicting findings in empirical investigations. Gross domestic product (GDP) refers to the comprehensive monetary value of a nation's production throughout a designated time frame (Schiller, 2008). A reliable indicator for assessing economic recession and subsequent recovery is the gross domestic product per capita.

Gross domestic product (GDP) is a metric that quantifies the total income generated by a nation through both domestic and foreign factors of production. The stock market return is directly influenced by significant fluctuations in gross domestic product, which can have either positive or negative effects. A positive economic forecast that anticipates economic growth is likely to result in an increase in stock prices, as a prudent investor would be inclined to purchase stocks in order to capitalize on the profits generated by a rising economy. Conversely, in the event of an anticipated economic crisis, it is seen that stock prices tend to decrease as investors choose to divest from their stocks and acquire instruments with lower risk, such as bonds.

According to Wang (2013), gross domestic product (GDP) is commonly regarded as the primary macroeconomic indicator for assessing total economic productivity in a country. The rate of growth in GDP serves as an indicator of the economic conditions during different phases. The data analysis in this study will employ actual numbers of Gross Domestic Product. The interest rate refers to the expense associated with obtaining a loan. An interest rate refers to the component of a loan that an investor requests in exchange for utilizing their funds. The interest rate is the percentage cost imposed by the lender on the borrower for loan money, given as a cost relative to the principal amount. The Central Bank of Kenya Lending Rate was employed as a proxy in this study to assess the interest rate.

According to Songole (2012), investors engage in the purchase of stocks with the most favorable interest rates, which is determined by the interplay of the money market mechanism in an economy (Darfor & Agyapong, 2010). The central bank, acting on behalf of the government, often adjusts interest rates as required to regulate the quantity of money in circulation. Numerous research examining the correlation between macroeconomic variables and stock returns have consistently demonstrated a

considerable negative impact of interest rates on stock returns. According to Olweny's (2011) study, there was a substantial relationship between interest rates and stock returns among firms listed on the Nairobi Stock Exchange. The lending rate of the Central Bank of Kenya served as an indicator for interest rates in the context of this study.

Economic growth refers to the gradual increase in the level of output within an economy during a specified timeframe, often measured over a one-year period. Economic growth is very desirable as it signifies an overall increase in the wealth of individuals within an economy. There are several factors that contribute to economic growth, including technological advancements, increased demand for goods and services, and an expansion of the labor force, resulting in a reduction in unemployment rates. The money supply refers to the aggregate amount of money present within an economy during a specific period. The average annual monetary base (M3) is determined by calculating the total amount of currency in circulation and reserve balances. Money refers to a collection of liquid assets that serve as a means of trade and are commonly accepted for the purpose of debt repayment. In this capacity, it functions to optimize the utilization of limited resources allocated to transactions, enhance resources for manufacturing, facilitate commerce, foster specialization, and contribute to the overall well-being of a society. The present study employed M2 as a surrogate measure for assessing the money supply. The utilization of M2 in this study was justified due to its broader categorization of currency compared to M1, which solely encompasses liquid assets. The inclusion of M2 in this analysis was deemed pertinent due to its exclusion of assets with the lowest liquidity, as observed in M3. The money supply data is collected, recorded, and periodically published by the government or central bank of the country.

1.1.2 Stock Market Prices

A share's value in the stock market—also called the stock market price—is determined by the supply and demand dynamics of the market. When there are more buyers than sellers, the stock market price rises because of the high demand, and when there are more sellers than buyers, the stock market price falls because of the increased supply. If a company is exhibiting strong performance and generating substantial profits, its stock prices will rise due to the perception among customers that it is a favorable investment opportunity. The stock market is a highly volatile institution characterized by significant risk, as share prices are prone to declines resulting from a range of economic downturns and shocks. Nevertheless, notwithstanding their inherent volatility, it is widely acknowledged that investments with elevated levels of risk are correlated with increased rates of return. In their study, Bamurange et al. (2019) examined the effects of specific macroeconomic factors on the performance of the stock market in Kenya.

The study conducted by Mutuku et al. (2015) examined the dynamic relationship between stock prices and specific macroeconomic variables in the context of Kenya. The findings of the researchers suggest that there is a long-term relationship between macroeconomic indicators and equity marketing. Rehman et al. (2019) examined the similarities in the fundamentals of equity markets and the co-movements of returns in 10 emerging and frontier equity markets in Asia. There is a long-term correlation between the variables that affect the co-movement of bilateral stock markets, according to the study's results. The correlation between macroeconomic variables and the stock market values of Nairobi Securities Exchange companies was investigated in a study by Maina (2013). Stock market prices were shown to be positively correlated with the macroeconomic factors that were studied in the study. The financial markets play a

crucial role in the economy because they make investment capital more accessible and encourage capital investments, which boost economic development. Additionally, it links capital deficits to the capital supply. Farkas (1970).

According to Malkiel (1999), inefficient markets result in an unstable link between risk and return. Moreover, it is worth noting that economic activity, capital investments, and monetary policy can exert persistent impacts on the fluctuations of stock prices, hence influencing the returns and risk premiums associated with securities demand. Hence, the aforementioned findings provide empirical support for the presence of an inverse causality and a sustained association between stock price fluctuations and macroeconomic indicators within the economic domain.

The review of monetary development in Kenya has been prompted by many considerations regarding the assumptions behind the strong and consistent relationship between macroeconomic factors and stock prices. Kenya encountered a macroeconomic crisis characterized by the loss of control over the money supply, elevated inflation rates, the collapse of both banks and non-bank financial intermediaries, and the imposition of high interest rates. This led to significant challenges for numerous enterprises and resulted in a substantial non-performing portfolio (Malouche, 2009).

1.1.3 The Nairobi Securities Exchange (NSE)

The Nairobi Securities Exchange, originally known as the Nairobi Stock Exchange, was created in 1954 by a collective of voluntary stockbrokers who were duly registered under the Societies Act in British Kenya. The NSE is responsible for managing the Kenya Shillings currency. At present, it has compiled a list of players of sixty-four enterprises that are spread throughout several sectors. The organization in question is

affiliated with the Africa Securities Exchange Association. Stock prices fluctuate in response to market dynamics, which are impacted by the forces of supply and demand. When demand for stocks increases, prices tend to rise, while supply increases (Songole, 2012).

A variety of industries, including investing, insurance, construction, automobile, commercial and services, agricultural, and banking, are represented by the listed companies. This market serves as a platform for listed corporations and the Government to engage in the trade of their respective financial securities. The oversight of the activities of the Nairobi Securities Exchange is entrusted to the Capital Market Authority (CMA), an agency responsible for this oversight. The obligation of providing a trading platform for securities of listed businesses at the Nairobi Securities Exchange lies with the Capital Market Authority (CMA). According to the NSE (2018), there are a total of 65 businesses listed on the Nairobi Securities Exchange. The Nairobi Securities Exchange plays a crucial role in enabling the conversion of savings into investments that yield profitability, as opposed to allowing them to remain unutilized. This fosters a propensity among both domestic and international investors to engage in investment activities, since they possess a sense of assurance regarding potential returns.

The growth and advancement of the Nairobi Securities Exchange have been enabled by the formulation and implementation of numerous policies. This phenomenon fosters a sense of assurance and encouragement among individual and private investors, prompting them to allocate their funds towards stock market investments. One of the measures that has been created is to grant Capital Market authority to govern the operations of the Nairobi Securities Exchange and eliminate distinctions between

leverage and shares in order to promote diversity in the stock market (Kemboi & Tarus, 2012).

1.1.4 Development of Equity Securities Market in Kenya

The advocates of stock markets place significant emphasis on the significance of a well-established stock market in enhancing investment efficiency. It is expected that a proficiently operating stock market will result in a reduced cost of equity capital for companies and enable individuals to more efficiently assess and mitigate risk. According to Kemboi and Tarus (2012), the Capital Market Authority has implemented laws aimed at providing guidance on the issuance of commercial papers, corporate bonds, and significant changes to the corporate governance systems of listed corporations. These policies are designed to ensure investor confidence.

The Nairobi Securities Exchange has become the leading market in East and Central Africa, with a significant increase in the total number of shares traded. As of 14 August 2019, the market capitalization is at 2,270.98 billion (NSE, 2018). The Nairobi Securities Exchange comprises a total of 65 businesses, which are categorized into four primary segments: Alternative Investment Market Segment (AIMS), Growth Enterprise Market Segment (GEMS), Main Investment Market Segment (MIMS), and Fixed Income Market Segment (FIMS). Smaller, emerging enterprises allocate their resources towards the Alternative Investment Market Segment, which entails less stringent criteria compared to the Main Investment Market Segment, which they may not be able to satisfy. These mechanisms also serve to address the evolving demands of savers and improve the liquidity of enterprises with substantial money by listing their existing shares, with the intention of enhancing marketability rather than seeking additional capital. According to the Nairobi Securities Exchange (2010), both institutional

investors and individuals seeking to diversify their portfolios are provided with investment alternatives.

The NSE 20 share index is a widely utilized index inside the Nairobi Securities market (NSE) that assesses the performance of the top 20 companies listed on the market. An index is a composite of diverse equities that accurately reflects the entire market. Investors employ the usage of indices to track the performance of a stock market, enabling them to make informed investment decisions (NSE, 2016). The NSE 20 share index is derived by calculating the mean value of shares from the top 20 companies that have demonstrated exceptional performance and are publicly traded on the Nairobi Securities Exchange. The NSE conducts periodic reviews of companies, typically at the conclusion of the day. The process of removing and including companies from the list occurs. In order for a firm to be deemed eligible for inclusion in the compilation of the NSE 20 share index, it is imperative that the company have a minimum market capitalization of 40%. Additionally, it is necessary for the company's shares listed on the National Stock Exchange (NSE) to have a minimum trading volume of 20%, liquidity of 20%, and a turnover of at least 10%. Furthermore, a minimum free float of 20% is also a prerequisite. The company must have a minimum market capitalization of Kshs. 20 million and a strong track record of high profit and dividend. The study includes a list of the NSE 20 share index in Appendix II.

1.2 Statement of the Problem

The performance of securities at the Nairobi Securities Exchange (NSE) is significantly influenced by various macroeconomic variables, including exchange rates, interest rates, inflation, money supply, and Gross Domestic Product (GDP) (Kirui, Wawire & Onono, 2014). These variables are critical in shaping investor expectations and

determining market trends. Despite extensive research, the relationship between these macroeconomic factors and securities performance remains ambiguous, with empirical studies yielding conflicting results. This inconsistency points to a gap in the literature, particularly within the Kenyan context, where emerging market dynamics add complexity to these interactions.

Exchange rates play a pivotal role in the NSE, as fluctuations can have substantial impacts on companies engaged in international trade. For instance, a study by Ochieng and Oriwo (2015) found that a depreciation of the Kenyan Shilling negatively affected stock prices of import-dependent companies, while exporters benefited from improved competitiveness. However, Mwangi and Nyamute (2016) observed that the exchange rate's impact on the NSE was minimal, suggesting that other factors may have a more significant influence. This divergence in findings underscores the need for further research to clarify the exchange rate's role in securities performance.

Interest rates are another critical macroeconomic variable influencing stock market performance. Higher interest rates typically increase the cost of borrowing, thereby reducing corporate profits and dampening stock prices. Nyasha and Odhiambo (2017) reported that rising interest rates in Kenya had a significant negative impact on the NSE, aligning with the traditional view. Conversely, Kiptoo and Kiplangat (2019) found that interest rates had an insignificant effect on stock prices, arguing that the Kenyan market might be more resilient to interest rate fluctuations than previously thought. These contradictory findings highlight the complex nature of interest rates' impact on securities performance, necessitating further investigation.

Inflation is another variable that can significantly affect securities performance. High inflation typically erodes purchasing power and increases production costs, negatively

impacting corporate earnings and stock prices. A study by Kibet and Omwenga (2019) found that inflation had a strong negative impact on the NSE, particularly during periods of economic instability. However, a contrasting study by Kimani and Mutuku (2016) suggested that the relationship between inflation and stock market performance was weak and that other factors, such as investor sentiment, played a more significant role. The conflicting evidence regarding inflation's impact on the NSE points to the need for more nuanced research that considers different inflationary environments.

The money supply also plays a crucial role in influencing securities performance. An increase in the money supply typically lowers interest rates and increases liquidity, which can boost stock prices. Odongo and Were (2017) found that an expanding money supply positively influenced the NSE, supporting the view that increased liquidity drives market performance. However, Ndungu and Obiero (2018) argued that the relationship between money supply and stock prices was not straightforward, as excessive money supply could lead to inflationary pressures that counteract any positive effects. This inconsistency in findings highlights the complex interplay between money supply and securities performance, particularly in an emerging market like Kenya.

GDP, as a broad measure of economic activity, is expected to positively influence securities performance by reflecting overall economic health. Kariuki and Mutua (2019) found that GDP growth had a positive impact on the NSE, indicating that a growing economy boosts investor confidence and stock prices. However, another study by Wambui and Kinyua (2020) suggested that GDP's impact on the NSE was limited, as other macroeconomic factors and global economic conditions played a more significant role in determining market performance.

1.3 Objectives of the Study

1.3.1 General Objectives

The general objective of this study was to determine the effect of selected macroeconomic variables on securities performance in Kenya.

1.3.2 Specific Objectives

i. To establish the effect of exchange rate on the securities performance in Kenya.
ii. To determine the effect of interest rate on the securities performance in Kenya
iii. To identify the effect of inflation on the securities performance in Kenya.
iv. To determine the effect of money supply on securities performance in Kenya
v. To establish the effect of GDP on the securities performance in Kenya

1.4 Hypotheses of the Study

The study was guided by the following hypothesis;

i. **H_{01}**: there was no significant effect of exchange rate on the equity security market indices in Kenya;
ii. **H_{02}**: there was no significant effect of interest rate on the equity security market indices performance in Kenya;
iii. **H_{03}:** there was no significant effect of inflation on the equity security market indices performance in Kenya;
iv. **H_{04}**: there was no significant effect of money supply on equity security market indices performance in Kenya
v. **H_{05}**: there was no significant effect of GDP on the securities performance in Kenya;

1.5 Significance of the Study

The results of this research hold significant relevance for a range of stakeholders and practitioners in the securities market, including corporate investors, individual investors, and government policy makers. Corporate and individual stock market investors are the primary recipients of this study, as they can utilize the data to inform their investing decisions and tactics.

This study offers valuable insights that can inform policy makers in both the government and corporate sectors, enabling them to develop macroeconomic policies aimed at fostering economic growth and stability. The study offers potential avenues for future research that can contribute to the advancement of this field of study. It is an integral aspect of the literature evaluation in this subject. The study would contribute to the current knowledge base by partially addressing the research gap.

1.6 Justification of the Study

The fundamental issues have been whether there is a relationship between macro-economic variables and equity market index as well as the nature of relationship that the market hold while considering its operational pricing. Further, establish any significant influence on key policy decisions, and whether investors and capital holders should place premium on the effects of Macro-economic variables while pursuing profitable instruments for investment in the capital market.

The critical issue of consideration among policy makers is whether macro-economic variables in a competitive market have substantive effect on the portfolio planning by investors as well as government seeking to influence fiscal and monetary policy thereof.

This study would be useful in providing insight to investment planning and mobilization of requisite capital by investors to meet their financing requirements.

Further, supports the government, investors and policy makers in establishing whether macro-economic variables consequently have an effect on the structure of capital in corporates who derive their financing from the capital markets and equity offerings while ensuring a stable monetary and fiscal environment.

1.7 Scope of the Study

The study aimed to find out how significantly the following macroeconomic variables; exchange rates, money supply, real Gross Domestic Product and rate of inflation affects the performance NSE Equity securities Market indices. Secondary time series data from the period 1986 to 2022 was used in this study. This is because of the numerous reforms that were enacted in Kenya due to the liberalization policies. The relevant information for the macro- economic variables was gathered from the Nairobi Securities Exchange, Capital Markets Authority, Kenya National Bureau of Statistics and Central Bank of Kenya whereas the data for the Equity market security index was obtained from the Nairobi Securities Exchange.

CHAPTER TWO

LITERATURE REVIEW

2.0 Overview

This chapter encompasses the concepts of Macroeconomic variables, Equity Securities market, theoretical literature, empirical review and the conceptual framework of the study. Further, seeks to review the existing literature, information and publications on the concepts of macro-economic variables and equity securities market.

2.1 Concept of the Study

2.1.1 Securities Performance

The equity securities market provides a facilitation of resource mobilization, pools quality investments from local and international markets, provides capital to companies for investments, aides in risk diversification thus encouraging investment and aides in poverty alleviation (Collins & Pierrakis, 2012). The equity securities market determines the adjustment price levels of money and capital asset due to the market forces (Patin, Rahman & Mustafa, 2020). Equity prices reacts as a consequence of new unexpected information in the economy and the prevailing markets situations. An equity market is expected to be efficient where investors' average return on investments is not more than the earnings if investors do not take above average risks (Carpenter & Whitelaw, 2021). Inefficiency in equity markets is where the equity securities prices do not fully depict all the available information.

According to Xu, Geng, Wei, and Jiang (2020), the stock market has a significant impact on financial intermediation in both developed and emerging economies. This is because it offers a platform for the transfer of excess resources to sections of the economy that are lacking in output and investment. The growth and development of nations necessitate the allocation of resources by both organizations and governmental

entities. The stock market serves as a platform via which business entities can generate funds by offering their shares to potential investors. Efficient stock markets are observed in economies that are regarded to be undergoing sustainable growth. Developing nations do not possess stock markets that are as effective as those found in industrialized nations (Coleman, 2008). Nevertheless, there have been ongoing efforts to ensure the attainment of the intended result over an extended period of time. The economic structure of a nation include both microeconomic and macroeconomic factors. The stock market is significantly influenced by economic conditions. Stakeholders, including investors and the government, are concerned about the characteristics of the current stock market within a specific geographic area.

2.1.2 Macroeconomic Variables

Macroeconomic variables including industrial production, oil prices, money supply, inflation, and exchange rates influence stock prices in the stock market. Previous studies (Rahman, Sidek & Tafri, 2009; Uddin & Alam, 2007; Osamuonyi & Evbayiro-Osagie, 2012; Owusu-Nantwi & Kuwornu, 2011; Onasanya & Ayoola, 2012) have looked at the relationship between macroeconomic behavior and economic progress in various countries. Coleman (2008) asserts that there is a correlation between macroeconomic conditions and the variations in stock values seen in developed nations.

It is true that macroeconomic factors have a lag in their effects on stocks and, by extension, returns. Therefore, it is important to note that adjustments to Kenya's macroeconomic factors are expected to have an impact on the values of stocks at the Nairobi Securities Exchange (NSE). The NSE's share prices are impacted by changes in the macroeconomic factors of Kenya's trading partners, which also have an effect on the nation's overall level of economic activity, business profit, and equity prices.

2.1.3 Macroeconomic Variables and Securities Performance

The available evidence from financial theory indicates that there exists a strong correlation between stock returns and macroeconomic factors such as interest rates, exchange rates, Gross Domestic Product (GDP), inflation, and money supply, as global financial markets undergo greater liberalization. The aforementioned variables have been widely regarded as the primary factors influencing stock market dynamics. They serve as indicators of the overall macroeconomic conditions, which investors must closely observe and predict in order to make informed investment choices (Junkin, 2012).

Macroeconomic variables have been found to impact on equity prices and returns based on various empirical studies using various models like asset pricing. However, there are dearth of studies on Kenya that attempts to investigate the effects of macroeconomic variables on the NSE market indices. The few existing studies on the same have provided inconsistent results, for example a study by Kimani and Mutuku (2013) indicated that inflation rate has statistically significant effect on the NSE 20 share index which was in contrast to the findings by Muthika and Sakwa (2009) which showed that inflation rate did not have statistically significant effect on the NSE 20 share index.

Over the past two decades, Kenyan economy has undergone heightened trade liberalization, implemented various financial policies and increased economic integration with the European Union. It is therefore a fact that exogenous macroeconomic shocks in the EU are likely to have visible effects on the local firms and consequently affect their ability to pay dividends and their balance sheets as well. In reaction to new information in regard to the EU economic situation, the NSE equities prices are expected to adjust in order to remedy against the expected capital losses.

2.2 Theoretical Review

This next section provides an overview of the Efficient Market Hypothesis Theory (EMH), Arbitrage Pricing Theory, and Capital Asset Pricing Model. The stock market price in a market that is open is determined by the current selling price of a stock at a specific moment. The stock market price typically experiences daily fluctuations due to the buying and selling of stocks by investors. A decline in stock market prices is observed when there is a decrease in investor demand, and an increase in stock prices is observed when there is an increase in investor demand.

2.2.1 Efficient Market Hypothesis Theory (EMH)

The efficient market hypothesis was formulated by Eugene Fama, an American economist, during the early 1960s. According to Fama (2014), the theory posits that stock prices comprehensively reflect all accessible information at any given point in time. Given that both buyers and sellers possess identical information, price fluctuations are inherently unpredictable and will respond to unidentified market information. Phylaktis and Ravazzolo (2008) suggest that the market employs various mechanisms to obtain information pertaining to publicly traded corporations. The strategies can encompass several routes and sources, among other possibilities.

The correlation between macroeconomic conditions and stock market prices has attracted significant scholarly and professional interest over time. Previous research conducted by several scholars has focused on various aspects of stock market performance in relation to the impact of changes in one or more macroeconomic variables. The majority of the research has focused on the microstructure of stock markets, neglecting other risk concerns. Fisher's (1930) hypothesis posits that equity stocks function as representations of claims on tangible assets held by a corporation.

Consequently, it may be deduced that stocks serve as a protective measure against the impact of inflation.

According to Fama (1965), significant fluctuations in stock markets are frequently accompanied by subsequent adjustments that account for the cluster effects of stock prices. Additional studies conducted by Sharpe (1964), Lintner (1965), Modigliani and Cohn (1979), Nelson (1976), Fama and Schwert (1977), Fama (1981), and Chen et al. (1986) and Fama (1970) have demonstrated that a perfect market consists of one in which price accurately predicts information for resource allocation. The idea states that markets are efficient when prices accurately represent the information that is currently accessible. The theory asserts the existence of three distinct market types, namely weak form markets, semi strong form markets, and strong markets. Furthermore, it asserts that the market efficiency itself cannot be tested, which is commonly known as the joint hypothesis problem.

The data pertaining to share prices is derived solely from historical prices for the form with the lowest level of efficiency. Given the circumstances, it may be concluded that technical analysis is not a practical tool. The utilization of technical analysis involves the prediction of future share prices by the examination of historical prices and the identification of patterns (Edwards, Bassetti, & Magee, 2007). In a market with not enough efficiency, the share price already incorporates historical prices, so limiting the investor's ability to make progress through technical assessment. Fama (1970) categorizes market efficiency into two forms: weak and semi-strong. The weak form of market efficiency is based on historical information that is publicly available, while the semi-strong form of markets takes into account both the available information and changes in prices that are influenced by new public information. Conversely, the strong

form of market efficiency encompasses complete information, adapts to newly accessible information, and uncovers concealed information.

The Efficient Market Hypothesis (EMH) theory is supported by Fama's (1970) semi-strong form of efficiency, which posits that stock prices incorporate all essential information, including publicly available data. This finding holds significant implications for policymakers and stockbrokers. The theory posits that stock prices are influenced by macroeconomic variables, such as money supply and interest rates. It further suggests that competing investors, driven by profit maximization, ensure that every relevant detail regarding macroeconomic variables is taken into account. Consequently, investors in stock markets can generate regular profits by accurately predicting future stock price movements.

The debate surrounding the development of monetary policy has been the primary focal point in the fields of economics and finance, particularly in relation to its impact on the development of stock markets. Multiple studies conducted in Kenya have demonstrated a substantial and enduring correlation between the development of monetary policy and stock returns. A successful firm necessitates the allocation of funds towards permanent assets, although investors exhibit reluctance in devoting funds for extended durations. Individuals who have saved funds in liquid equity markets can quickly and economically sell their investments due to the lower level of risk associated with these investments (Maxwell Fry, Lavan Mahadeva & Sterne, 2000). Simultaneously, the investing corporations derive long-term capital access by means of stock shares.

The concept of semi-strong efficiency posits that share prices are influenced solely by publicly available information, such as annual reports and stock announcements. Meanwhile, the market already incorporates information that is accessible to the public;

the investor cannot gain economic benefits unless they have access to confidential information. Insiders and sensitive information that an investor can access include monthly internal reports and unpublished procurements (Tames Blanco & Nsiah, 2010). The concept of strong form efficiency arises when the share prices accurately reflect all available market information, encompassing both public and private and confidential data. This observation suggests that the probability of investors achieving a competitive advantage in the market is low. Despite possessing a certain level of information, investors are unable to accurately predict future price fluctuations (Barker, Hendry, Roberts, & Sanderson, 2012).

2.2.2 Arbitrage Pricing Theory (APT)

Arbitrage pricing theory, proposed by Ross (1976), is a comprehensive theory that illustrates how the anticipated return of a financial asset is determined by different theoretical market indices. Each change in these indices is represented by a distinct beta coefficient. This particular theory, in conjunction with other models with multiple variables of asset returns, holds considerable importance within the realm of contemporary finance theory. The profit of each security in the multifactor model is expressed as a linear combination of the returns of a limited number of variables and the returns particular to each asset. The mutual impact in the capital asset pricing model (CAPM) proposed by Sharpe (1964) and Lintner (1965) is demonstrated by the market return. In recent times, a multitude of empirical studies have emerged, providing substantial evidence supporting the association between stock returns and many factors encompassing macroeconomic, market-level, and firm-level characteristics. Chen, Roll, and Ross (1986) have identified many key characteristics that can be incorporated into the arbitrage pricing theory to explain security returns. These variables include unexpected changes in inflation, gross national product (GNP), yield

curve, and investor confidence. The justification for closely monitoring their timely and correct information is primarily based on economic considerations, as a result of their unforeseen movements.

Arbitrage Pricing theory utilizes the anticipated return of a high-risk asset and the risk premium associated with various macroeconomic conditions. APT necessitates that the returns of each given stock have a linear relationship with a collection of multiple factors. This study employed the APT framework, which computes the anticipated return by considering several factors and their corresponding sensitivities that could impact the movement of stock prices. Therefore, it enables the identification of factors that have a significant and distinctive impact on stock values.

2.2.3 Capital Asset Pricing Model (CAPM)

The Capital Asset Pricing Model (CAPM) is a financial model utilized to ascertain an appropriate and theoretically sound rate of return for an asset. It is employed to inform decisions regarding the inclusion of assets in a diversified portfolio. William Sharpe, a financial economist, devised this model (Sharpe, 2011). The CAPM model presents a straightforward theory that yields a straightforward outcome. According to the hypothesis, the sole justification for an investor to generate higher average profits by investing in one venture over another is that one venture carries a higher level of risk. It is not surprising that the model has assumed dominance over current financial theory. Regardless of the extent of your efforts to diversify your investments, a certain degree of risk will inevitably remain. Hence, entrepreneurs inherently pursue a rate of return that adequately compensates for the risk involved. The Capital Asset Pricing Model (CAPM) is a useful tool for assessing investment risk and predicting the expected return

on investment for investors. The underlying premise of this model claims that individual investments encompass two distinct forms of risk.

The initial category is referred to as Systematic risk. These market risks are inevitable and cannot be mitigated through diversification. Illustrative instances encompass recessions, wars, and interest rates. Unsystematic risk, often known as "specific risk," pertains to individual stocks. In alternative terminology, it denotes the component of a stock's return that is independent of the overall market movement (Macharia, 2018). Quantifying or measuring the risk associated with a project or investment poses significant challenges. This difficulty stems from the inherent variability in individuals' risk perceptions. One investor may perceive a project as highly risky, while another investor may perceive it as quite secure. Ultimately, how can one accurately quantify beauty, courage, patience, or risk? (Flyvbjerg, Bruzelius, & Rothengatter, 2003) The beta coefficient of the securities market as a whole is defined to be 1.0. The calculation of beta coefficients for individual enterprises is performed in relation to the beta of the market. A beta value greater than 1.0 indicates a greater level of risk compared to the typical market, whereas a beta value less than 1.0 indicates a lower level of risk compared to the market average (Al-Qaisi, 2011).

The betas of most organizations typically range from 0.75 to 1.50, although any value is feasible, even negative values. However, it is extremely unlikely for a beta to be negative, as it would signify lower risk compared to a venture that is completely risk-free. The beta coefficient is determined through a statistical examination of the daily returns of individual share prices, which are then compared to the daily returns of the overall market within the corresponding time frame. In their 1972 study titled "The Capital Asset Pricing Model," financial economists Jensen, Black, and Scholes

observed a linear correlation between the financial returns of stock portfolios and their beta coefficients. The researchers examined the fluctuations in stock prices on the New York Stock Exchange from 1931 to 1965. Despite the validity concerns presented by several research, the Capital Asset Pricing Model (CAPM) continues to be widely employed throughout the investment world. While it may be challenging to determine the specific reactions of individual stocks to market movements based on beta, investors can generally deduce that a portfolio consisting of high-beta stocks will outperform the market in either direction, while a portfolio consisting of low-beta stocks will outperform the market. Overall, the Capital Asset Pricing Model (CAPM) is a significant theory as it offers a valuable metric for investors to assess the potential returns they might expect to gain from an investment, in exchange for risking their capital.

2.3 Empirical Review

Since the Big Bang in 1986, a great deal of study has been done to investigate the connections between macroeconomic factors and stock market prices. This section of the thesis gives a thorough summary of earlier studies that have used the macroeconomic factors model to examine stock prices. According to the literature currently in publication, there is a correlation between stock market prices in developed nations and developing nations, but not in the former. There is a lot of debate over the relationship between a corporation's profitability and security returns and its financial success as measured by GDP fluctuation, interest rates, exchange rates, and inflation. While some studies have found no relevant relationship between the elements, others have shown statistically significant relationships between the factors.

The creation of multi-factor models has been suggested by Chen et al. (2001) as a way to explain the variation seen in security returns. Previous research suggests that a wide range of factors play a role in explaining security returns. Menike (2006) states that a number of reasons can be responsible for the observed variances. These factors can include, but are not limited to, the following: trade sector, budget deficits, oil prices, political risks, real activity, money supply, exchange rates, imports, domestic consumption, unemployment rate, real wage, and regional stock market indices. Regarding the relationship between the inflationary effect and official exchange rate, empirical data from both individual country studies and cross-country research are inconclusive (Rutasitara, 2004).

Menike (2006) looked at how variables related to GDP variation, interest rates, and currency rates affected stock prices in the developing Sri Lankan stock market. Monthly data from September 1991 to December 2002 were used in the study. The majority of companies reported a higher $R2$, which suggests that these variables have a larger capacity to explain stock prices, according to the data. This result is consistent with other research on emerging markets that has also shown a negative relationship between stock prices, currency rates, and inflation rates. Vaz et al. (2006) looked into how stock returns of major Australian banks from 1990 to 2005 were affected by changes in officially announced interest rate fluctuations. The results showed that the Australian Bank's stock returns benefited from the announcement of higher government interest rates. Furthermore, it has been seen that banks reacting to an increase in cash rates show net-positive anomalous returns. This result is consistent with the dividend valuation hypothesis, which suggests that stock returns may not be negatively impacted if income effects predominate. Olweny and Omondi's (2011) study sought to determine how macroeconomic factors affected the performance of the stock market. The results

showed that variables like inflation, interest rates, and foreign exchange rates affect how volatile stock returns are.

2.3.1 Real GDP and securities Performance

Wu et al. (2010) measured the ratio between the value of domestic shares listed on domestic exchanges and GDP in their study using the equity market capitalization. They also used the stock market's liquidity as a proxy for the value of domestic share trading on domestic exchanges divided by the value of domestic shares that are listed. The results of the study showed that equity market development had a negative short-term impact on real output relative to its long-term effects. According to their research, while equity market capitalization and liquidity have positive long-term effects on economic development, they have a negative short-term impact on economic growth.

Diebold and Yilmaz's (2008) analysis found a one-way correlation between the volatility of the GDP and the equities market. Caporale and Spagnolo (2003) discovered that the volatility of the production growth was positively impacted by the equity market's volatility. However, a number of studies have provided empirical evidence of a reciprocal relationship between GDP growth volatility and stock market volatility. Using spectral analysis, Leon and Filis (2008) looked at Greece's quarterly GDP, investment, and stock market data. According to Leon and Filis (2008), changes in GDP can cause changes in equity market volatility, but changes in equities market volatility can also cause changes in GDP.

In recent years, a number of research have been carried out to examine the relationship between GDP and stock returns. Most studies have found that future levels of real economic activity, measured by gross domestic product, will positively correlate with current stock levels (Geske & Roll, 1983; Chen et al., 1986; Sharma & Wongbangpo,

2002). In the economy, stock returns are influenced by how the GDP (gross domestic product) affects firm profitability. Increased output leads to expectations of increased earnings in the future, which in turn raises stock values. The converse also applies in the event of a recession in an economy. Tursoy, Gunsel, and Rjoub (2008) used the Ordinary Least Squares (OLS) technique to investigate the correlation between 11 industrial portfolios and 13 macroeconomic indices, including the gross domestic product. Examining the effects of macroeconomic factors on the Istanbul Stock Exchange was the aim of this study.

The results of the analysis show that there is no statistically significant correlation between stock returns and GDP. This phenomena may be explained by the variability of the relationship, which might show both positive and negative associations depending on the industry. Similar conclusions were drawn about the relationship between macroeconomic variables and stock returns in the Nigerian capital market index in a study by Osamuonyi and Evbayiro-Osagie (2012). It was discovered that the gross domestic product had little effect on stock returns in the Nigerian economy. On the other hand, the goal of Kirui, Wawire, and Onono's (2014) study was to evaluate the relationship between macroeconomic variables and stock returns inside Kenya's Nairobi Securities Exchange. The results of the analysis showed that there was no statistically significant relationship between stock return and GDP.

2.3.2 Interest Rates and Securities Performance

In a similar line, Owusu-Nantwi and Kuwornu (2011) carried out research using a Ghanaian background. The study's conclusions show that interest rates have a comparatively small impact on stock returns in the Ghanaian stock market. The interest rate in the nation's stock market was calculated using the rate on 91-Treasury bills. The

interest rate and stock return were found to be negatively correlated. The aforementioned result was obtained through the application of the Ordinary Linear Square methodology to the analysis of monthly data collected between 1992 and 2008. The research team's conclusions aligned with earlier investigations on contemporary society.

Onasanya and Ayoola (2012) used data from 1985 to 2008 and a Vector Error Correction Model (VECM) in their work. The purpose of the study was to look into the relationship between stock returns and macroeconomic variables. The researchers arrived at the conclusion that there was little to no impact of the macroeconomic factors on stock returns. The study's conclusions show that interest rates and stock returns in the Nigerian stock market are negatively correlated. However, the statistical insignificance of the observed negative association was determined.

Maswere and Kaberuka (2013) conducted a study in which they looked at the variables affecting the Uganda Security Exchange stock market. The study's conclusions show that interest rates and stock market performance inside the country have a negative relationship over a long period of time. Nevertheless, no statistically significant changes in this connection were seen in the short term.

Kirui, Wawire, and Onono (2014) looked into the relationship between macroeconomic variables and stock market performance on Kenya's Nairobi Securities Exchange. The analysis came to the conclusion that interest rates and stock returns are negatively correlated. As such, government authorities must maintain control over the extent to which interest rates fluctuate in the nation. Elly and Oriwo (2012) came to a similar conclusion in their research, showing a negative link between stock returns in Kenya's Nairobi Security Exchange and 90-Day Treasury bill rates.

2.3.3 Inflation Rate and Securities Performance

Choudhry (2001) looked into how inflation affected stock returns. Four major Latin American nations—Chile, Mexico, Argentina, and Venezuela—that were known for having high rates of inflation were the focus of the study. The results of the empirical analysis showed that every series in the study showed mean reversal at every level. In order to investigate the relationship between stock returns and inflation, the study used linear regression. The results showed that inflation levels had a significant effect on stock returns, mainly because they were lags rather than leads. The results also showed that there was an adverse relationship between inflation and stock returns during times of high inflation. Maswere and Kaberuka's (2013) study examined macroeconomic variables from 2003 to 2011 in order to determine the factors impacting stock market prices in Uganda. The Phillip-Perron unit root test and the Augmented Dickey Fuller test were used to test the variables. The findings showed that while inflation was initially constant, later changes had a significant effect on the economy's stock prices.

On the other hand, Shilinde (2013) carried out research that looked at how macroeconomic factors affected Tanzania's economy. The study used the Johansen co-integration test and the Vector Autoregressive (VAR) framework to investigate the existence of long-lasting relationships between the variables. The results concerning inflation suggest that high rates of inflation have a noteworthy effect on stock returns in the Tanzanian economy.

Kirui, Wawire, and Onono (2014) conducted a study with the objective of evaluating the relationship between the GDP, inflation, Treasury bill rate, exchange rate, and stock return in relation to Nairobi Stock Exchange Limited.

In order to ascertain whether the inflation illusion was indeed influencing the relationship between stock return and inflation, Lee (2009) reevaluated the data. Using a larger sample period of data from US and international sources, the hypothesis was reexamined. The study looked at the pre-war era phenomena of overpricing in tandem with growing inflation. This implies that in both subsample periods, the mispricing component has a considerable impact on the link between the equity market and inflation. The relationships found before and after the conflict are consistent with the relative importance of these shocks.

Mohammad (2011) utilized a Multivariate Regression Model in their research, incorporating the Granger causality test and Standard OLS formula, to investigate the impact of changes in particular microeconomic and macroeconomic variables on the performance of the Bangladeshi equity market. From July 2002 to December 2009, the researcher analyzed monthly data related to all the topics under investigation. The study found a negative relationship between foreign remittances and inflation as well as the performance of the stock market. On the other hand, it was discovered that the market's prices and earnings as well as the increase in stock market capitalization had a positive effect on equity market returns. However, no unidirectional Granger Causality between stock returns and any of the independent variables is found by the research. Granger Causality's absence points to the existence of an unofficially inefficient market.

Empirical evidence, according to Gallagher and Taylor (2002), indicates that inflation, both expected and unexpected, negatively affects equity returns. These studies frequently explain the negative correlation between inflation and the performance of the equity market by pointing to the impact of money demand and the general theory of money quantity. In 2005, Hondroyiannis and Papapetrou looked into the relationship

between real stock returns and inflation in Greece. They observed that price changes affect the returns of the equity market through two different methods. Channel 1 illustrates how rising inflation hurts investment and output, which in turn has a negative influence on economic growth. This creates uncertainty in the economy, which has a negative impact on actual economic activity. The performance of the market is negatively correlated with inflation.

Ritter and Warr (2002) support the inflation illusion theory by pointing out that the 1982–1983 bull market was, at least partially, caused by undervaluing leveraged stocks due to mistakes made while applying nominal and real capitalization rates. Campbell and Vuolteenaho (2004) investigated the problem of inflation-induced mispricing using data from 1927 to 2002. Their results lend further credence to the inflation illusion theory.

2.3.4 Exchange Rates and Securities Market Performance

In 2009, Rahman, Sidek, and Tafri carried a research to investigate the correlation between various macroeconomic variables and stock returns in the Kuala Lumpur Composite Index (KLCI), a proxy for the Malaysian stock market. The study utilized the Vector Autoregression (VAR) methodology with data collected between 1986 and 2008. The research study's conclusions show a significant and negative correlation between the exchange rate and stock market performance, which in turn affects stock returns.

Osamuonyi and Evbayiro-Osagie (2012) came to a similar conclusion when they examined the relationship between macroeconomic factors and stock returns in the Nigerian capital market index. The study used annual exchange rate data from 1975 to 2005 and the Vector Error Correction Model (VECM) to investigate the short- and long-

term relationships between exchange rates and stock returns. Aurangzeb (2012) came to a similar result in his investigation of the variables influencing the stock market's performance in South Asian nations. The author used monthly data for India, Pakistan, and Sri Lanka—three South Asian nations—that ranged from 1997 to 2010. Descriptive statistics were used in the study's analysis. The study's conclusions showed that exchange rates had a significant and positive effect on stock market performance in each of the three countries. As a result, exchange rates and stock returns showed a strong and positive association.

Adarmola (2012) conducted a study wherein the behavior of the Nigerian stock market and the volatility of currency rates were examined. The study used an error correcting mechanism and Johansen's Co-integration Technique, and the results were similar to those published in the previously stated articles. The study comprised quarterly information from 1985 to 2009. The study's conclusions show that the exchange rate had a significant impact on the Nigerian stock market during both short- and long-term timeframes. Based on the investigation's findings, it was determined that the exchange rate had a positive short-term impact on the stock market's performance or returns. On the other hand, over an extended period of time, the study's results also showed a statistically significant negative correlation between the exchange rate and stock returns.

Stavarek (2004) examined in his research the causal relationship between exchange rates and stock prices in the United States and four of the EU's established members—Austria, France, Germany, and the United Kingdom—as well as the four recently admitted members—the Czech Republic, Hungary, Poland, and Slovakia. The information varies from county to county depending on the availability of the data. A

number of tests, including the conventional Granger causality test, vector error correction modeling, and co integration analysis, were used to investigate the relationship between exchange rate and equity market performance. The study's conclusions show that no long-term association was found between 1970 and 1992, when the initial analysis period was conducted. Due to their strong stock markets and rising currency rates, the United States and the former members of the European Union suffered a disproportionately high number of casualties between 1993 and 2003. The relative underdevelopment of the markets in recent EU members is the reason for the lack of long-term equilibrium in those countries.

Nyamute (1998) looked at the relationship between equity prices and other financial variables in the setting of Kenya, including the money supply, interest rates, inflation rates, and currency rates. The study found that there was a positive relationship between exchange rates and stock prices. The validity of the conclusions could be negatively impacted by the results of the data analysis for non-stationary series. Additionally, the study by Sifunjo and Mwasaru (2012) looked at the relationship that exists between foreign currency rates and NSE equity prices. The investigators employed monthly information from November 1993 to May 1999. The error correction model and the Johansen consideration technique were used in the analysis. Based on empirical evidence, it appears that exchange rate variations significantly influence how Kenyan stock prices are determined.

2.3.5 Money Supply and Securities Performance

In his 1982 study, Eric Sorensen examined the impact of money on stock prices, paying particular attention to both anticipated and unforeseen changes in the money supply. According to Sorensen's (1982) research, the efficient market theory is supported by

the observation that unexpected changes in the money supply have a greater impact on the stock market than expected fluctuations.

A study by Hamzah (2004) looked at the relationship between money supply and the performance of the stock market. The study's conclusions showed a positive correlation between shifts in the money supply and the evolution of Singapore Stock Exchange share prices. A study by Brahmasrene and Jiranyakul (2007) examined the connection between emerging country stocks markets and money supply, with a particular emphasis on the Thai stock market from 1992 to 2003. Their analysis's conclusions showed a favorable relationship between equities prices and the money supply. In the Turkish market, Cagli, Halac, and Taskin (2010) did not find any indication that the money supply and equity returns were co-integrated.

Shaoping (2008) discovered that during the period of 2005 to 2007, changes in macroeconomic variables, such as the money supply, had a considerable impact on the evolution of equity returns. The results of the investigation showed a stable and reliable relationship between the general monetary aggregate and the performance of the equity market. Similarly, the money supply and the performance of the equities market are positively co-integrated. It is implied by the presence of positive co-integration that an increase in the money supply raises equity share prices proportionately.

According to Habibullah and Baharumshah's (1996) analysis, there is no cointegration between the money supply and stock performance in Malaysia's equity market, and the market's efficiency is low. The money supply and the equities market have a positive causal relationship, as demonstrated by Habibullah (1998) and Hanousek and Filler (2000).

Ouma and Muriu (2014) used the frameworks of Arbitrage Pricing Theory (APT) and Capital Asset Pricing Model (CAPM) to examine how macroeconomic factors affected stock returns in Kenya from 2003 to 2013. Monthly data were the main focus of the analysis. The Ordinary Least Squares (OLS) method was employed in this study to evaluate the model's viability and ascertain the relative importance of the several variables that could affect stock returns. Two fascinating results emerged from the empirical investigation. Each variable is first represented by the letter I(0). Moreover, there is a strong correlation between macroeconomic factors and stock market returns—interest rates excluded. The study's conclusions imply that there is a connection between Kenya's stock market performance, money supply, inflation, and exchange rates. It has been determined that the money supply and inflation have a major effect on NSE returns. However, new research suggests that while interest rates have little effect on the long-term performance of the NSE, variations in currency rates negatively affect stock returns.

2.4 Research Summary and Gap

Over the past thirty years, a considerable body of empirical research has been dedicated to investigating the intricate connections between stock market dynamics and economic activity. This research has primarily focused on developed stock markets, including the United States, United Kingdom (UK), Germany, and Japan. Notable pioneering studies in this field include those conducted by Fama (1981, 1990), Geske and Roll (1983), and Chen and Ross (1986).

While there is existing literature on the behavior of the stock market in Kenya, the majority of studies primarily concentrate on investigating the correlation between economic factors and stock market prices. Additionally, these studies often assess the

volatility of the stock market in response to specific political and economic events, as well as analyze the fluctuations in stock performance at the market level caused by macroeconomic factors. In a study conducted by Njehu (2011), the impact of market capitalization on the Nairobi Securities Exchange was investigated. Similarly, Njenga (2013) conducted research on the relationship between stock market development and economic growth. Previous research has examined the diverse aspects that impact the overall performance of the National Stock Exchange (NSE). Some of these include Kimani and Mutuku (2013).

The literature review demonstrates that the impact of macroeconomic variables on stock market performance varies between countries, indicating a lack of consistency. A study of this nature has not been conducted at the NSE, and the objective of this study is to address this research gap.

Additionally, this study considered a different time frame that runs to the year 2021 and also employed the autoregressive distributed lag model for analysis which is different from what most studies employed in their studies. This study also investigated the effect of the macroeconomic variables across the different sectors of the Kenyan economy a study that had not been carried before at the NSE.

2.5 Conceptual Framework

The conceptual framework is to show the relationship among the dependent and independent variables in a research study. This interaction facilitates the researcher to identify expected correlation which exists between the variables faster and simply.

Independent Variables **Dependent Variable**

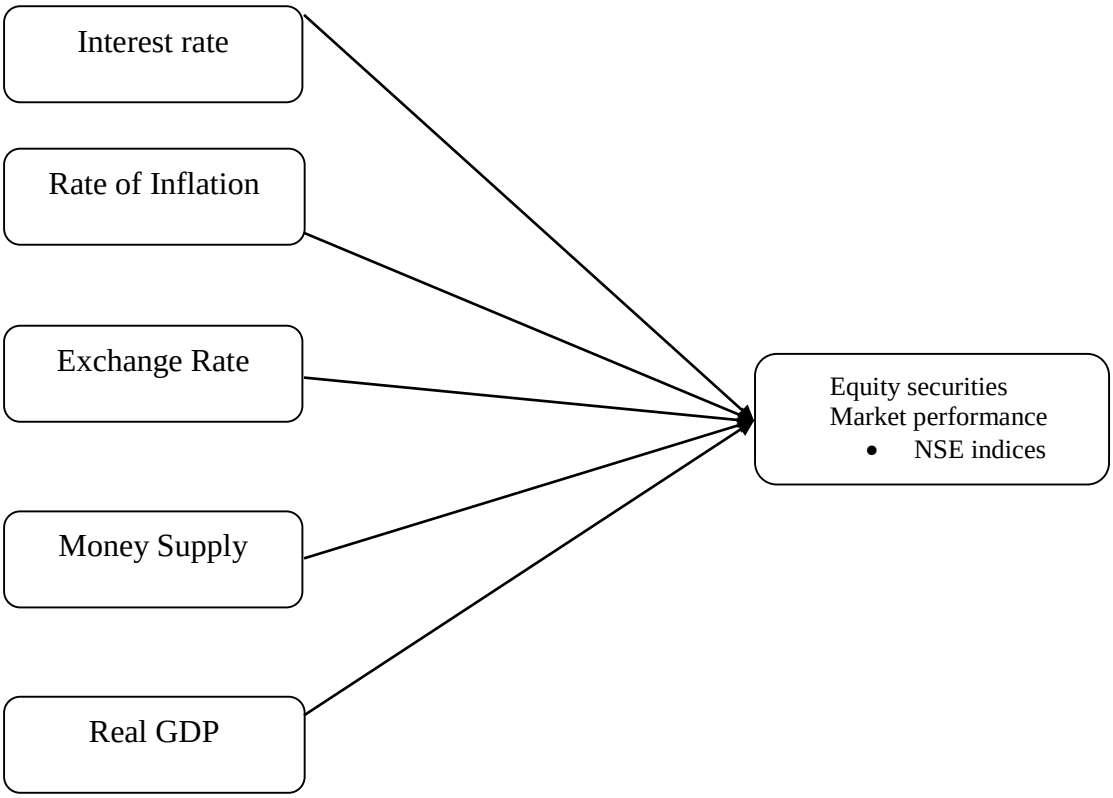

Figure 2.1 Conceptual Framework

Source: (Author, 2023)

2.6 A Conceptual Framework relating to the Equity securities market performance and the selected macro-economic variables

The conceptual model above illustrates the dependent and independent variables (macro-economic variables) in the study. The dependent variable is the equity securities market performance index. The independent variables are gross domestic product, inflation rate, interest rate, exchange rate and money supply.

CHAPTER THREE

RESEARCH METHODOLOGY

3.0 Overview

This chapter provides an overview of research design, encompassing many components such as the type of research, study population, sampling technique, sample size, instruments, and data analysis.

3.1 Research Design

Orodho (2003) defines a research design as a systematic framework or blueprint employed to develop responses to research inquiries. According to Lavrakas (2008), research design refers to the overall plan or approach used to perform a research study in order to investigate specific research questions that can be tested. According to Sounders, Lewis, and Thornhill (2009), the selection of a research strategy is influenced by several factors, including the research question(s), objective(s), the level of current knowledge, the available time and resources, and the philosophical foundation.

The research design utilized in this study was explanatory, with a focus on evaluating cause and effect correlations between variables. The underlying assumption of this approach is that if there is a statistically significant association between two factors, it becomes feasible to forecast the dependent variable by utilizing the available knowledge on the independent variables. The association or impact may exhibit either a negative or positive nature. Kothari (2004) defines causal research as a method used to investigate the impact of one variable on another. This study aims to determine the influence of macroeconomic conditions on stock market performance.

3.2 Target Population and Sampling

Borg and Gall (2007) define a target population as the complete set of individuals, events, or objects that a researcher aims to generalize their research findings to. On the other hand, an accessible population refers to all individuals who might realistically qualify as being in the sample. In this study, the target population was the NSE-20 share index at the Nairobi Securities Exchange from 1986 to 2022.

3.3 Data Collection and Processing

According to Creswell (2002), data collection refers to the process of acquiring information from the chosen participants in a research study. The data collecting Sheet was utilized to gather secondary data for this investigation. The stock performance data was acquired from the Nairobi Securities stock exchange. The Central Bank of Kenya provided statistics on currency rate, money supply, and interest rates, while the Kenya National Bureau of Statistics provided data on inflation.

3.4 Data Analysis and Presentation Techniques

The process of data analysis was conducted in accordance with the research's aims and objectives, as well as the measurement of the acquired data. The data that was gathered was displayed in several visual formats, including graphs, tables, descriptive statistics, and inferentials. A preliminary examination of the data was conducted in order to assess the presence of multicollinearity and autocorrelation. The researchers employed a variance inflation factor to assess multicollinearity, and utilized the Durbin-Watson statistic to quantify autocorrelation. The relevance of the independent variables on the dependent variable was tested using regression analysis. The study employed regression analysis utilizing the stated Time series model to estimate and give empirical evidence on the relationship between stock market performance and macroeconomic parameters. The researchers employed the generalized least squares method to conduct

a regression analysis, wherein the market capitalization data for each sector was examined in relation to macroeconomic parameters. The data pertaining to the entire market capitalization was subjected to regression analysis in order to examine the impact of macroeconomic factors on the performance of the overall market. Fox and Hartnagel (1979) effectively employed this analytical approach in their study entitled "Changing social roles and female crime in Canada." The analysis employed annual time series data spanning from 1993 to 2021, matching with the period of economic liberalization.

3.4.1 Measurement of Variables

Table 3.1: Measurement of variables

Variable	Definition	Measurement
Equity securities market performance	Refers to the evaluation and measurement of how well stocks or equity securities are doing within a specific market, such as a stock exchange or a broader equity market index (Almagtome & Abbas, 2020).	NSE indices
Interest rate	is the cost of borrowing money or the return on investment for lending or saving money (Alper et al.,2020)	Annual interest rate
Inflation rate	is a measure of the percentage increase in the general price level of goods and services in an economy over a specific period of time (Liu & Lee, 2021)	Consumer price index
Exchange rate	is the rate at which one currency can be exchanged for another (Edwards, 2019).	Annual Ksh/USD
Money supply	is the total amount of money available in an economy at a given point in time (Qing & Kusairi, 2019).	M3
Gross domestic product	is a key economic indicator that measures the total monetary or market value of all goods and services produced within the borders of a country in a specific time period, typically a year or a quarter (Coscieme et al., 2020)	Real GDP

Source: Researcher (2024)

3.4.2 Model Specification

Equation below shows the regression model of the independent variables against the dependent variable

$$\mathbf{ESM_t=\beta_0 +\beta_1 ER_t +\beta_2 IF_t +\beta_3 IT_t +\beta_4 MS_t +\beta_5 GDP_t + \varepsilon_t}$$

Where;

ESM = Equity Securities Market index

β_i the model coefficients

ER: =Exchange rate.

IF= Inflation

IR =Interest rate

MS=Money supply

GDP= Gross Domestic Product

ε = is the error term.

t = is time element

A transformed analytical model using natural log (Ln) to standardize the variable representation (unify the elasticity)

$$\mathbf{\mathit{Ln}\ ESM_t=\beta_0 +\beta_1 \mathit{Ln} ER_t +\beta_2 \mathit{Ln} IF_t +\beta_3 \mathit{Ln} IT_t +\beta_4 \mathit{Ln} MS_t +\beta_5 \mathit{Ln} DP_t + \varepsilon_t}$$

3.4.3 Data and Model Testing

The stability of the data and model was assessed through the application of the cumulative sum of recursive residuals (CUSUM) test. The objective of this test is to assess the stability of the parameters of the generated model over time. The CUSUM command in Stata was utilized to conduct the stability test. The significance of this test lies in its ability to assess the presence of structural breakdowns within the break. The

null hypothesis of the test claims that the cumulative residuals have a mean of zero, indicating the absence of structural breaks. Conversely, the alternative hypothesis suggests that the cumulative residuals do not have a mean of zero, indicating the presence of structural breaks in the model.

3.4.3.1 Normality Test

According to González-Estrada & Cosmes (2019), normality test assumes that data are normality distributed. The test of the normality of the data in the model was carried out using the Shapiro-Wilk and Shapiro-Francia test of normality that are inbuilt in the Stata statistical package. As a formal technique to test for normalcy, the Shapiro-Wilk Test and Shapiro-Francia assumes that the null hypothesis of variables is normally distributed. We can reject the null hypothesis and conclude that the variable is not normally distributed if the p-value of the test is less than some significance level of 0.05 (González-Estrada & Cosmes 2019).

3.4.3.2 Heteroscedasticity Test

Heteroscedasticity was tested using the Breusch-Pagan test of heteroscedasticity. Breusch-Pagan commands available in Stata statistical package were employed. According to Obabire (2021), Breusch-Pagan test compares null hypothesis and the alternative hypothesis to each other. An alternative hypothesis argues that the error variances are a multiplicative function of one or more variables, whereas the null hypothesis states that the error variances are all equal (homoscedasticity). If the p-value of the test is less than some significance level of 0.05, the null hypothesis is rejected and heteroscedasticity is present.

3.4.3.3 Multicollinearity Test

The presence of multi-collinearity, characterized by a high correlation between two or more independent variables, has been observed to have a detrimental impact on the estimation of regression parameters. The Variance Inflation Factor (VIF) and tolerance level were utilized in the study to assess the presence of multi-collinearity. A threshold ranging from 1 to 10 was utilized for VIF. Therefore, a Variance Inflation Factor (VIF) value below 1 or above 10 signifies the existence of multi-collinearity. Conversely, Fidell (2001) suggested a tolerance limit beyond 0.10.

3.4.3.4 Auto-correlation Test

Autocorrelation was tested using the Breusch-Godfrey test of Autocorrelation. Breusch-Pagan commands available in Stata statistical package was employed. Cipra (2020) states that the Breusch-Godfrey test is used to compare the null hypothesis and the alternative hypothesis. The alternative hypothesis posits that the error variances exhibit a multiplicative relationship with one or more variables, while the null hypothesis asserts that the error variances are uniform. The null hypothesis is rejected and autocorrelation is seen when the p-value of the test is below a predetermined significance level of 0.05.

3.4.3.5 Unit Root Test

Regression models assume that the time series data are stationary in nature. However, this is not always the case. Stationarity means that the probability of the time series data changing over time is minimal (Palachy, 2019). This study employed the dickey fuller test to test whether the data are stationary or non-stationary. The dickey fuller test was used to test the null hypothesis that a unit test is present in the autoregressive model and therefore the time series data is not stationary.

3.4.3.6 Co-integration Test

The maximum likelihood method test developed by Johansen and Juselius (1990) was used to investigate the existence of a long-run relationship between a dependent variable and the independent variables. If two or more variables have a long-term or equilibrium relationship, they are said to be co-integrated. As a result, it is critical that variables be tested for co-integration after stationarity tests. However as earlier stated, ARDL has advantage since even if there is a mixture of I(0) and I(1); different orders of co-integration this model is appropriate.

The study employed a co-integration method based on Johansen's maximum likelihood framework that includes a multiple trace test procedure, the maximum eigen-value test, and a method based on minimizing one of two different information criteria. According to Becketti (2013), standard regression techniques such as Ordinary Least Square (OLS) require variables to be covariance-stationary, i.e., have a finite mean and variance process at the level, so co-integration is important because it allows inference and interpretation of variables that are not covariance-stationary..

3.4.3.7 Causality Test

Causality test was tested using the Granger causality test. According to Granger (1980), granger causality test is used to test whether one-time series is useful in predicting the outcome of another time series. The granger causality is interpreted as a cause-effect of one-time series on another time series. The granger causality test compares null hypothesis and the alternative hypothesis to each other. An alternative hypothesis argues that one-time series data influence and predict another time series data, whereas the null hypothesis states that the coefficient of past values are zero which means one-time series data does not provide useful information of predicting another time series.

If the p-value of the test is less than some significance level of 0.05, the null hypothesis is rejected and granger causality is present.

3.4.3.8 Lag Selection Criteria

In this work, the optimal lag duration of the ARDL model was determined using the following criteria: the Akaike Information Criterion (AIC), Final Prediction Error (FPE), Hannan-Quinn Criterion (HQIC), and Schwartz Information Criterion (SIC). But particular attention was paid to the Final Prediction Error (FPE) and the Akaike Information Criterion (AIC). As to Liew (2004), the Akaike Information Criterion (AIC) and Final Prediction Error (FPE) are the best suitable metrics when dealing with tiny data sets or fewer than sixty observations. This is so that a model is more likely to achieve the ideal lag duration as AIC and FPE lessen the chance of underestimating.

3.4.3.9 Parameters Stability Test

To estimate and model the structural break in the models, Gregory and Hansen's (1996) method was applied. An expansion of a residual-based test is the Gregory and Hansen co-integration test. It determines whether a particular event has affected the trend of a certain series. In the Gregory Hansen co-integration test, the alternative hypothesis of co-integration at the break point is opposed by the null hypothesis, which asserts that there is no co-integration at the break point at a 5% level of significance. The null hypothesis is rejected when the zt statistics absolute values are greater than the 5% critical value. This shows that although the linear combination of variables has structural cracks, its properties are stable over the long term. The cumulative sum of recursive residuals (CUSUM) test was also used to examine the parameter stability of the time series model. This test was used to determine whether the time series model's coefficients are stable over time, or if the residuals of the model exhibit structural breaks. With respect to the test, the alternative hypothesis is that there are structural

breaks and the cumulative of the residuals does not equal a mean zero, which is the null hypothesis. A cusum graph was employed to verify the model's stability. The null hypothesis of no structural fractures was rejected at the 5% level of significance if the line was outside the shaded area of the graph, but it was not rejected if it was inside it.

3.4.3.10 Test of Significance

The test seeks to determine whether there exists a significant relationship between the dependent variable and the independent variables (Stephan & Levine, 2010). The test statistic preferable was a 5% significant level for testing the hypothesis. (Schindler, 2008).

3.5 Ethical Consideration

This study had no major ethical problems because it used publicly available data, implying that no questionnaires or respondents were used. However, the study employed only the relevant data and the execution of the research was done according to the standards. In addition, consent was sought through a research permit obtained from the National Commission for Science, Technology and Innovation (NACOSTI) and the University.

CHAPTER FOUR

DATA ANALYSIS, PRESENTATION AND INTERPRETATION

4.0 Overview

This section encompasses the findings derived from the examination of data, as well as the outcomes obtained from hypothesis testing. The chapter commenced by providing an overview of the descriptive statistics findings, the diverse diagnostic test results, the correlation analysis results, the outcomes of the models, and closes by addressing the results.

4.1 Descriptive Statistics

Table 4.1 outlines the summary of descriptive statistics of variables that were employed in this study. These descriptive statistics entails mean, standard deviation, minimum and maximum values. Mean is used as a yardstick of central value of the entire dataset in the observation. The standard deviation is used shows the extent to which dataset spreads from the central values.

From the table 4.1, the mean of the interest rate is 7.8967 (standard deviation =6.8991; Minimum=-10.096; Maximum=21.0963). Higher value of interest rate is an indicator of a tight monetary policy in an economy while low interest rate is an indicator of an expansionary monetary policy. It can be concluded from the results that on average for the last 37 years, interest rate in Kenya has been 7.8967. Further, the gap between the minimum value and the maximum value implies interest rate in Kenya has been fluctuating with some periods recording high values while other periods recording low values. The extent of variation from the mean of interest rate was high as indicated by a higher value of standard deviation of 6.8991.

The graphical representation of the interest rate from 1986 to 2022 is shown in Figure 4.1. The interest rate has varied significantly over all of the years, with 1998 recording the highest rate at 21.096 and 2009 recording the lowest rate at -10.096. Between the years 2010 and 2022, interest rates have maintained a relatively stable, steady level with only very slight shifts.

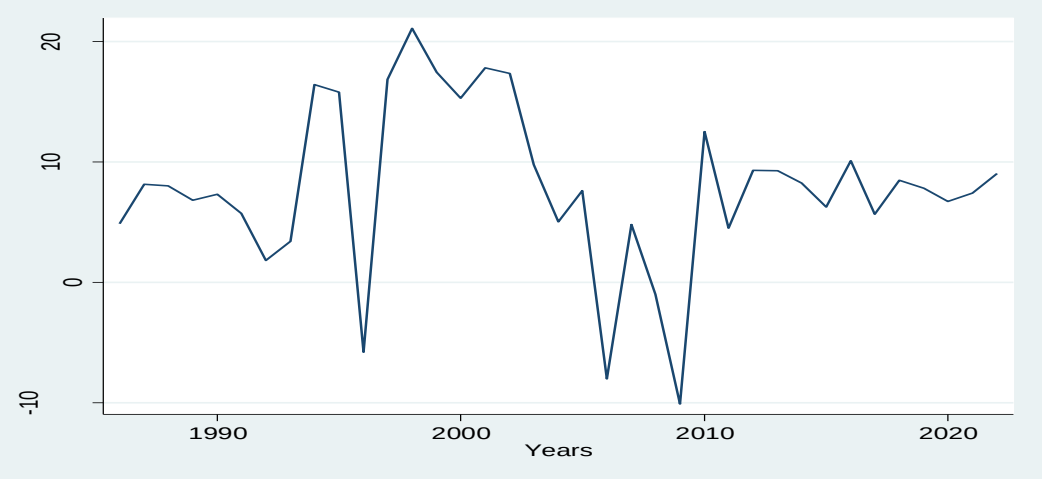

Figure 4.1: Graphical Representation of Interest Rate

From the table 4.1, the mean of the exchange rate is 69.8031 (standard deviation =28.4718; Minimum=16.2257; Maximum=117.866). Higher value of exchange rate is an indicator of stronger currency while low interest rate is an indicator of weak currency. It can be concluded from the results that on average for the last 37 years, exchange rate in Kenya has been 69.8032. Further, the gap between the minimum value and the maximum value implies exchange rate in Kenya has been fluctuating with some periods recording high values while other periods recording low values. The extent of variation from the mean of exchange rate was high as indicated by a higher value of standard deviation of 16.2257.

The exchange rate from 1986 to 2022 is graphically represented below in figure 4.2, which spans the years 1986 to 2022. From 1986 through 1995, there was an overall rising trend in the currency exchange rate. From 1995 through 2010, there were

oscillations, with some years recording a rise and some years recording a decline. The overall trend, however, was generally upward. Nevertheless, the degree of volatility seen in exchange rates has been growing from the year 2010 to 2022.

Figure 4.2: Exchange rate graphical representation

From the table 4.1, the mean of the inflation rate is 11.0952 (standard deviation =8.850691; Minimum=1.554328; Maximum=45.97888). Higher value of inflation rate is an indicator of high cost of living while low inflation rate is an indicator of low cost of living. It can be concluded from the results that on average for the last 37 years, inflation rate in Kenya has been 11.0952. Further, the gap between the minimum value and the maximum value implies inflation rate in Kenya has been fluctuating with some periods recording high values while other periods recording low values. The extent of variation from the mean of inflation rate was high as indicated by a higher value of standard deviation of 8.850691.

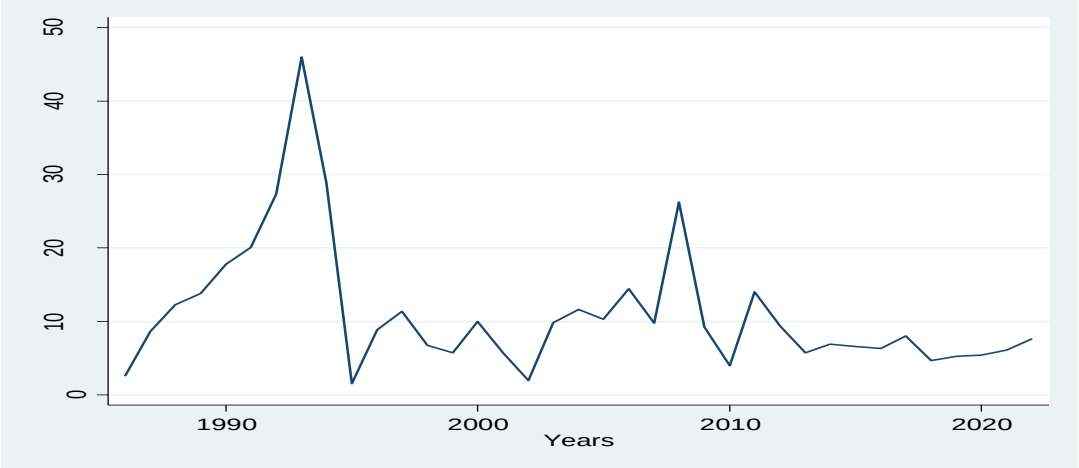

Figure 4.3: Inflation rate graphical representation

The inflation rate from 1986 to 2022 is depicted graphically in Figure 4.3 above. From 1986 to 1993, the inflation rate rose significantly. The recession of the late 1980s and early 1990s may be to blame. Since then, the inflation rate has fluctuated, with some periods exhibiting an inflation rate increase and others exhibiting an inflation rate decrease. The maximum rate of inflation was recorded in 1993, while the lowest rate was recorded in 1995.

From the table 4.1, the mean of the money supply is 1.24e+12 (standard deviation =1.41e+12; Minimum=3.57e+10; Maximum=4.69e+12). It can be concluded from the results that on average for the last 37 years, money supply in Kenya has been 1.24e+12. Further, the gap between the minimum value and the maximum value implies money supply in Kenya has been increasing over years. The extent of variation from the mean of money supply was high as indicated by a higher value of standard deviation of 1.41e+12

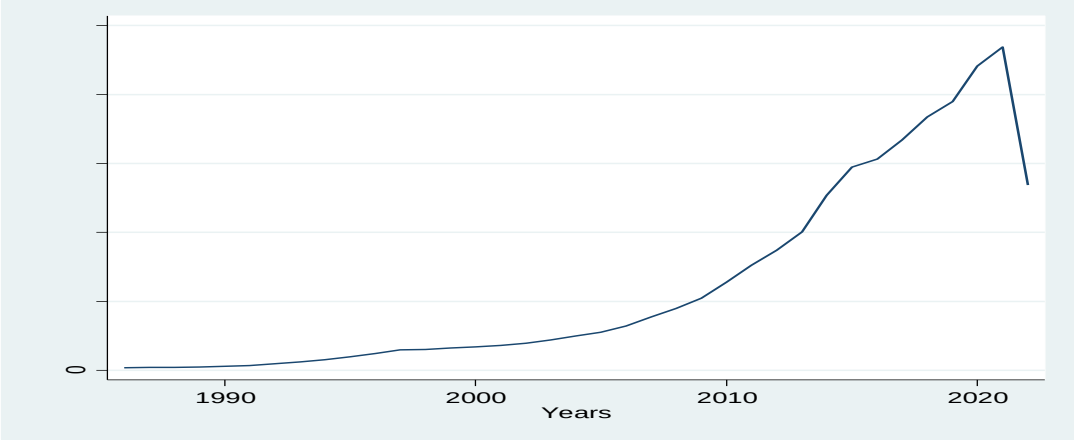

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Figure 4.4: Money supply graphical representation

The graphical representation of the money supply from 1986 to 2022 is shown in Figure 4.4. From 1986 to 2022, the trend of money supply shows a general upward trajectory with some fluctuations. The money supply data indicates a significant increase over the years. From 1986 to the early 1990s, the money supply experienced steady growth, more than doubling by 1995. The growth rate accelerated further in the late 1990s and early 2000s, reaching a peak in 2008. This period saw a substantial increase in the money supply, reflecting economic expansion and potential monetary stimulus. However, the global financial crisis in 2008 had an impact, leading to a temporary decline in the growth rate. Following the crisis, the money supply continued to increase, with varying growth rates. Notably, there was a sharp increase in money supply from 2020 to 2021, likely influenced by fiscal and monetary measures implemented to address the economic challenges caused by the COVID-19 pandemic. The data for 2022 shows a decrease compared to the previous year, suggesting a possible change in the growth trajectory. Overall, the trend indicates a generally increasing money supply, reflecting economic growth, monetary policies, and macroeconomic conditions.

From the table 4.1, the mean of the GDP is 3.72e+10 (standard deviation =3.45e+10; Minimum=5.75e+09; Maximum=1.13e+11). It can be concluded from the results that on average for the last 37 years, GDP in Kenya has been 3.72e+10. Further, the gap

between the minimum value and the maximum value implies GDP in Kenya has been increasing over years. The extent of variation from the mean of GDP was high as indicated by a higher value of standard deviation of 3.45e+10.

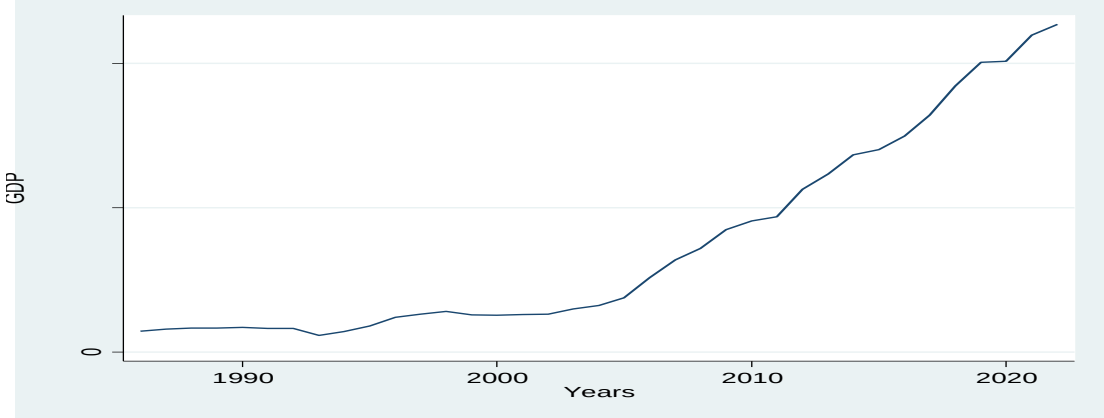

Figure 4.5: GDP graphical representation

The graphical representation of the GDP from 1986 to 2022 is shown in Figure 4.5. From 1986 to 2022, the trend of GDP (Gross Domestic Product) shows a generally increasing trajectory with some fluctuations. The GDP data indicates periods of growth and temporary setbacks. The GDP experienced relatively steady growth from the late 1980s to the mid-1990s, with some fluctuations along the way. There was a notable increase in GDP from the mid-1990s to the early 2000s, reflecting a period of economic expansion. However, there was a dip in GDP in 2009, likely due to the global financial crisis. Following the crisis, GDP recovered and continued to grow, reaching new highs in subsequent years. The data shows a consistent upward trend in GDP from 2012 to 2022, indicating sustained economic growth. Notably, there was a significant increase in GDP from 2020 to 2021, possibly influenced by fiscal stimulus measures and economic recovery efforts following the COVID-19 pandemic. The data for 2022 indicates further growth in GDP, highlighting the ongoing economic expansion. Overall, the trend suggests a generally positive trajectory for the economy, reflecting periods of growth and resilience in the face of challenges.

From the table 4.1, the mean of the equity performance index is 16.99195 (standard deviation =38.24838; Minimum=-40.30563; Maximum=186.21). It can be concluded from the results that on average for the last 37 years, equity performance index in Kenya has been 16.99195. Further, the gap between the minimum value and the maximum value implies equity performance index in Kenya has been increasing over years. The extent of variation from the mean of equity performance index was high as indicated by a higher value of standard deviation of 38.24838.

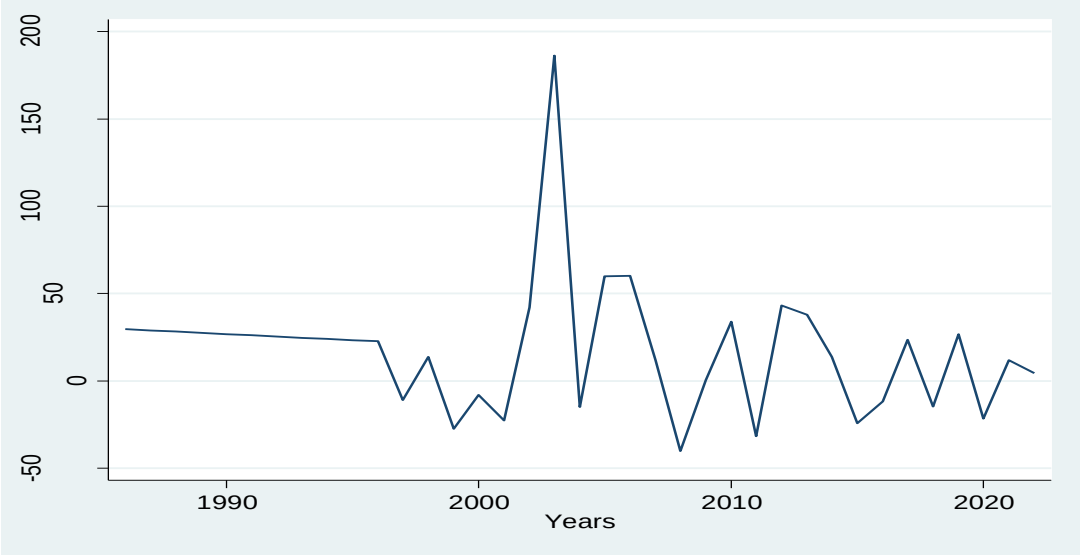

Figure 4.6: Equity performance index graphical representation

The graphical representation of the equity performance index from 1986 to 2022 is shown in Figure 4.6. From 1986 to 2022, the trend of the equity performance index shows a mixed pattern with periods of growth, decline, and volatility. The index experienced relatively stable performance during the late 1980s and early 1990s, with minor fluctuations. However, there was a significant decline in the index in 1997, followed by a substantial increase in 1998. The year 1999 saw a significant downturn, and the index experienced further volatility in the early 2000s. The year 2002 stood out with a notable increase in the index, followed by a significant surge in 2003. The index experienced fluctuations and negative performance in subsequent years, notably with a

sharp decline in 2008 during the global financial crisis. The years 2010 and 2012 showed positive growth, but 2011 saw a significant decline. The index experienced a mix of positive and negative performance from 2013 to 2019. In 2020, the index declined sharply, likely due to the economic impact of the COVID-19 pandemic. The following years showed some recovery and moderate growth. Overall, the trend of the equity performance index reflects a combination of market ups and downs, influenced by various economic and financial factors over the years.

Table 4.1: Results of Descriptive statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Interest rate	37	7.896658	6.899123	-10.096	21.09633
Exchange rate	37	69.80315	28.47182	16.22574	117.866
Inflation rate	37	11.0952	8.850691	1.554328	45.97888
Money Supply	37	1.24e+12	1.41e+12	3.57e+10	4.69e+12
Gdp	37	3.72e+10	3.45e+10	5.75e+09	1.13e+11
Equity index	37	16.99195	38.24838	-40.30563	186.21

4.2 Pearson Correlation Analysis

The correlation's results are summarized and presented in table 4.2. Despite a high R-squared, the correlation between independent variables is evaluated due to the possibility of a very high standard error, a low t-statistic, and unanticipated changes in the signs or magnitudes of coefficients. The pair-wise correlation matrix of the independent variables reveals that no two variables exhibit an exceptionally high degree of collinearity.

Results in Table 4.2 indicate that Exchange rate is negatively related with Inflation rate ($r = -0.3337$, $p < 0.05$). Consequently the higher the exchange rate, the lower the inflation rate. Results further show that money supply is positively related with exchange rate($r = 0.7933$, $p < 0.05$). Therefore, the higher the money supply, the higher

exchange rate. Gdp was positively correlated to exchange rate (r = 0.8092, p <0.05). The higher the Gdp, the higher the exchange rate. Money supply was negatively correlated to inflation rate and significant at 5 percent level of significance (r = -0.3586, p < 0.05). The higher the money supply the lower the inflation rate. Gdp was negatively correlated to inflation rate (r = -0.3582, p <0.05).The higher Gdp the lower the inflation rate. Gdp was positively correlated to money supply (r = 0.9694, p <0.05). The higher the Gdp the higher the money supply.

Table 4.2: Results of Correlation Analysis

	NSE Index	Interest rate	Exchange rate	Inflation rate	Money supply	Gdp
NSE Index	1.0000					
Interest rate	-0.0364	1.0000				
Exchange rate	-0.1985	0.0448	1.0000			
Inflation rate	0.0119	-0.2760	-0.3337*	1.0000		
Money supply	-0.2354	-0.0668	0.7933*	-0.3586*	1.0000	
Gdp	-0.2307	-0.1024	0.8092*	-0.3582*	0.9694*	1.0000

Note: * 5% significance level

Source (Field data, 2023).

4.3 Normality Test

The Shapiro-Wilk Normality test was employed to verify normality. The findings displayed in Table 4.3 indicate that the -value exceeds the threshold of 0.05. Based on the findings, it is not possible to reject the null hypothesis that the residuals follow a normal distribution. Consequently, the conclusion drawn is that the data exhibits a normal distribution.

Table 4.3: Shapiro Wilk Normality test

Variable	Obs	W	V	Z	Prob>z
Interest rate	37	0.94423	2.077	1.530	0.06295

Source: Field data (2023)

4.4 Autocorrelation Test

The Breusch Godfrey LM test was employed to examine the presence of autocorrelation. The data displayed in table 4.4 indicate that the p-values are 0.7874, which is greater than 0.05. Hence, the null hypothesis of the test, which posits the absence of a correlation, cannot be rejected. The findings were further validated by the utilization of the Durbin Watson test, which yielded a value of 2.0865. According to prevailing convention, it is generally accepted that the absence of serial correlation is indicated when the test statistic values fall within the range of 1.5 to 2.5.

Table 4.4: Breusch Godfrey LM test results

Source	chi2	df	Prob>chi2
Breusch Godfrey LM test for Autocorrelation(lags(1))	0.073	1	0.7874
Durbin Watsin Test d statistic (6, 37)			2.0865

Source (Field data, 2023).

4.5 Heteroskedasticity Test

The heteroscedasticity test for residuals was assessed using the Breusch-Pagan test. The null hypothesis of homoscedasticity was contrasted to the alternative hypothesis of heteroscedasticity. According to Breusch and Pagan (1979), the acceptance of the null hypothesis of homoscedasticity is dependent upon the p values associated with the chi-square test statistics exceeding the predetermined threshold of significance of 5 percent. Conversely, if the p values are below the aforementioned level of significance, the null hypothesis is rejected.

Table 4.5 displays the test results, which demonstrate that the residuals of the model exhibit homoscedasticity. The p values for the chi-square test results of 0.9740, which exceed the 5% level of significance (0.05), provide support for this conclusion.

Table 4.5: Heteroskedasticity Test results

Source	chi2	Df	Prob>chi2
Heteroscedasticity	9.66	20	0.9740

Source (Field data, 2023).

4.6 Multi-collinearity Test

Multicollinearity refers to the presence of a strong correlation between two or more predictor variables. In order to assess the presence or lack of multicollinearity, the study employed the Variance Inflation Factor (VIF) and the correlation matrix. According to Gujarati (2012), the presence of multicollinearity can be identified when the Variance Inflation Factor (VIF) exceeds 10 or when the pairwise correlation coefficients above 0.8. According to Table 4.5, the Variance Inflation Factor (VIF) is 8.27, which is below the threshold of 10. This suggests that the study variables are not affected by multicollinearity.

Table 4.6: Multi-collinearity test results

Variable	VIF	1/VIF
Gdp	18.89	0.052950
Money supply	16.94	0.059036
Exchange rate	3.05	0.328381
Inflation rate	1.29	0.772885
Interest rate	1.21	0.829834
Mean VIF	8.27	

Source (Field data, 2023).

4.7 Stationarity Results

From the results of the table below, the null hypothesis of unit root of interest rate, exchange rate, inflation rate, money supply, GDP and Equity performance index is rejected at 5 percent level of significance. This suggests that interest rate, exchange rate, inflation rate, money supply, GDP and Equity performance index do not have a unit root which means they are stationary.

Table 4.7: Stationarity test results

Variable	Test Statistic	1% Critical Value	5% Critical Value	10% Critical Value
Interest rate	-5.523	-3.675	-2.969	-2.617
Exchange rate	-5.997	-3.675	-2.969	-2.617
Inflation rate	-4.972	-3.675	-2.969	-2.617
Money supply	-8.890	-3.675	-2.969	-2.617
Gdp	-8.005	-3.675	-2.969	-2.617
Nseindex	-5.717	-3.675	-2.969	-2.617

Source: Field data (2023)

4.8 Lag Selection Criteria

The best lag duration of the ARDL model was determined in this study using the Akaike Information Criterion (AIC), Final Prediction Error (FPE), Hannan-Quinn Criterion (HQIC), and Schwartz Information Criterion (SIC). Nevertheless, particular attention was devoted to the Akaike Information Criterion (AIC) and Final Prediction Error (FPE). Liew (2004) asserts that the Akaike Information Criterion (AIC) and Final Prediction Error (FPE) are particularly well-suited for the analysis of small data sets or datasets with less than 60 observations. AIC and FPE decrease the probability of underestimating, hence enhancing the probability of achieving the optimal lag duration in a model.

The criteria for selecting the lag order for all variables in the study are presented in Table 4.8. These criteria include the Akaike Information Criterion (AIC), Final

Prediction Error (FPE), Hannan-Quinn Criterion (HQIC), and Schwartz Information Criterion (SIC). The Akaike Information Criterion (AIC) recommends that the autoregressive distributed lag (ARDL) model should use four lags.

Table 4.8: Lag Selection Criteria Results

Lag	LL	LR	df	P	FPE	AIC	HQIC	SBIC
0	-2313.89				1.2e+56	140.478	140.539	140.659
1	-2217.68	192.42	16	0.000	9.4e+53	135.617	135.922*	136.524*
2	-2208.97	17.416	16	0.359	1.5e+54	136.059	136.608	137.691
3	-2178.14	61.657	16	0.000	7.0e+53*	135.16	135.954	137.518
4	-2161.97	32.335*	16	0.009	9.0e+53	135.15*	136.188	138.234

Source (Field data, 2023).

4.9 Co-integration Test

According to Gregory Hansen's co-integration test, the null hypothesis posits the absence of co-integration at the break point, while the alternative hypothesis suggests the presence of co-integration at the break point, with a significance level of 5 percent. The null hypothesis is rejected when the absolute values of the zt statistics surpass the crucial threshold of 5 percent. This observation indicates that the linear combination of the variables demonstrates consistent characteristics over an extended period, but with occasional structural disruptions. The assessment of the structural rupture was conducted utilizing the zt test distribution.

The findings of the Gregory Hansen cointegration test for structural breakdowns in the level are presented in Table 4.9. The magnitudes of the zt test statistics, which are 4.43, are smaller than the asymptotic critical value of 5.44, which represents the 5 percent limit. The acceptance of the null hypothesis, which posits the absence of co-integration at the break point, and the rejection of the alternative hypothesis, which suggests the

presence of co-integration at the break point, were observed. Consequently, it can be inferred that there was an absence of a sustained association between the variables.

4.9.1 Gregory-Hansen Test with break in level (break in the level)

Table 4.9: Gregory-Hansen Test with break in level (break in the level) results

	Test Statistic	Breakpoint	Date	5% Asymptotic Critical Value
ADF	-4.43	6	1991	-5.44
Zt	-4.49	6	1991	-5.44

Source (Field data, 2023).

4.9.2 Gregory-Hansen Test for Co-integration with Regime Shifts (break in Regime)

Table 4.10 shows the results for Gregory Hansen cointegration test for structural breaks in the regime. The absolute values of zt test statistics of 4.49 are less than the 5 percent asymptotic critical value of 5.44. The null hypothesis of no co-integration at the break point was accepted and the alternative hypothesis of co-integration at the break point was rejected. This therefore means that there was no long run relationship among the variables.

Table 4.10: Gregory Hansen cointegration test for structural breaks

	Test Statistic	Breakpoint	Date	5% Asymptotic Critical Value
ADF	-4.43	6	1991	-5.44
Zt	-4.49	6	1991	-5.44

Source (Field data, 2023).

4.10 Parameter Stability Test

The CUSUM test was used to assess the consistency of the model's variables. It made it possible to monitor the evolution of the estimated coefficient as the sample size of

the data used to make the estimation increased. There are two standard error ranges on either side of the calculated coefficients. If there is a significant variation in the coefficient when new information is introduced into an estimation equation, this is a distinct indication that the system is unstable. If the blue line is located outside of the two red lines, this is an unmistakable indication of instability.

The results of the CUSUM and CUSUM of squares are displayed in Figures 4.7 and 4.8. The blue lines were within the red lines, as depicted by the two graphs. This indicates that the variables utilized in the model remained consistent over time. Figure 4.7 depicts the numerous residual graphs of the model's variables. The variables' residuals fluctuate around the mean. This conforms to the assumption of normality that the residuals have a mean of zero.

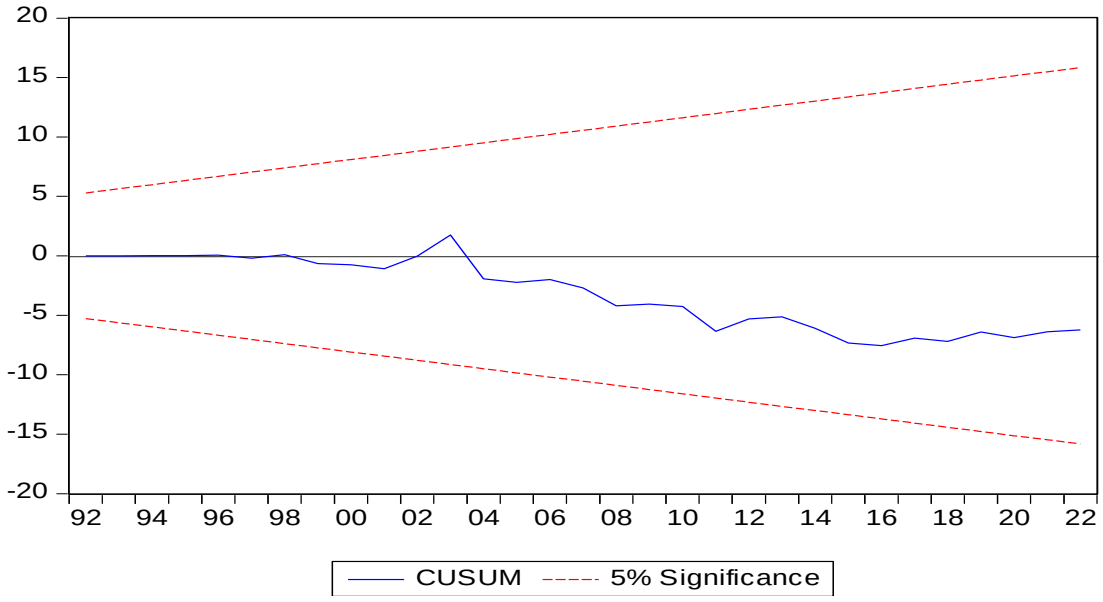

Figure 4.7: Cusum graph

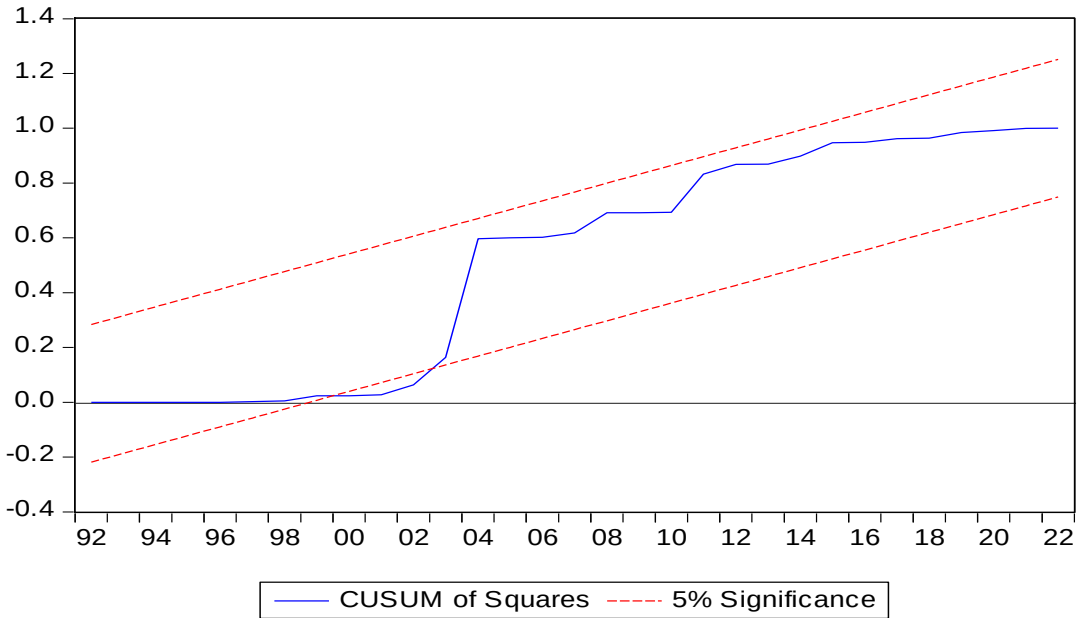

Figure 4.8: Cusum of squares graph

4.11 Discussion of ARDL Results

Table 4.11: ARDL Test Results

Sample: 1990-2022				Number of obs	=	33
				F(2,358)	=	5193.60
				Prob > F	=	0.0000
				R-squared	=	1.0000
				Adj R-squared	=	0.9998
Log likelihood = -4.9426718				Root MSE	=	0.5983
Variable	Coef.	Std. Err.	t	p>t	[95% Conf.	Interval]
nseindex						
L1	1.18962	.1109209	10.72	0.000	.8816545	1.497586
L2	-1.701016	.1917524	-8.87	0.001	-2.233406	-1.168626
L3	.9289012	.1058428	8.78	0.001	.6350346	1.222768
L4	.5015541	.0907663	5.53	0.005	.2495464	.7535619
Interest rate	-.3469313	.0305245	-11.37	0.000	-.4316809	-.2621817
L1	.3119061	.0566127	5.51	0.005	.1547241	.4690881
L2	-.4288249	.0353078	-12.15	0.000	-.526855	-.3307949
L3	.3824891	.05471	6.99	0.002	.2305898	.5343884
L4	-.4262062	.0410089	-10.39	0.000	-.5400653	-.3123472
Exchange rate	-.0146571	.0001068	137.23	0.000	.0143606	.0149537
L1	-.0169246	.0015636	-10.82	0.000	-.0212658	-.0125834
L2	.0236187	.0026837	8.80	0.001	.0161676	.0310697
L3	-.0131567	.0014826	-8.87	0.001	-.017273	-.0090403
L4	-.0060815	.0012657	-4.80	0.009	-.0095958	-.0025673
Inflation rate	.2377357	.0341427	-6.96	0.002	-.3325311	-.1429403
L1	.293814	.0479017	6.13	0.004	.1608174	.4268105
L2	-.5611202	.0620455	-9.04	0.001	-.7333862	-.3888542
L3	.0465851	..0271844	1.71	0.162	-.028891	.1220611
Money supply	-1.51e-13	7.59e-15	-19.90	0.000	-1.72e-13	-1.30e-13
L1	1.80e-13	1.48e-14	12.19	0.000	1.39e-13	2.21e-13
L2	-1.91e-13	2.58e-14	-7.42	0.002	-2.63e-13	-1.20e-13
L3	1.35e-13	1.62e-14	8.36	0.001	9.04e-14	1.80e-13
L4	-2.25e-14	1.30e-14	-1.73	0.159	-5.86e-14	1.37e-14
Gdp	1.10e-09	2.04e-10	5.36	0.006	5.28e-10	1.66e-09
L1	-2.59e-09	2.64e-10	-9.79	0.001	-3.32e-09	-1.85e-09
L2	1.86e-09	1.88e-10	9.94	0.001	1.34e-09	2.39e-09
L3	-6.94e-10	1.43e-10	-4.87	0.008	-1.09e-09	-2.98e-10
L4	3.38e-10	1.70e-10	1.98	0.119	-1.36e-10	8.11e-10
cons	7.485306	2.156742	3.47	0.026	1.49723	3.47338

Source (Field data, 2023).

H_{01}: Exchange rate has no significant effect on equity security market indices in Kenya.

The results presented in Table 4.12 show that exchange rate has a significant negative effect on equity performance index (*$\beta 1$ = - .0147 ρ-value<0.05)*; hence, (H01) was

rejected. A one-unit increase in the exchange rate is associated with a decrease in the equity performance index by 0.0147 units. In other words, when the exchange rate rises, it tends to have a negative impact on the equity performance index. This relationship suggests that a stronger domestic currency or depreciation in the exchange rate can potentially lead to improved equity performance. These results are in agreement with another study that was done by Osamuonyi and Evbayiro-Osagie (2012). Depreciation in the exchange rate tends to make imported goods and services relatively more expensive. As a result, companies that rely heavily on imports for their operations may face higher production costs, leading to a decrease in profitability. This can negatively impact the overall performance of these companies, which are typically included in equity indices. Secondly, depreciation in the exchange rate can increase the cost of foreign debt for companies that have borrowed in foreign currencies. This can put financial strain on these companies, impacting their profitability and subsequently affecting the performance of the equity market indices. Thirdly, depreciation in the exchange rate can lead to inflationary pressures in an economy. Higher inflation can erode consumer purchasing power and reduce overall economic growth. This can dampen investor sentiment and lead to a decrease in equity market performance. Furthermore, the exchange rate serves as a signal of a country's economic stability and attractiveness to foreign investors. A volatile or depreciating exchange rate may lead to a loss of investor confidence, resulting in capital outflows from the equity market and a decline in stock prices

H_{02}: *Interest rate has no significant effect on equity security market indices in Kenya.* The results presented in Table 4.12 show that interest rate has a significant negative effect on equity performance index ($\beta 2$ =-.3469 ρ-*value*<0.05); hence, (H01) was rejected. A one-unit increase in the interest rate is associated with a decrease in the

equity performance index by 0.3469 units. In other words, when interest rates rise, it tends to have a negative impact on the equity performance index. This relationship suggests that higher interest rates can potentially lead to decreased investor confidence and reduced investment in the equity market, resulting in lower equity performance. These results are in agreement with another study that was done by Maswere and Kaberuka (2013). The inverse relationship between interest rates and equity security market indices in can be attributed to several factors. Firstly, higher interest rates increase borrowing costs for businesses and individuals, which can lead to decreased investment and reduced consumer spending. This can negatively impact the profitability and growth prospects of companies listed in the equity market, ultimately affecting the performance of equity indices. Additionally, higher interest rates can make fixed-income investments, such as bonds or savings accounts, more attractive relative to equity investments. This can divert funds away from the equity market, resulting in decreased demand for equities and potential downward pressure on stock prices. Furthermore, higher interest rates can reflect tighter monetary policy aimed at controlling inflation. This can dampen economic activity and investor sentiment, leading to a decrease in equity market performance. Overall, the inverse relationship between interest rates and equity security market indices in Kenya suggests that changes in interest rates can have a significant impact on investor behavior, investment decisions, and ultimately the performance of the equity market.

H_{03}: *Inflation rate has no significant effect on equity security market indices in Kenya.* The results presented in Table 4.12 show that inflation rate has a significant positive effect on equity performance index ($\beta 3$ =.2377 ρ-*value<0.05)*; hence, (H01) was rejected. A one-unit increase in the inflation rate is associated with a increase in the equity performance index by 0.2377 units. In other words, when the inflation rate

rises, it tends to have a positive impact on the equity performance index. This relationship suggests that higher inflation can potentially lead to increased investor confidence and reduced investment in the equity market, resulting in lower equity performance. These results are in contradiction with another study that was done by Mohammad (2011). Moderate levels of inflation often coincide with a growing economy, which can drive increased consumer spending and business activity. This can lead to higher corporate earnings and improved financial performance for companies listed in the equity market, positively impacting equity market indices. Additionally, during periods of inflation, certain industries or companies may benefit from increased pricing power, allowing them to pass on higher costs to consumers through price adjustments. This can contribute to revenue growth and positively influence equity market performance. Moreover, inflation can incentivize investors to seek alternative investments to preserve the value of their assets. Equities, as an asset class that historically has the potential to outpace inflation, may become relatively more attractive, leading to increased demand and upward pressure on equity market indices.

H_{04}: *Money supply has no significant effect on equity security market indices in Kenya.* The results presented in Table 4.12 show that money supply has a significant negative effect on equity performance index ($\beta 4$ =-1.51e-13 ρ-*value<0.05)*; hence, (H01) was rejected. A one-unit increase in the money supply is associated with a decrease in the equity performance index by -1.51e-13 units. When the money supply increases, it tends to have a negative impact on the equity performance index. This relationship suggests that higher money supply can potentially lead to decreased investor confidence and reduced investment in the equity market, resulting in lower equity performance. These results are in contradiction with another study that was done by Shaoping, (2008). A decrease in the money supply can indicate tighter monetary

policy aimed at controlling inflation. This can lead to higher borrowing costs, reduced consumer spending, and decreased business investment, negatively impacting the financial performance of companies listed in the equity market. Additionally, a contraction in the money supply can result in reduced liquidity in the economy, making it more challenging for businesses to access funds for expansion or operational needs. This can constrain their growth prospects and ultimately affect equity market performance. Moreover, a decrease in the money supply can signal a period of economic uncertainty and decreased investor confidence. Investors may become more risk-averse and shift their investments away from equities, leading to a decline in demand for stocks and a potential decrease in equity market indices.

H_{05}: *GDP has no significant effect on equity security market indices in Kenya.* The results presented in Table 4.12 show that GDP has a significant positive effect on equity performance index ($\beta 4$ =1.10e-09 ρ-*value*<0.05); hence, (H01) was rejected. A one-unit increase in GDP is associated with an increase in the equity performance index by 1.10e-09 units. When GDP increases, it tends to have a positive impact on the equity performance index. This relationship suggests that higher GDP can potentially lead to increased investor confidence, improved corporate earnings, and higher stock prices, positively influencing equity market performance.

These results were in agreement with another study that was done by Diebold and Yilmaz (2008). A growing GDP indicates an expanding economy with increased production, consumption, and business activity. This can lead to higher corporate earnings and improved financial performance for companies listed in the equity market, positively impacting equity market indices. As GDP expands, companies may experience revenue growth, increased profitability, and enhanced investor confidence, which can contribute to higher stock prices and overall equity market performance.

Additionally, a growing GDP often implies a positive business environment, favorable market conditions, and increased investor sentiment, attracting both domestic and foreign investors to participate in the equity market. This influx of investment can drive demand for equities and lead to upward pressure on equity market indices. However, it's important to note that other factors, such as government policies, monetary conditions, market sentiment, and global economic trends, can also influence the relationship between GDP and equity market indices.

Table 4.12 Hypotheses

Hypotheses	β	P<5%	Decision
$H_{01:}$ Exchange rate has no significant effect on equity security indices in Kenya	-0.0147	0.000	Rejected
$H_{02:}$ Interest rate has no significant effect on equity security indices in Kenya	-0.3469	0.001	Rejected
$H_{03:}$ Inflation rate has no significant effect on equity security indices in Kenya	0.2377	0.002	Rejected
$H_{04:}$ Money supply has no significant effect on equity security indices in Kenya	-1.51e-13	0.000	Rejected
$H_{05:}$ Gdp has no significant effect on equity security indices in Kenya	1.10e09	0.006	Rejected

Source (Field data, 2023).

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.0 Overview

This chapter outlines a summary of the study findings in line with the specific study objectives done in the previous chapter. It also presents the conclusion of the findings and also provides theoretical and policy recommendations. Areas for further research are also outlined in this chapter.

5.1 Summary of Findings of the Study

Therefore, this study's general objective was to determine the effects of selected macroeconomic variables on securities performance in Kenya. Following is the summary of the findings with reference to table 4.12.

5.1.1 Effect of Exchange Rate on Equity Security Market Indices

The study's first specific objective was to assess the effect of exchange rate on equity security market indices. The findings revealed that exchange rate had a negative and significant effect on equity security market indices (β= -0.0147*; ρ< 0.05)*; suggesting that when exchange rate goes up the equity security market indices reduces. These findings were consistent with a study conducted by Osamuonyi and Evbayiro-Osagie (2012). When the exchange rate depreciates, imported products and services tend to become relatively more expensive. Consequently, companies that rely significantly on imports for their operations may experience higher production costs and a decline in profitability. This can have a negative effect on the performance of these companies, which are typically included in equity indices. Second, a depreciation in the exchange rate can result in an increase in the cost of foreign debt for companies that have borrowed in foreign currencies. This can place a financial strain on these companies, influencing their profitability and, in turn, the performance of the equity market indices.

Thirdly, exchange rate depreciation can cause inflationary pressures in an economy. Inflation can erode the purchasing power of consumers and reduce economic growth. This can diminish investor sentiment and reduce the performance of the stock market. In addition, the exchange rate serves as an indicator of a country's economic stability and investment appeal. A volatile or depreciating exchange rate may erode investor confidence, leading to capital outflows from the equity market and a decline in stock prices.

5.1.2 Effect of Interest Rate on Equity Security Market Indices

The study's second specific objective was to assess the effect of interest rate on equity security market indices. The findings revealed that interest rate had a negative and significant effect on equity security market indices (β= -0.3469*; ρ< 0.05)*; suggesting that when interest rate goes up the equity security market indices reduces. These findings are consistent with the findings of a different study that was carried out by Maswere and Kaberuka (2013). There are a number of reasons that can explain the inverse link that exists between interest rates and indices of the equities security market. To begin, an increase in interest rates results in increased borrowing costs for companies as well as people. This, in turn, might restrict investment as well as lower consumer spending. This might have a detrimental effect on the profitability and growth prospects of companies that are listed on the public market, which would ultimately have an influence on the performance of equities indices. Additionally, an increase in interest rates might make assets that produce a fixed income, such as bonds or savings accounts, more appealing in comparison to investments that produce equity. Because of this, funds may be redirected away from the equity market, which may lead to a decline in the demand for shares and a potential downward pressure on stock prices. In addition to this, higher interest rates may be an indication of a more restrictive monetary

policy that is intended to curb inflation. This may put a damper on economic activity as well as the sentiment of investors, ultimately resulting in a drop in the performance of the equity markets. The overall negative relationship between interest rates and equities security market indices in Kenya implies that changes in interest rates can have a major impact on the behavior of investors, the decisions they make regarding investments, and ultimately the performance of the stock market.

5.1.3 Effect of Inflation Rate on Equity Security Market Indices

The study's third specific objective was to assess the effect of inflation rate on equity security market indices. The findings revealed that inflation rate had a positive and significant effect on equity security market indices ($\beta = 0.2377$*; $\rho < 0.05$)*; suggesting that when inflation rate goes up the equity security market indices increase. The findings of this study run counter to the findings of another research carried out by Mohammad (2011). Inflation that is kept under control typically coincides with an expanding economy, which, in turn, can spur increasing levels of consumer spending and activity among businesses. This can have a beneficial impact on equity market indices as it can lead to increased corporate profitability and improved financial performance for companies that are listed on the equity market. In addition, during times of inflation, particular sectors of the economy or enterprises may experience an increase in their pricing power, which enables them to pass on higher costs to customers by adjusting their prices. This has the potential to contribute to revenue growth and positively influence the performance of equities markets. In addition, inflation can serve as an incentive for investors to look for other investments in order to protect the value of their assets. It is possible that equities, as a category of asset that has traditionally had the capacity to outrun inflation, would become relatively more appealing, which will lead to an increase in demand and put upward pressure on equity market indexes.

5.1.4 Effect of Money Supply on Equity Security Market Indices

The study's fourth specific objective was to assess the effect of money supply on equity security market indices. The findings revealed that money supply had a negative and significant effect on equity security market indices (β= -1.51e-13*; ρ< 0.05)*; suggesting that when money supply goes up the equity security market indices reduces. The findings of this study contradicted the findings of Shaoping's (2008). A decrease in the money supply may signal a stricter monetary policy aimed at containing inflation. This can result in increased borrowing costs, decreased consumer expenditure, and decreased business investment, all of which have a negative effect on the financial performance of companies listed on the equity market. In addition, a reduction in the money supply can reduce liquidity in the economy, making it more difficult for businesses to access funds for expansion or operational requirements. This can limit their growth prospects and ultimately impact stock market performance. Moreover, a decrease in the money supply can indicate a period of economic uncertainty and lowered investor confidence. Investors may become risk-averse and transfer their investments away from equities, resulting in a decline in demand for stocks and a possible decline in equity market indices.

5.1.5 Effect of GDP on Equity Security Market Indices

The study's first specific objective was to assess the effect of GDP on equity security market indices. The findings revealed that GDP had a positive and significant effect on equity security market indices (β= 1.10e09*; ρ< 0.05)*; suggesting that when GDP goes up the equity security market indices increases. These results were consistent with those of another study conducted by Diebold and Yilmaz (2008). An expanding economy with rising production, consumption, and business activity is indicated by a growing GDP. This can result in increased corporate earnings and enhanced financial

performance for companies listed on the equity market, influencing the equity market indices positively. As the GDP expands, companies may experience revenue growth, improved profitability, and increased investor confidence, all of which can contribute to higher stock prices and overall equity market performance. In addition, a growing GDP often indicates a favorable business climate, favorable market conditions, and increased investor sentiment, which attracts both domestic and international investors to the equity market. This influx of capital can increase the demand for stocks and exert upward pressure on the equity market indices. It is essential to note, however, that other factors, such as government policies, monetary conditions, market sentiment, and global economic trends, can also influence the relationship between GDP and equity market indices.

5.2 Conclusions

The study concluded that there was negative significant relationship between exchange rate and equity security market indices suggesting an inverse relationship between these two variables. This means that as the exchange rate increases or strengthens, there is a tendency for equity market indices to decrease. The depreciation of the domestic currency can have adverse effects on the equity market, including increased import costs, reduced competitiveness of export-oriented companies, and potential capital outflows from foreign investors. These factors can negatively impact the financial performance of companies listed in the equity market and result in a decline in equity market indices.

The results also showed that there was a negative significant effect of interest rates on equity security market indices suggesting an inverse relationship between these two variables. This means that as interest rates increase, there is a tendency for equity market indices to decrease. Higher interest rates can lead to increased borrowing costs

for businesses and individuals, which can result in reduced investment, decreased consumer spending, and lower corporate profitability. These factors can negatively impact the financial performance of companies listed in the equity market and subsequently lead to a decline in equity market indices. Additionally, higher interest rates can make fixed-income investments more attractive compared to equities, diverting funds away from the equity market.

The study also concluded that there was a positive significant relationship between inflation rate and equity security market indices. This means that as the inflation rate increases, there is a tendency for equity market indices to increase. Higher inflation can be indicative of a growing economy, increased consumer demand, and improved business conditions, which can positively impact the financial performance of companies listed in the equity market. Additionally, during periods of inflation, certain industries or companies may benefit from increased pricing power, contributing to revenue growth and profitability. Furthermore, inflation can incentivize investors to seek investments that can outpace inflation, such as equities, leading to increased demand for stocks and upward pressure on equity market indices.

Additionally, the study concluded that there was a negative significant relationship between money supply and equity security market. This means that as the money supply increases, there is a tendency for equity market indices to decrease. An expansion in the money supply can lead to concerns of inflationary pressures, reduced purchasing power, and increased uncertainty in the economy. These factors can negatively impact investor sentiment and lead to a decline in demand for equities. Additionally, an excessive increase in the money supply can indicate loose monetary policy or economic instability, which can further erode investor confidence and result in a decrease in equity market indices.

Lastly, the study also concluded that there was a positive significant relationship between GDP (Gross Domestic Product) on equity security market. This means that as GDP increases, there is a tendency for equity market indices to increase. A growing GDP indicates a thriving economy with increased business activities, consumer spending, and market expansion. These factors can lead to higher corporate earnings, improved financial performance, and increased investor confidence, positively impacting equity market indices. Additionally, a growing GDP often signifies favorable market conditions, increased investor sentiment, and economic stability, attracting both domestic and foreign investors to participate in the equity market. This influx of investment can drive demand for equities and contribute to upward movements in equity market indices.

5.3 Recommendations of the Study

5.3.1 Theoretical Recommendation

The findings of this study support the efficient market hypothesis theory. This theory therefore recognizes that market participants are already incorporating relevant exchange rate information into equity prices. Instead of attempting to directly influence the exchange rate to impact equity market indices, policymakers should focus on creating an environment that fosters transparency, market stability, and investor confidence. This can be achieved through implementing sound macroeconomic policies, promoting regulatory frameworks that protect investor rights and ensure fair competition, and facilitating access to accurate and timely information for market participants. By allowing the market to operate freely and efficiently, policymakers can facilitate the fair valuation of equities based on all available information, including the exchange rate, and ensure a level playing field for investors.

The Efficient Market Hypothesis (EMH) suggests that financial markets, including the equity market, are efficient and incorporate all available information into asset prices. This theory suggests that Policymakers should prioritize transparency in the dissemination of economic data, interest rate decisions, inflation reports, money supply figures, and GDP growth. This can help investors make well-informed decisions and contribute to efficient market functioning. Additionally, policymakers should focus on maintaining stable macroeconomic conditions, implementing prudent monetary and fiscal policies, and fostering a business-friendly environment that supports sustainable economic growth. By promoting transparency, stability, and favorable investment conditions, policymakers can contribute to the efficient pricing of equities in line with the information provided by interest rates, inflation rates, money supply, and GDP, enhancing the overall efficiency of the equity market.

Arbitrage Pricing Theory (APT) suggests that the expected return of an asset, such as equity security market indices, can be explained by multiple factors. policymakers should work towards promoting economic stability, implementing effective monetary and fiscal policies, and fostering an environment conducive to sustainable economic growth. By understanding and considering the relevant risk factors identified through APT, policymakers can enhance the understanding and management of equity market risks and contribute to efficient pricing and investment decisions in the equity market.

The Capital Asset Pricing Model (CAPM) suggests that the expected return of an asset, such as equity security market indices, can be determined by the risk-free rate, market risk premium, and the asset's beta coefficient. Policymakers and market participants should focus on analyzing the relationships between these factors and equity market indices, particularly their impact on the market risk premium. This can involve monitoring and understanding how changes in exchange rates, interest rates, inflation,

money supply, and GDP affect market sentiment, investor risk perception, and the overall risk profile of equity investments. By comprehensively evaluating these risk factors and incorporating them into the assessment of expected returns, policymakers and investors can make more informed decisions regarding equity investments and risk management strategies. Furthermore, policymakers should strive to maintain macroeconomic stability, implement prudent monetary and fiscal policies, and foster an environment conducive to sustainable economic growth, as these factors can influence the risk premium associated with equity securities.

5.3.2 Policy Recommendation

Central Bank of Kenya (CBK) should adopt policies to stabilize the exchange rate. Excessive volatility in the exchange rate can undermine investor confidence and lead to lower stock market performance. The government can employ a mix of interventions, such as maintaining sufficient foreign exchange reserves, employing currency swaps, and pursuing policies that encourage foreign direct investment (FDI) to stabilize the currency. Strengthening Kenya's export competitiveness through diversification and value addition could also reduce pressure on the exchange rate, supporting a healthier stock market environment.

The CBK could consider policies that maintain interest rates at levels that are conducive to both economic growth and financial stability. High-interest rates tend to increase the cost of borrowing, which can reduce corporate profitability and negatively affect stock prices. Therefore, a moderate interest rate policy that encourages investment while controlling inflation is crucial. Additionally, introducing targeted lending programs for strategic sectors at lower interest rates could stimulate growth and indirectly benefit the stock market.

Inflation beyond a certain threshold can be detrimental. Policymakers should implement strategies to control inflation through monetary policy measures, such as adjusting the money supply and using interest rates to manage demand. Supply-side interventions, such as improving agricultural productivity to stabilize food prices and reducing import dependence, could help control inflation. A stable inflationary environment would help preserve purchasing power and investor confidence in the stock market.

The CBK should carefully regulate the growth of money supply to avoid excessive liquidity in the economy, which could lead to inflationary pressures and speculation in the stock market. Open market operations (OMOs) and other monetary policy tools should be used judiciously to strike a balance between supporting economic growth and maintaining financial stability. The CBK should also focus on improving the effectiveness of monetary transmission mechanisms to ensure that adjustments in money supply have the intended effects on the economy and the financial markets.

The government should prioritize policies that enhance GDP growth, such as investing in infrastructure, improving the ease of doing business, and fostering innovation and entrepreneurship. Policies aimed at diversifying the economy, particularly by expanding the manufacturing and service sectors, would help create a more resilient economic environment. Additionally, increasing public and private sector investments in human capital development, particularly education and healthcare, can contribute to long-term economic growth and, consequently, stronger stock market performance.

5.4 Limitations of the Research

The investigation was constrained by the lack of precise data pertaining to the established ARDL model. Consequently, a restructuring of the ARDL model was

undertaken, wherein proxies were utilized to represent the true variable. Nevertheless, the impact of these restrictions on the outcomes of the ARDL model was not substantial, as the proxies utilized were consistent with both the theoretical and empirical information equity security index.

5.5 Area for Further Research

The research utilized the ARDL time series estimation method. Nevertheless, an alternative approach might be pursued by employing alternative estimation methods, such as VAR, VECM, and GLM methods. The objective would be to evaluate the outcomes of different estimation methods in order to ascertain their comparability. The previously mentioned study can be applied to additional East African regions, including Uganda, Rwanda, Tanzania, Burundi, South Sudan, and the Democratic Republic of Congo (DRC), with the aim of assessing the impact of specific macroeconomic factors on the performance of securities.

Future research should incorporate exports and foreign investment as additional independent variables that influence the performance of the equity security market, in addition to the variables used in this study, and compare the results to those obtained in this study. In addition, this research ought to be conducted frequently, since such many macroeconomic variables are subject to frequent change.

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APPENDICES

Appendix I: Introduction Letter

MOI UNIVERSITY
POSTGRADUATE OFFICE
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0722685969
0715245347
Fax No: (053) 43047
Telex No. MOIVARSITY 35047

P.O. Box 3900
Eldoret.
Kenya

RE: MU/SBE/PGR/ACD/21B **DATE:** 3rd July, 2023

TO WHOM IT MAY CONCERN:

RE: MAIYO CHELANG'A LUKA R- SBE/PGE/07/09

The above named is a bonafide student of Moi University School of Business and Economics, undertaking **Master of Arts in Economics** degree.

He has successfully completed the coursework, defended his proposal, and is proceeding to the field to collect data for his research titled: ***"Effect of Selected Macro-Economic Variables on Equity Securities Performance at the Nairobi Securities Exchange, Kenya."***

Any assistance accorded to him will be highly appreciated.

Yours faithfully,

SCHOOL OF BUSINESS & ECONOMICS
MOI UNIVERSITY
P.O. Box 3900 ELDORET 30100

DR. RONALD BONUKE
POSTGRADUATE CHAIR, SB&E

/vc

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    ii. Adversely affect the lives of Kenyans
    iii. Be in contravention of Kenya's international obligations including Biological Weapons Convention (BWC), Comprehensive Nuclear-Test-Ban Treaty Organization (CTBTO), Chemical, Biological, Radiological and Nuclear (CBRN).
    iv. Result in exploitation of intellectual property rights of communities in Kenya
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    vi. Adversely affect the rights of communities
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National Commission for Science, Technology and
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Awareness test for Thesis entitled: **EFFECT OF SELECTED MACRO-ECONOMIC VARIABLES ON SECURITIES PERFORMANCE AT THE NAIROBI SECURITIES EXCHANGE, KENYA** With similarity index of 15% and striving to maintain academic integrity.

Word count: 21004

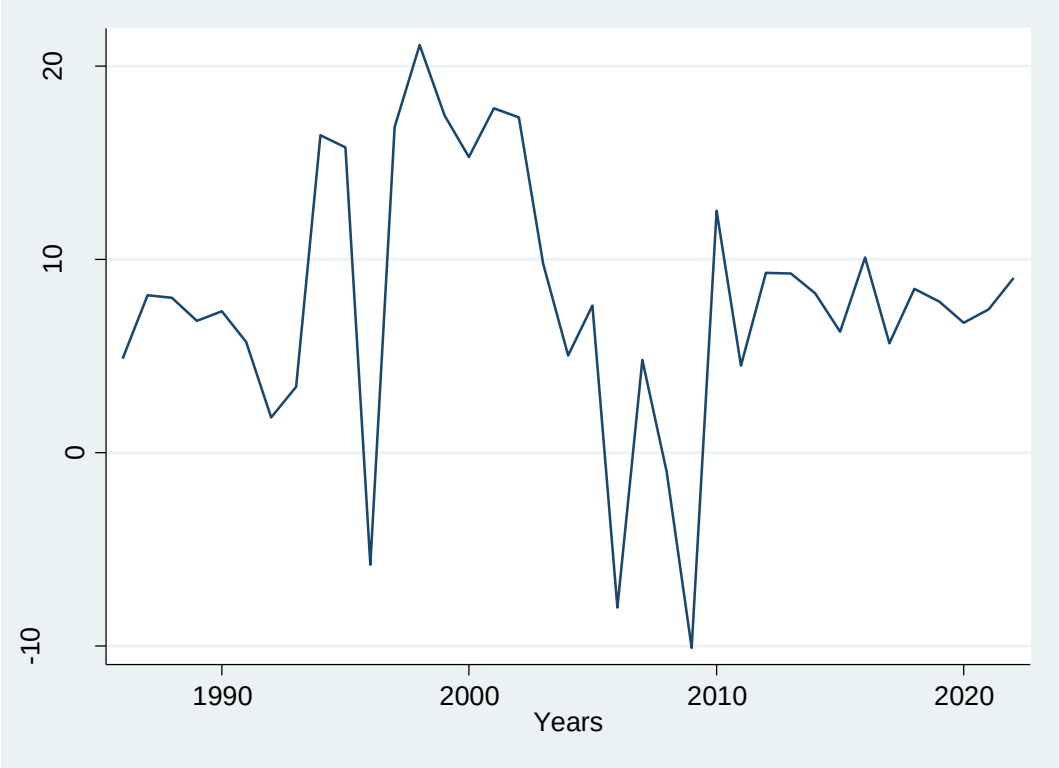
Awarded by

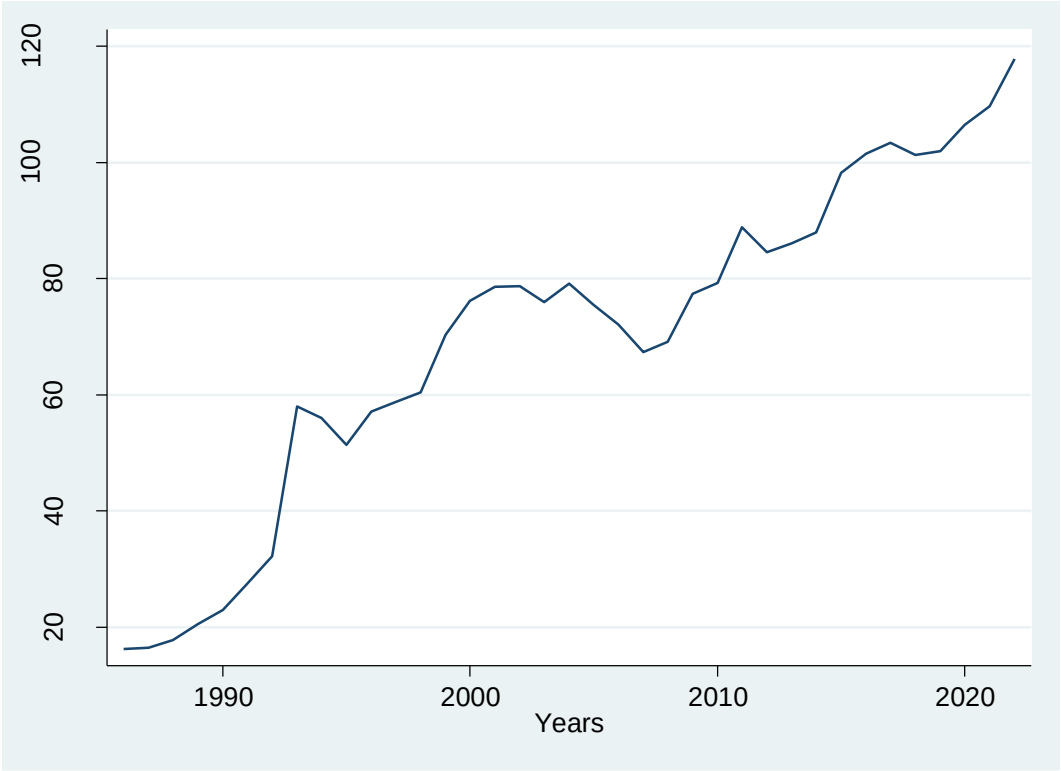
Prof. Anne Syomwene Kisilu
CERM-ESA Project Leader Date: 08/04/2024

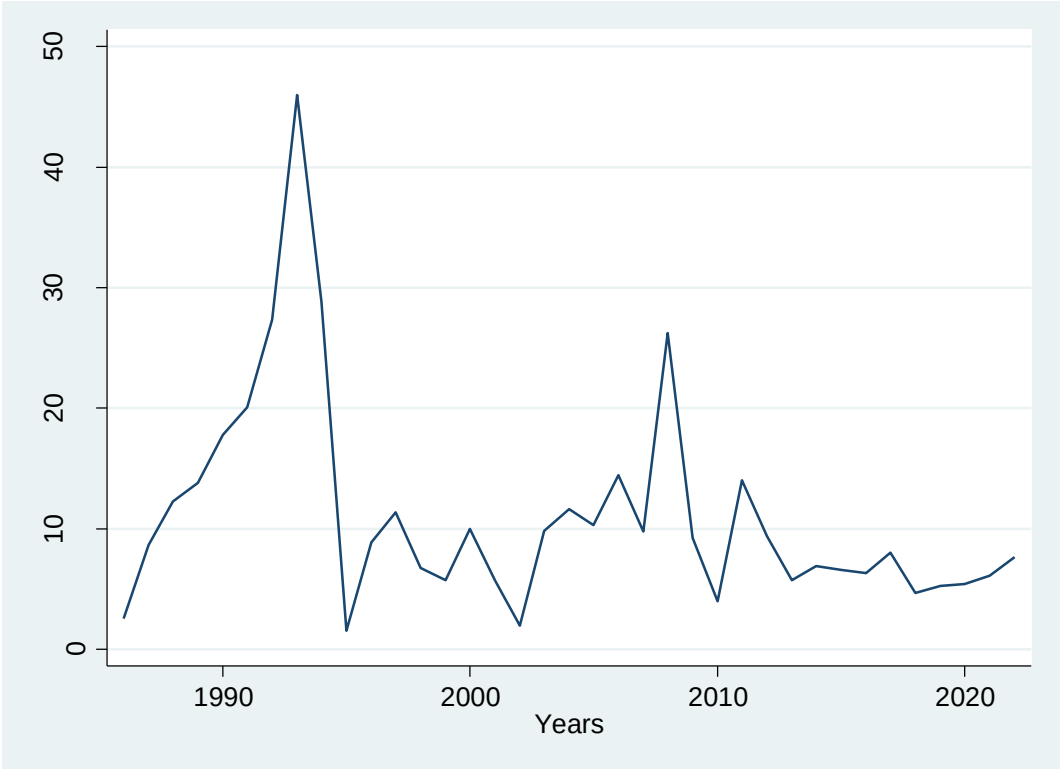
Appendix IV: Stata Output

```
. sum interestrate exchangerate inflationrate moneysupply gdp nseindices
```

Variable	Obs	Mean	Std. Dev.	Min	Max
interestrate	37	7.896658	6.899123	-10.096	21.09633
exchangerate	37	69.80315	28.47182	16.22574	117.866
inflationr~e	37	11.0952	8.850691	1.554328	45.97888
moneysupply	37	1.24e+12	1.41e+12	3.57e+10	4.69e+12
gdp	37	3.72e+10	3.45e+10	5.75e+09	1.13e+11
nseindices	37	16.99195	38.24838	-40.30563	186.21




120
100
80
60
40
20
1990
2000
2010
2020
Years


50
40
30
20
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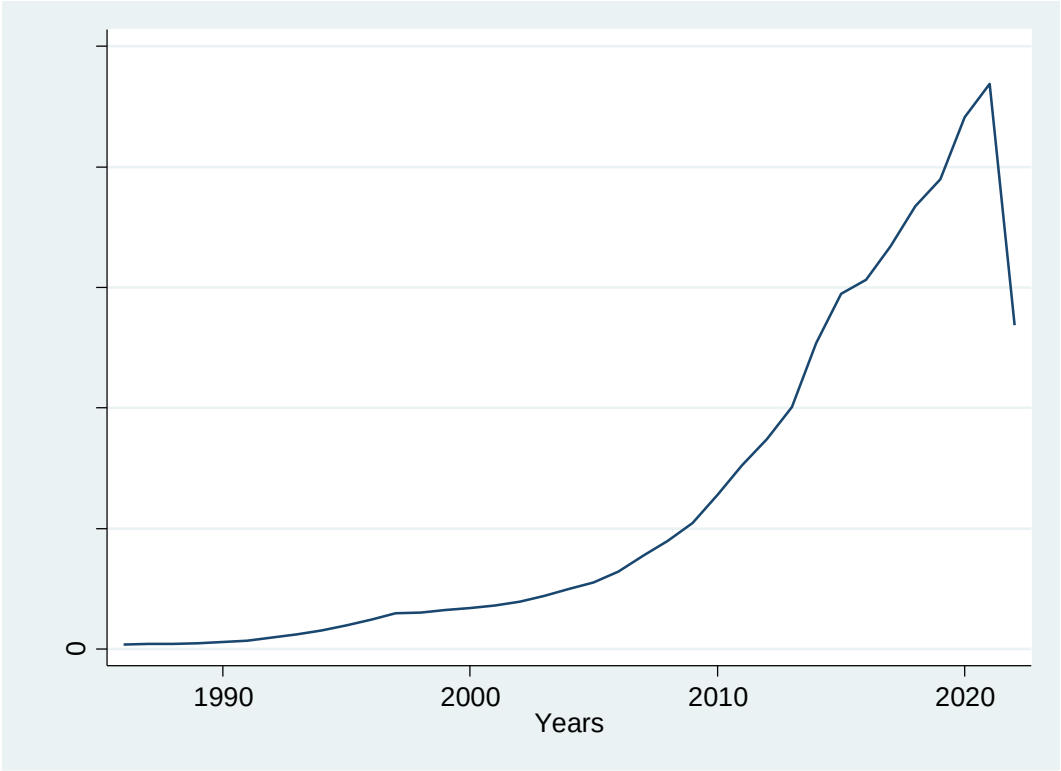
0
1990
2000
2010
2020
Years


0
1990
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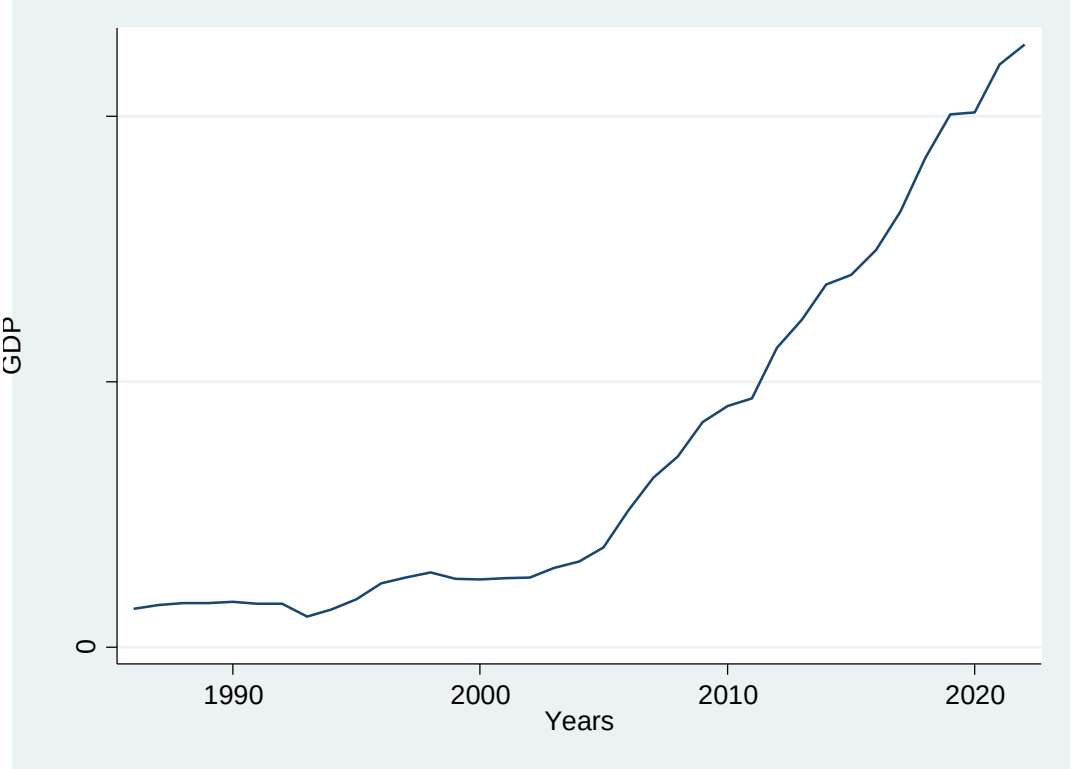
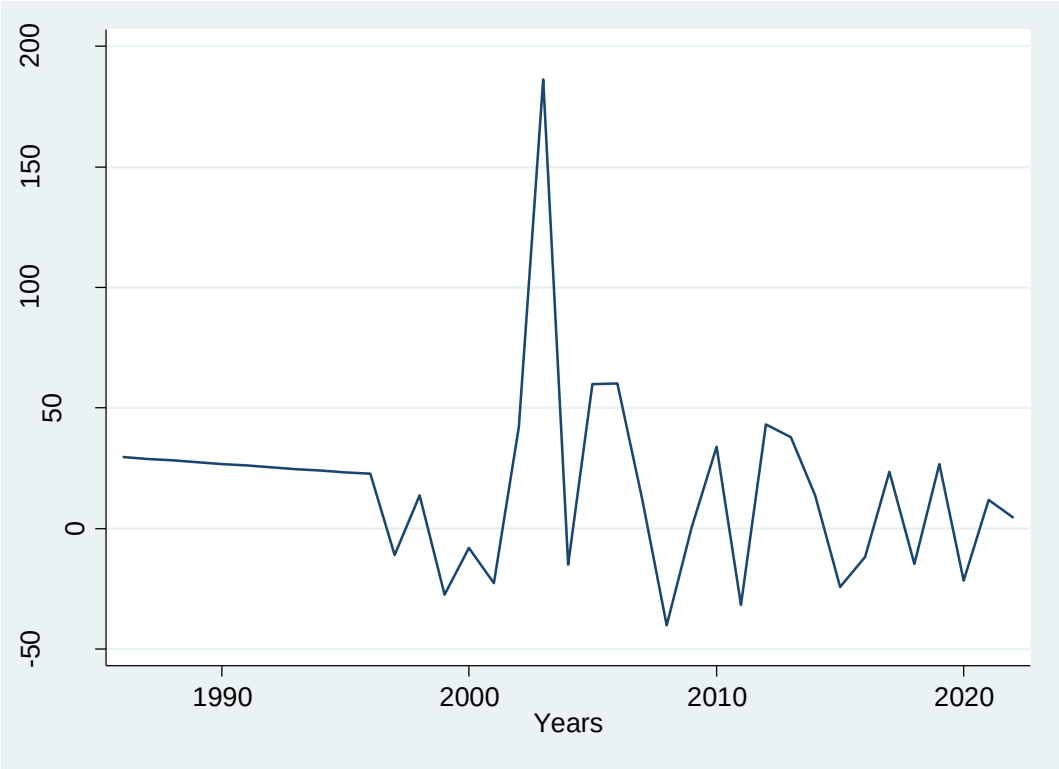
Years


GDP
0
1990
2000
2010
2020
Years




```
. pwcorr nseindices interestrate exchangerate inflationrate moneysupply gdp,
star(0.05)

             | nseind~s intere~e exchan~e inflat~e moneys~y      gdp
-------------+------------------------------------------------------
  nseindices |   1.0000
interestrate |  -0.0364   1.0000
exchangerate |  -0.1985   0.0448   1.0000
inflationr~e |   0.0119  -0.2760  -0.3337*  1.0000
 moneysupply |  -0.2354  -0.0668   0.7933* -0.3586*  1.0000
         gdp |  -0.2307  -0.1024   0.8092* -0.3582*  0.9694*  1.0000

. vif

    Variable |       VIF       1/VIF
-------------+----------------------
         gdp |     18.89    0.052950
 moneysupply |     16.94    0.059036
exchangerate |      3.05    0.328381
```

```
inflationr~e |      1.29    0.772885
interestrate |      1.21    0.829834
-------------+----------------------
    Mean VIF |      8.27

. dfuller IR

Dickey-Fuller test for unit root                  Number of obs   =        36

                                 ---------- Interpolated Dickey-Fuller -------
--
                 Test         1% Critical       5% Critical    10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
--
 Z(t)             -5.523            -3.675            -2.969          -2.617
------------------------------------------------------------------------------
--
MacKinnon approximate p-value for Z(t) = 0.0000

. dfuller ER

Dickey-Fuller test for unit root                  Number of obs   =        36

                                 ---------- Interpolated Dickey-Fuller -------
--
                 Test         1% Critical       5% Critical    10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
--
 Z(t)             -5.997            -3.675            -2.969          -2.617
------------------------------------------------------------------------------
--
MacKinnon approximate p-value for Z(t) = 0.0000
```

```
. dfuller INR

Dickey-Fuller test for unit root                 Number of obs   =        36

                                 ---------- Interpolated Dickey-Fuller -------
--
                   Test         1% Critical       5% Critical    10% Critical
                Statistic           Value             Value             Value
------------------------------------------------------------------------------
--
 Z(t)             -4.972            -3.675            -2.969          -2.617
------------------------------------------------------------------------------
--
MacKinnon approximate p-value for Z(t) = 0.0000

. dfuller MS

Dickey-Fuller test for unit root                 Number of obs   =   36

                                 ---------- Interpolated Dickey-Fuller -------
--
                   Test         1% Critical       5% Critical    10% Critical
                Statistic           Value             Value             Value
------------------------------------------------------------------------------
--
 Z(t)             -8.890            -3.675            -2.969          -2.617
------------------------------------------------------------------------------
--
MacKinnon approximate p-value for Z(t) = 0.0000
```

```
. dfuller GDDP

Dickey-Fuller test for unit root                  Number of obs   =        36

                                 ---------- Interpolated Dickey-Fuller -------
--
                   Test         1% Critical       5% Critical    10% Critical
                Statistic           Value             Value             Value
------------------------------------------------------------------------------
--
 Z(t)             -8.005            -3.675            -2.969          -2.617
------------------------------------------------------------------------------
--
MacKinnon approximate p-value for Z(t) = 0.0000

. dfuller nseindices

Dickey-Fuller test for unit root                  Number of obs   =        36

                                 ---------- Interpolated Dickey-Fuller -------
--
                   Test         1% Critical       5% Critical    10% Critical
                Statistic           Value             Value       Value
------------------------------------------------------------------------------
--
 Z(t)             -5.717            -3.675            -2.969         -2.617
------------------------------------------------------------------------------
--
MacKinnon approximate p-value for Z(t) = 0.0000
```

```
. swilk resid

                    Shapiro-Wilk W test for normal data

    Variable |    Obs       W           V         z       Prob>z
-------------+--------------------------------------------------
   residuals |     37    0.94423      2.077     1.530    0.06295
. estat bgodfrey
Breusch-Godfrey LM test for autocorrelation
-------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-----------------------------------------------------------
       1     |          0.073               1                   0.7874
-------------------------------------------------------------------------
                        H0: no serial correlation
. estat dwatson

Durbin-Watson d-statistic(  6,    37) =  2.086492
. estat imtest

Cameron & Trivedi's decomposition of IM-test

---------------------------------------------------
              Source |       chi2     df      p
---------------------+-----------------------------
  Heteroskedasticity |       9.66     20    0.9740
            Skewness |       3.79      5    0.5802
            Kurtosis |       1.19      1    0.2749
---------------------+-----------------------------
               Total |      14.64     26    0.9636
---------------------------------------------------
```

```
ghansen exchangerate inflationrate moneysupply, break(level) lagmethod(aic)
Gregory-Hansen Test for Cointegration with Regime Shifts
Model: Change in Level                          Number of obs   =        37
Lags  =  0  chosen by Akaike criterion          Maximum Lags    =         2
```

Test	Breakpoint Statistic	Date	Asymptotic Critical Values 1%	5%	10%
ADF	-4.43	6	1991	-5.44	-4.92	-4.69
Zt	-4.49	6	1991	-5.44	-4.92	-4.69
Za	-30.45	6	1991	-57.01	-46.98	-42.49

```
ghansen exchangerate inflationrate moneysupply, break(regime) lagmethod(aic)

Gregory-Hansen Test for Cointegration with Regime Shifts
Model: Change in Regime                         Number of obs   =        37
Lags  =  2  chosen by Akaike criterion          Maximum Lags    =         2
```

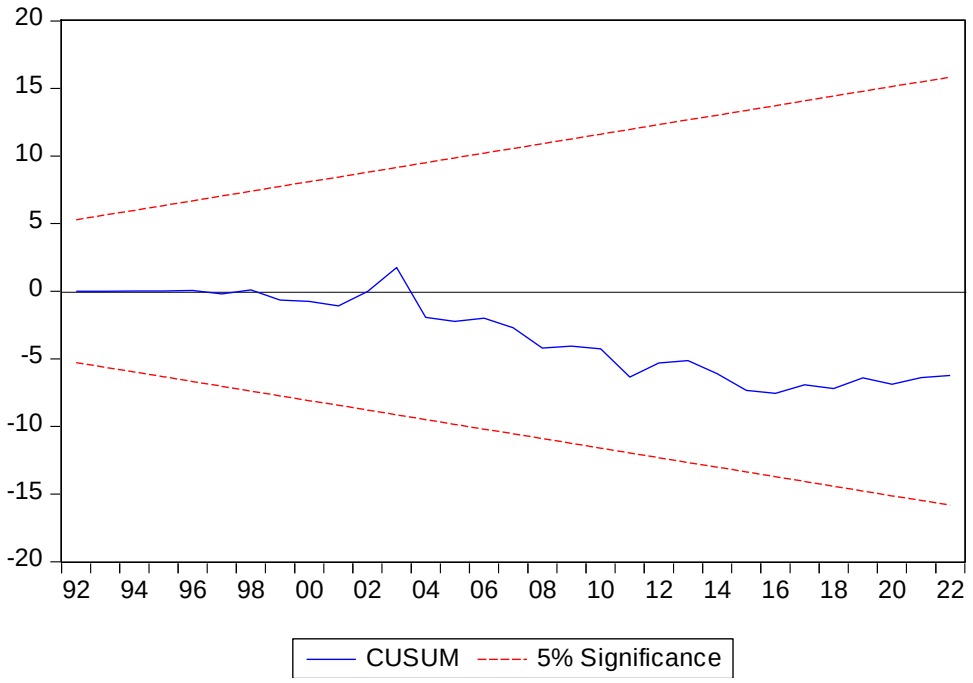
Test	Breakpoint Statistic	Date	Asymptotic Critical Values 1%	5%	10%
ADF	-4.59	12	1997	-5.97	-5.50	-5.23
Zt	-4.18	18	2003	-5.97	-5.50	-5.23
Za	-32.39	18	2003	-68.21	-58.33	-52.85

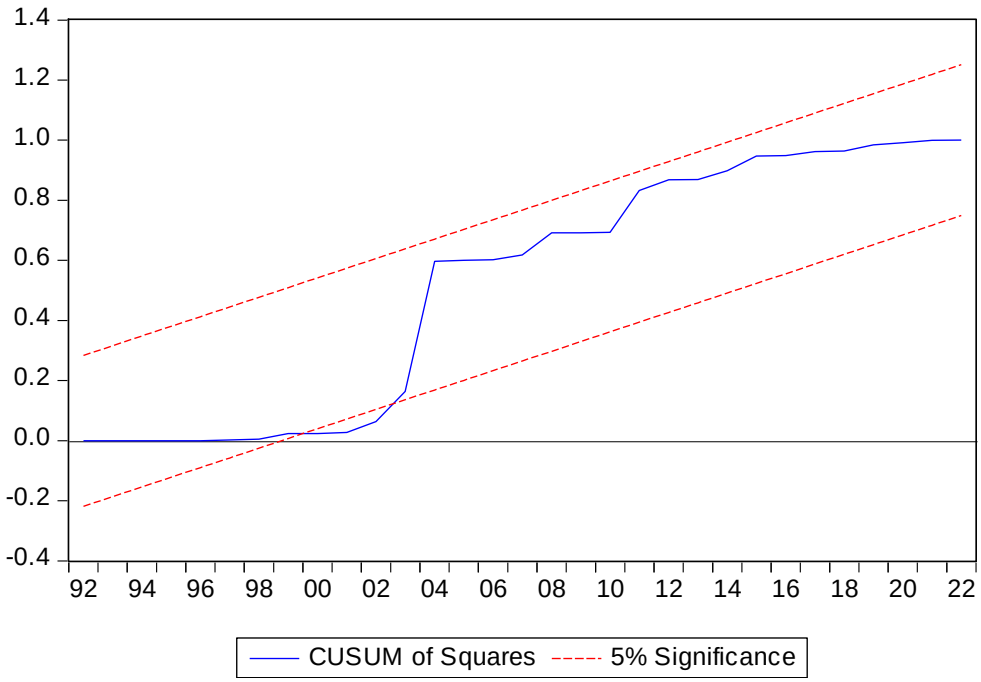
```
. varsoc nseindices ms ir gdp er inf


   Selection-order criteria

  Sample:  1990 - 2022                        Number of obs      =        33
+---------------------------------------------------------------------------+
|lag |    LL      LR      df    p      FPE       AIC      HQIC      SBIC    |
|----+----------------------------------------------------------------------|
|  0 | -2313.89                      1.2e+56   140.478   140.539   140.659  |
|  1 | -2217.68  192.42   16  0.000  9.4e+53   135.617   135.922*  136.524* |
|  2 | -2208.97  17.416   16  0.359  1.5e+54   136.059   136.608   137.691  |
|  3 | -2178.14  61.657   16  0.000  7.0e+53*   135.16   135.954   137.518  |
|  4 | -2161.97  32.335*  16  0.009  9.0e+53    135.15*  136.188   138.234  |
+---------------------------------------------------------------------------+
   Endogenous:  nseindices ms ir gdp er inf

    Exogenous:  _cons
```






```
ardl nseindices interestrate ER inflationrate MS gdp

ARDL(4,4,4,3,4,4) regression

Sample:     1990 -     2022                 Number of obs    =         33
                                            F(  28,      4)  =    5193.60
                                            Prob > F         =     0.0000
                                            R-squared        =     1.0000
                                            Adj R-squared    =     0.9998
Log likelihood =  4.9426718                 Root MSE         =     0.5983

------------------------------------------------------------------------------
   nseindices |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
--------------+---------------------------------------------------------------
   nseindices |
          L1. |    1.18962   .1109209    10.72   0.000     .8816545    1.497586
          L2. |  -1.701016   .1917524    -8.87   0.001    -2.233406   -1.168626
          L3. |   .9289012   .1058428     8.78   0.001     .6350346    1.222768
          L4. |   .5015541   .0907663     5.53   0.005     .2495464    .7535619
              |
 interestrate |
          --. |  -.3469313   .0305245   -11.37   0.000    -.4316809   -.2621817
          L1. |   .3119061   .0566127     5.51   0.005     .1547241    .4690881
```

L2.	-.4288249	.0353078	-12.15	0.000	-.526855	-.3307949
L3.	.3824891	.05471	6.99	0.002	.2305898	.5343884
L4.	-.4262062	.0410089	-10.39	0.000	-.5400653	-.3123472
ER						
--.	-.014657	.0001068	-137.23	0.000	-.0143606	- .0149537
L1.	-.0169246	.0015636	-10.82	0.000	-.0212658	-.0125834
L2.	.0236187	.0026837	8.80	0.001	.0161676	.0310697
L3.	-.0131567	.0014826	-8.87	0.001	-.017273	-.0090403
L4.	-.0060815	.0012657	-4.80	0.009	-.0095958	-.0025673
inflationrate						
--.	.2377357	.0341427	6.96	0.002	.3325311	.1429403
L1.	.293814	.0479017	6.13	0.004	.1608174	.4268105
L2.	-.5611202	.0620455	-9.04	0.001	-.7333862	-.3888542
L3.	.0465851	.0271844	1.71	0.162	-.028891	.1220611
MS						
--.	-1.51e-13	7.59e-15	-19.90	0.000	-1.72e-13	-1.30e-13
L1.	1.80e-13	1.48e-14	12.19	0.000	1.39e-13	2.21e-13
L2.	-1.91e-13	2.58e-14	-7.42	0.002	-2.63e-13	-1.20e-13
L3.	1.35e-13	1.62e-14	8.36	0.001	9.04e-14	1.80e-13
L4.	-2.25e-14	1.30e-14	-1.73	0.159	-5.86e-14	1.37e-14
gdp						
--.	1.10e-09	2.04e-10	5.36	0.006	5.28e-10	1.66e-09
L1.	-2.59e-09	2.64e-10	-9.79	0.001	-3.32e-09	-1.85e-09
L2.	1.86e-09	1.88e-10	9.94	0.001	1.34e-09	2.39e-09
L3.	-6.94e-10	1.43e-10	-4.87	0.008	-1.09e-09	-2.98e-10
L4.	3.38e-10	1.70e-10	1.98	0.119	-1.36e-10	8.11e-10
_cons	7.485306	2.156742	3.47	0.026	1.49723	13.47338

Appendix V: Data collection schedule

Years	Exchange rate	Interest rate	Inflation rate	Money supply	GDP	Security performance
1986						
1987						
1988						
1989						
1990						
1991						
1992						
1993						
1994						
1995						
1996						
1997						
1998						
1999						
2000						
2001						
2002						
2003						
2004						
2005						
2006						
2007						
2008						
2009						
2010						
2011						
2012						
2013						
2014						
2015						
2016						
2017						
2018						
2019						
2020						
2021						
2022						