RELATIONSHIP BETWEENMACROECONOMIC VARIABLES AND STOCK MARKET RETURNS AT NAIROBI SECURITIES EXCHANGE

BY

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DECLARATION

I, the undersigned, declare that this is my original work and has not been presented to any institution or university other than the University of Nairobi for examination

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This research project has been submitted with my approval as university supervisor

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DEDICATION

I dedicate this project to my mum Cecilia Nyambura   and my son Mark Mwangi.

-Thank you for your unfailing support-

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LIST OF ABBREVIATIONS

ADF   Augmented Dickey Fuller

APT   Arbitrage Pricing Theory

CAPM Capital Asset pricing Model

CBK   Central Bank of Kenya

CBR   Central Bank Rate

CMA Capital Markets Authority

CPI   Consumer Price Index

EMH   Efficient Market Hypothesis

GDP   Gross Domestic Product

NSE   Nairobi Securities Exchange

KNBS Kenya National Bureau of Statistics

VECM Vector Error Correction Model

VIF   Variance Inflation Factors

ABSTRACT

The objective of the study was to determine the relationship between selected macroeconomic variables and stock market returns at Nairobi Securities Exchange. It also aimed at reviewing the increasing body of theoretical and empirical studies that have endeavored to examine the range of magnitude and effects of macro-economic variables on the stock market returns at the Nairobi Securities Exchange.The study employed a causal research design. The target population was all the listed sixty seven firms at theNairobi Securities Exchange; the sample was represented by the NSE 20 Share Index. Secondary sources of data were employed, and data was collected on; the average treasury bill rate, money supply, the inflation rates, the GDP, the exchange rates, and the NSE 20 Share Index. The unit period of analysis was quarterly, and data was collected for the period from October 2008 to September 2018. The period comprised of 40 quarters. The study applied Granger causality tests, correlation analysis and multiple linear regression equation with the technique of estimation being Ordinary Least Squares (OLS) so as to establish the relationship of the macro-economic variables and stock market returns.The study findings were that the Granger causality test found no causality between stock market returns and the macro-economic variables employed in the study. The study also found out that a significant negative association exists between inflation and the stock market returns when correlation and linear regression analysis were conducted. However, the model developed in the study was found to be insignificant hence, it cannot be used to forecast stock market returns. The study concluded that inflation has a significant negative effect on stock market returns.The study recommended that; the governments through its various arms can device methods of influencing and stimulating the stock market. Investment banks, stock brokerage firms, institutional investors, and individual investors, can try the strategy of investing in the stock market when they anticipate a decrease in inflation because the returns are likely to increase during the period.

CHAPTER ONE: INTRODUCTION

1.1 Background of the Study

A stock market carry out a vital task in enabling mobilization and transfer of capital from surplus economic units to deficient's economic units and thus stimulates growth of industry and commerce in a country. Boubakari (2010) studied stock market importance in economic development and in his findings he reported that a long-run connection prevail between growth of the stocks market and that of economic activities. He further observed that a liquid stock market improves future prospects of an economy. Paudel (2005) reported that, stock market liquidity enable entities to acquire the capital needed, thus facilitates capital allocation, investment and growth of the economy. The stock market enables linkage of borrowers with lenders in the capital market which is a vital role in development of economy of a nation. A well functioning stocks market boost savings, efficiently allocating them to the most productive areas in the economy (Junkin,2012).

Stock price hence stock market return is high in sensitivity to changes in key macroeconomic factors i.e. forex rate, rate of interest, rate of inflation and M2 supply. In developed countries the behavior of macroeconomic indicators is closely linked to changes in stock prices (Muradoglu et al., 2000). Domestic economic fundamentals play an important role in stock price determination however, at a global level economies of countries are integrated and policies adopted by a country may affect macroeconomic variables of other countries hence the stock market returns (Muradoglu et al., 2000).This study will be anchored on three theories; the first one is the Efficient Market Hypothesis (EMH), the second one is Arbitrage Pricing Theory (APT) and the third is Capital Asset Pricing Model (CAPM)) all of the three theories support a relationship connecting macroeconomic indicators with returns at the stock

market.Malkiel and Fama (1970) in their study of the Efficient Market hypothesis stated that the price of a share is a reflection of the available information on a company's value; they further noted that it would be difficult to make arbitrage profit using already availableinformation. Ross(1976) in the study of the Classical Arbitrage Pricing Model stated that returns of an asset area function ofmacroeconomic variables.

The Nairobi Securities Exchange (NSE) is an emerging market given that Kenya is a developing country. Just like other emerging market the NSE is characterized by: few listed companies, inefficiency in information delivery, low turnover ratios and low trading volumes (Nairobi Stock Exchange, 1997). Stock market performance is dependent by a large extent on the macroeconomic indicators nature hence returns in stocks volatility determined by stock prices at the NSE is considered to be caused by macroeconomic variables, which if not controlled may results into a crisis in the stock market (Odhiambo, 1997). A given macroeconomic indicator that affects an assets cash flow expected in the future and it's required rate of return will subsequently affect stock prices hence stock market returns (Paudel, 2005).

1.1.1 Macroeconomic Variables

Macroeconomic variables refer to important factors that affect the entire economy at both regional and national level. Factors such as inflation, unemployment, economic output, savings and investments give an indication of how the economy is performing and are therefore closely monitored by the government, consumers and businesses (Khalid et al. 2012). Brinson, Singer and Beebower (1991) defined macro-economic variables as factors that include GDP, unemployment, rate of interest, inflation and exchange ratethat have relevant influence to an economy as a whole. Macroeconomics

is a division of economics dealing with decision making affecting entire economy (Akers, 2001).

Gross domestic product, inflationary rate, broad money supply, exchange rate (usd/kes) and interest rate forms the macroeconomic variables considered in this study. Inflation is persistent growth inuniversal price of commodities in a country resulting into ana rise in the cost of living, leading to a reduction in the general public living standards (Kariuki &Kagiri, 2016). In a purposeful and fixed consumption basket, inflation measures the change in prices of the commodities in the basket (Mukiza, 2011). In Kenya, the Consumer Price Index (CPI) is applied in measuring growth in prices(inflation) in the country. It measures consumer commodities average price variation on monthly, quarterly or on annual basis. Money supply refers to cash, demand deposits held by thrift institutions and commercials banks and finally government deposits held by central bank and commercial banks (Mises 1980). The study considered M2 in the economy to measure money supply. Interest rate refers to charge paid by borrower for the amount loaned by lender (Barnor, 2014). Interest rate is the price of savings arrived at the point of interaction of the curves of demand and supply of loanable funds (Anyango & Obura, 2016). Proxy for interest rate in this study is Treasury bill rate. Exchange rate refers to the amount of units of a country's currency needed to purchase another country's currency (Nisha, 2015). Rate of exchange of Kenyan shillings and United States dollar was used as a measure. The integration of various macroeconomic variables lays the foundation upon which numerous studies economics and finance are based (Fischer, 1993).

1.1.2 Stock Market Returns

Stock market returns refer to gain or loss in the value of a stock held by an investor at a stock exchange within a specified duration expressed in percentile form. It is

comprised of gains in capital and income derived from divided received from shares held (Mugambi&Oketch, 2016).Stock return is a variable that is forward-looking and incorporates expectations on future cash flows and discount rates. Return in stock market is used as an index in decision making of the investors and government, hence investment in stock market by investors of different financial capacity is possible for as long as investors achieve a return greater than their cost of capital (Wang, 2012).

A strong market is considered to be the one that integrates innovative facts on stock prices resulting into stability and accuracy in stock returns (Mwangi & Mwitu, 2015). Stockreturns is a key determinant of how the stock market is effective and efficient in the allocation of equities based on market information availability. Stock prices variations increase investor uncertainty and as a result demand and supply of stocks is affected (Taofik & Omosola, 2013). Returns in stocks is significantly influenced by rate of exchange and inflationary rates while broad supply of money, gross growth in earnings(GDP), oil prices and rates of inerest do not affect the stock returns (Sayilgan &Suslu, 2011). The NSE 20 Share index calculated as price weight mean of 20 publicly listed companies is study's measure of stock returns.

1.1.3 Macroeconomic Variables and StockMarket Returns

Macroeconomic variables regarded as fundamental and generally believed to determine stock returns in an economy are 91-day T-bill, forex rate ,inflation, a country's earnings, and government expenditure, hence change in stock prices is closely linked to the behavior of the macroeconomic indexes (Muradoglu et.al, 2000). Macroeconomic variables among them exchange rate, interest rate, supply of money, inflationary rate and Gross Domestic Product (GDP) are linearly related to returns of

stocks and therefore an investor must carefully monitor and forecast these variables when making choices with regard to investment decisions (Junkin, 2012).

According to Hosseini, Ahmd& Lai (2011), uncertainties in the stock market is caused by the movement in oil prices which makes an investor to delay their investment decisions. A rise in oil prices increases costs of transport, heating and production costs which negatively affect earnings of corporate. Fuel price increase also causes inflation which diminishes discretionary spending of consumers. Therefore, during periods of wide fluctuation in oil prices, financial risk in investments increases. A rise in money supply results into security prices being higher due to availability of increased liquidity to buy securities. Money supply in many cases causes inflation which consequently triggers interest rate increase and a fall in stock prices. Production of industries as real indicator of economic activities level, directly affect returns at the stocks market. Increase in the production of industries causes earnings of firms to rise and as a result stock prices go up as investors are more confident investing in the securities market. An increase in inflation causes the government to tighten its monetary policy resulting into a rise in the discount rate. This translates into an increase in borrowing costs which in turn reduces stock market investment causing the stock returns to fall.

Change in stock prices is as a reflection of change in investor expectation about future values of economic indicators which directly affects the pricing of stocks. Macroeconomic and financial variables do not contain much information in the prediction of the stock returns (Rangan&Modise, 2013).Economic forces affect discount rate, cash flow generated and the dividend paid by a firm, this results into a stock market systematic consequence on returns caused by the economic variables (Chen et al., 1986).The direction of the real economic activity is the same as that of

the stock returns since ex ante cash flows are positively affected by real economic activities level (Fama,1990). Stock market returns interaction with macroeconomic variables is derived through various financial liberalization measures on the stock market size relative to the world market (Bigan, 2000).

1.1.4 Nairobi Securities Exchange

The Nairobi Securities Exchange (NSE) came into existence in 1954 formed by an organization of brokers who were registered and operated under the guidance of societies Act (Ngugi, 2005). The NSE operated as an overseas branch of the London stock exchange until 1963 when Kenya gained its independence. The membership of NSE is drawn from investment banks, dealers and stock brokers (Muturi, 2014). The NSE is licensed, supervised and monitoredby capital market authority, which also approves public offers and listings. The NSE 20 share index is a weighted price computed as an average of the shares of 20listed companies which have demonstrated exemplary performance at NSE(Mutuma,2014). The NSE 20 share index tracks exemplary blue chip companies with a high profitability and dividend record. The NSE All Share Index (NASI) in the year 2008 was launched as an alternative to the 20 NSE share index. NASI measures NSE aggregate performance where all the shares traded in a day at the NSE are incorporated.

Stock market returns measured by 20 NSE share index and NASI has declined in the recent past with listed stocks in 2015 losing an estimate of 31% of their value with banking and insurance sectors being the most affected (Business Daily, 2015).In the year 2016 NSE 20 share index declined by 21.15% from 4040.75 points as at 31st December 2015 to 3186.21 points as at close of the year 31st December 2016. The

NSE All Share Index (NASI) did not perform well either as it shed off 8.48% to close at 133.34 as at end of 2016 down from 145.70 at the close of trading day in December 2015 (NSE, 2016). In year 2011 there was recorded a decrease in industry capital from billion dollars 1192.28 to 1049.56, this was due to abnormal variation in the NASI which moved from 4495 points to 3733 points (NSE, 2011).

Fluctuations in macroeconomic variables in Kenya can be linked to the poor performance of the NSE in the recent past. Interest rate capping introduced by central bank on 24th August 2016, capped lending rates of commercial banks at 4.0% above the rate charged by central bank commonly known as (CBR) and a base of 70% of the CBR on the deposits rates. The interest rate capping had negative effects on the stock returns given that on the first day of trading after the bill was passed, the NSE 20 share index hit a low of 3309.76 points after losing 152.92 points which is equivalent to 4.4% of its value (NSE, 2016). The Kenya shillings have continued to weaken against the world's major currencies such as US dollar, Euro and Sterling Pound with Kenya shillings losing an approximated 37.2% of its value against the US dollar over the past ten years (CBK, 2017). This has lead to mass exit of foreign investors who fear diminution of their capital and has further worsened stock market returns at the NSE. The GDP has stagnated at below 10% caused majorly by influx of imports and reduced exports. In year 2016, when the GDP growth was only 5.6%, the NSE 20 Share Index lost 21.15% to close at 3186.21 points. Vector (2005) observed that, stock market that is organized and managed well will cause growth in the economy through increase in financial assets liquidity, promotion of wise investment decisions, diversification of risks at global and domestic level and influence of better corporate governance.

1.2 Research Problem

The study's objective is to determine the relationship between macroeconomic variables and stock market returns at Nairobi Securities Exchange. This study aimed at establishing whether volatility in stocks returns is any way related to fluctuations in macroeconomics variables. Macroeconomic variables refer to factors such as inflationary rate, , economic output, broad money, savings, investments, forex rate, unemployment, interest rate and gross domestic product which give an indication of how the economy is performing at a given time period (Brinson *et al.*1991). Stock market returns refer to gain or loss made at the stock market measured by an index such as NASI or the 20 NSE share index (Mugambi & Oketch, 2012). The Securities Exchange of Nairobi is part of the capital market which facilitates issuance, purchase and sell of financial securities through stockbrokers or dealers (Mutuma, 2014)

The stock market returns has been on a decline as indicated by the 20 NSE share index and the All Share NSE Index. This has been as a result of volatility in the price of publicly listed stocks. In the year 2016 a decline of 21.15% and 8.48% was recorded in the 20 share and All Shares NSE Indexes. In the last ten years Nairobi Securities Exchange has seen exits of some of the listed companies such as Access Kenya, Rea Vipingo and Unga group. There has also been no notable Initial Public Offer after that of Safaricom and Kengen this has been contributed by low intake of new firms at the Nairobi Securities Exchange. Fluctuations in macroeconomic activities have been experienced in the Kenya economy with interest rate being capped at 14% down from 26%. The Kenyan shillings has lost an approximated value of 37.2% against the US dollar over the past ten years where it was trading at 73.52 in October 2008 and as October of 2018 trading at 100.9.The rise in the price of basic commodities such as food and oil has caused prices of goods and services to persistently rise leading to inflation.

Global studies include that of Talla (2013) who examined effects changes in macroeconomic indicators have on stocks returns at Stockholm stock exchange, the findings were that inflation showed negative significance effect on stock returns while a positive influence was shown between money supplied and stock returns, the result contradict those of Issahaku *et al.*(2013) who examined relationship of a causal nature linking macroeconomic indicators to stock returns at securities exchange of Ghana and found a positive relationship of a long-run nature between foreign direct investment(FDI), money supply, inflationary rate with stock returns.

Local studies on the relationship of macroeconomic indexes and NSE stocks returns include that of Sakwa (2008) and Kirui (2014), while the former found interest rate ,supply of money and exchange rate to hold a direct relation with stock returns while finding GDP, and inflationary rate to be indirectly related with stock market returns. The latter found exchange rate to be the only one with negative effects on stock returns while inflation, treasury bill rate, GDP, were found as being unimportant in explaining stock market returns. Nasibu (2013) studied the effects of inflationary rate, forex rate, GDP an expenditure of the government on stock market returns at NSE, he found a relationship of a negative nature connecting inflation and interest rate with stock market returns while he found government spending and GDP to have nil significance effects on returns of stocks. The findings of Nasibu contradicted those of Kirui (2014) who found 91-day Treasury bill rate and GDP as being not being important in explaining returns of stocks, he however established exchange rate hold a negative relation with returns of stocks. Lack of consensus from the global and local studies on the effects macroeconomic indicators have on stock returns creates a research gap that requires further study.

The available literature has immensely contributed to knowledge build up in the area of macroeconomic indicators and returns at the stock market. However, the literature findings have had mixed results as the number of variables examined, study period and the level of growth of the stock market is different. Therefore, generalization of findings is not possible given uniqueness of each particular market considering investor type, and procedures and regulations governing each market. This study aims at filling the gaps left by other researchers who have not considered all the five macroeconomic variables in a single study. This study also covers the period within which significant fluctuations in key macroeconomic variables have been experienced which includes interest rate capping, depreciation of the exchange rate and a rise in oil prices leading to cost-push inflation. The study is in search of an answer to the question, does a relationship connecting macroeconomic factors to stock market returns exists?

1.3 Research Objective

To determine relationship between selected macroeconomic indicators and stock market returns at Nairobi's Securities Exchange.

1.4 Value of the Study

Government organs such as Central Bank and capital market authority will find the study of use in the formulation of policies on interest rate, exchange rate and inflation which are macroeconomic variables with a direct impact on stock returns. Hence the government will promote a stable investment environment in the Stock Market through control of excessive stock volatility. Investors will find the study important as it will raise their power in returns prediction, hence will make sound and quality investment decisions.

The findings of the study will form a future reference to scholars, students and researchers who will find the study useful in advancing knowledge in similar or interrelated field. The study will also support scholars with additional extents when carrying out other correlated studies. Managers of listed companies will find the study useful as they will make informed management decisions which will lead to wealth maximization to the shareholders. Listed companies and those seeking to be listed will benefit from the study as they will improve performance and ensure sustainability

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

Relationship of macroeconomic indexes with stocks returns is finance area that has attracted many researchers worldwide who have studied the topic in-depth. Theoretical literature on stock market returns have been provided by among others Sharpe (1964), Lintner (1965) and Ross (1976). However, the models that they derived are basedon assumptions which have weakness. Therefore, practical application and implementation of these models in real life situations have encountered difficulties brought about by the key weaknesses in the models. Nonetheless, the models lay a firm theoretical foundation upon which stock market movement can be associated with effects of the macroeconomic factors.

2.2 Theoretical Framework

This study adopted Asset Pricing Theory (APT), Capital Asset Pricing Model and Efficient Market Hypothesis CAPM) to underpin the relationship linking macroeconomic variables with stock market returns.

2.2.1 Capital Asset Pricing Model

The Sharpe's 1964 model of Capital Asset Pricing investigates effects of volatility on return expected on an investment compared with portfolio developed from the market. The model in determining an asset's returns considers only those risks that cannot be diversified known as systematic risks. In CAPM an asset's expected return is arrived as an asse's historical return rate variance with its asset class. Systematic and specific risks are the two types of risks that the portfolio risk is decomposed into. Systematic volatility is the general market volatility of every asset that forms the market

portfolio. Unique risk of individual asset forming the portfolio is called the specific risk.

The CAPM model states that investors that take systematic risk are the ones compensated in the market and not those taking specific risk. The basis of the argument is that specific risk can be eliminated by way of diversified portfolio. Where an investor holds market portfolio each of the asset contains specific risk which is eliminated by diversification hence an investor's net exposure is only the systematic risk. Investors choose mean-variance-efficient portfolios that lie along the efficient frontier (Fama & French, 2004). One of the assumptions of CAPM is that a mean-variance-efficient portfolio lies on the efficient frontier and equals market's portfolio.The outcome of this assumption according to Fama and French(2004) is that if market asset equilibrium is to be maintained, then the expected returns and risk of an efficient portfolio must hold for the market portfolio as well.

CAPM theory calculates stock returns as a product of riskless rate of return, beta and market return. When beta equals zero an asset returns will be equivalent to return of the riskless rate and when beta equals one asset returns will be equal to market portfolio returns. In relation to this study the theory explains why fluctuations in macroeconomic variables causes stock returns to deviate from returns of the riskless rate and returns of market since beta falls or rises in line with fluctuations in macroeconomic variables.

2.2.2 The Arbitrage Pricing Theory

Ross 1976 theory of Arbitrage Pricing analyzes sensitivity of a security return to multiple macroeconomic factors. Economic forces have an impact on future dividend payments, cash generation ability of a firm and discount rates, as such economic

variables can be said to have a systematic consequence on stock returns (Chen, Roll & Ross). APT core idea is that only few systematic influences affect securities average returns in the long-term. The Multi-factor model upon which APT is based permits many measures of an asset's systematic risk (Jecheche, 2006). An asset's return sensitivity to each of the corresponding economic variable is captured by the measure. When assets lack specific risk the intuition for the result would be that, prices of all assets move lockstep with each other. Chen et al., (1986) investigated the APT empirically, observations were that fundamental valuation model determines asset returns and hence, a stock's return will be the expected future dividends discounted correctly. Systematic influences should therefore be included in the choice of factors that affects future dividends i.e. investor's expectation and discount rate of future cash-flows.

Macroeconomic variables in equity market are considered part of risk factor as returns in stock, are exposed to economic news of systematic nature and the pricing of stocks is dependent on their level of exposure. The APT model has been criticized on the basis that it fails to lay a theoretical foundation on the number of factors that ought to be incorporated in determining the asset's return adjusted for risk. Methodology issues related to model estimation is another criticism of the APT model. Cheng (1996) observed that the linear regression includes a numeral of independent variables to which the model may be sensitive. However, APT applicability in determining returns of an asset has been found to be valid. APT theory calculates asset returns by considering multiple factors that captures systematic risk of an asset. This study considers five macroeconomic variables which the APT theory will help explain how each affects the expected stock market returns at the NSE.

2.2.3 Efficient Market Hypothesis

The hypothesis other name is random walk developed in 1960 by Eugen Fama, driven largely by a thesis of a French Mathematician Louise Bachelier. Market efficiencies are of three type's the initial one is weak form, next is semi-strong form and the final one is strong form (Fama, 1991).The weak form is the first type of market efficiency and states that, the prices of stock contain historical information i.e. volume trading information and past security prices. The semi-strong states that the security price incorporates information in the weak form and all publically available information. In strong form security prices incorporates both publically available information and private information which has leaked out.

According to this theory an asset's price is a reflection of all available relevant information on the asset intrinsic value. In stock market the theory supports the accurate and efficient pricing of company shares on the basis of information available in the market. If new information is received in the market concerning a share of a company and its performance that particular information will quickly and rationally be reflected in the price of a trading share. If fully efficient stock market were to be achieved, expected returns on a stock would be the matching and it only unanticipated random information that would reason the price of a stock to deviate from the expected average yields. Market efficiency that is extremely high is discouraged since it would eliminate profitable opportunities that motivate security analyst to produce information (Sanford & Joseph, 1980).Nairobi Securities Exchange is efficient in the weak form since the stock prices incorporate all publicly available information. The theory helps to explain why it is impossible to make arbitrage profit from the NSE since there are no mispriced securities given that, information on macroeconomic fluctuations is already incorporated in the stock prices. Hence stock market returns

will always be consistent with the stock price volatility caused by fluctuations in macroeconomic variables.

2.3 Determinants of Stock Market Returns

2.3.1 Exchange Rate

Depreciation of a country's own currency increases appetite, for its exports in the international-global market. The outcome being an increase in cash flows to the domestic firm's causing a rise in stock prices. According to (Geske& Roll, 1983) of all the macroeconomic variables, exchange rate has been observed to affect stock returns through trade effect. Depreciation of a country's currency has short-run and long-run both being negative unfavorable effects on the stocks returns. Currency appreciation for an export-oriented country causes export from its country to be expensive hence less competitive in the global market. The companies involved in exports in such a country reports reduced profits which makes them less attractive to a potential investor leading to a fall in their share prices hence share return (Muthike & Sakwa, 2012)

2.3.2 Money Supply

Money supply can affects stock market returns optimistically or pessimistically. Fama (1981) observed that, growth in broad supply can consequence into inflation. A swell in money supply causes the rate of discount to fall thus reducing prices of stocks. The negative effects supply of moneyhas on prices of stocks can be mitigated through thestimulusprovided, by growthin money which increases flow in cash and a rise in stock prices (Mukherjee & Naka, 1995). Anticipative changes arising from money supplied in an economy have been observed as not having any effects on financial

assets price development (Bernanke, 2003). Money supply is a useful tool in the prediction of stock market development (Gupta, 1974).

2.3.3 Interest Rate

Real interest rates increase, causes a drop in a firm's present value of cash flows expected in the future, which results into a decline in the prices of stocks. Higher real interest rate however, stimulates capital inflow into a country causing the exchange rate to fall (Rashid and Karachi, 2007). Therefore, Movement in real interest rate is an important factor in explaining the positive relationship that exists between average level of stock value and exchange rates. The present value of cashflows reduces during times of high interest rate resulting into opportunity cost rise of holding cash. As a result investors substitute investment in stocks with other interest bearing securities with a high return (Rehman, Sidek & Fauziah, 2009). According to Barnor, (2014) investors modify their investment in times of high interest rate and shift from capital market to fixed income securities.

2.3.4 Inflation

High rate of inflation creates an environment of uncertainty in the economy and as such investors fear investing in capital goods (Adhikari, 2014). A cost of living that is on the rise due to high inflation causes resources to be spent on consumption rather than investment. According to Adam &Twenoboa (2008) the government responds to an increase in inflation by tightening economic policies, the outcome of such a move by the government is a boost in the risk-free ostensible rate subsequently discount rate raises. Stock markets perform well when the inflation is low and the economy is strong (Munene, 2007).

2.3.5 Gross Domestic Product

Current stock levels as measuredby Gross Domestic Product are shown to have a positive relationship with real economic activity future levels (Geske& Roll, 1983). Gross Domestic Product (GDP) levels impact on corporate profitability hence influence stock market returns. Stock prices will rise during periods of economic expansion, as a result of an increase in output which increases future cash expected. During a recession an opposite effect will be experienced (Kirui, *et al* 2014)

2.4 Empirical Review

Studies carried out by researchers and scholars on the relationship linking macroeconomic variables with stock market returns have culminated into detailed examination involving both emerging and developedstock markets as evidenced by the global and local studies.

2.4.1 Global Studies

Ahmed (2008) studied the Indian stock market in an examination of the relationship nature that connects stock market returns in India with selected macroeconomic indexes. He applied johansen co-integration model in analyzing time series monthly data from year 2000 to 2010. Macroeconomic variables studied were 91 day T-bill rate, industry's production exports, broad money supplied, foreign direct investments and forex rate. A relationship of a long-run nature was shown to exist between stocks returns and broad money supplied while 91 day T-bill was found as not having any relationship with stock market returns. The study failed to include Gross Domestic Product and inflation which are key macroeconomic variables.

Zakaria & Shamsuddin (2012) sought to examine macroeconomic variables relationship with volatility of returns in Malaysian stock market. Five key

macroeconomic indexes namely: forex rate, GDP, 91 day T-bill rate, inflationary rate and broad money supplied were studied. Time series month by month data commencing January 2000 to January 2012 was used while Garch (1,1) was employed in estimation. Interest rate was the only variable seen to granger cause volatility of returns at the stock market. All the macroeconomic variables however, when considered as a group were shown not to possess significant relationship with stock market instability. The study only considered two years which is a very short duration given that the impact of fluctuations in macroeconomic variable is felt over a long period of time.

Talla (2013) conducted an investigation on the effects that changes in macroeconomic factors have on stock prices at the stock exchange of Stockholm. The macroeconomic variables considered in the study were inflation, supply of money and rate of interest .Multivariate regression model and unit root test were computed by use of ordinary least squares method. Tests were conducted on monthly time series data for period 1993 to 2012 using granger causality. In the findings of the study it was only inflation that was found to have a significant effect of a negative nature on returns at Stockholm's stock exchange, a non-significant positive effect between stock market returns and money supply was found while interest rate was shown not to have any importance in the determination of the stock returns. The study though conducted over a 10 year period considered only three macroeconomic variables which were not sufficient if an acceptable conclusion was to be arrived at.

Gay (2008) studied China, Russia, Brazil and India. He investigated the relationship linking stock index price with two macroeconomic indicators namely; rate of foreign exchange and price of oil. He used ARIMA's Box-Jenkins model. Findings were that there existed nil significant relationship connecting each of the country's exchange

rates and price of oil with index prices of stocks. In his conclusion he stated that China, Russia, Brazil and India exhibited the weak form of market efficiency. The study though conducted on a number of emerging markets failed to consider any African country given that, most of African stock markets are categorized as emerging. The study also considered only two macroeconomic variables i.e. oil price and exchange rate.

Osisanwa and Atanda (2012) applied ordinary least square techniques in examining stock market returns determinants in Nigeria. They used yearly data for the period starting 1984 and ending 2010. The variables used included broad money, consumer price index (CPI), exchange rate real per capital income and Treasury bill rate. In their findings they reported that, previous stock market returns, exchange rate, supply of money and 91 day T-bill rate are the key stocks returns determinants in Nigeria. The study though covered a 26 year period its main shortcoming was use of yearly data and only 4 macroeconomic variables. The study used yearly data and given the nature of macroeconomic fluctuations, yearly data may fail to capture important information of events that take place in between the year.

Shoil et al, (2012) studied three stock exchanges which are Lahore, Karachi and Islamabad Stock Exchanges. Johansen co-integration technique was applied in examining monthly data which ranged from November of 1991 to June of 2008.The key variables used in the study were industry's production index, inflation, M2 money supplied , forex rate and three months real effective treasury bills rate. The findings were that in all the three market Industrial production has long run impact on stock prices. Treasury bills rate had a mixed effect on all the three market, expect for Islamabad stock exchange. Exchange rate was seen to positively affect the stock returns of the other two markets. Money supply was found to negatively affect the

stock returns of all the three markets. Consumer price index in Karachi stock market was found to positively affect the stock returns.

Vygodina(2006) using data for the years 1987 to 2005 studied the relationship nature that connects exchange rate with stocks prices for large and small capitalized stocks. He applied Granger causality methodology. He reported Granger causality between large-capitalized stocks and exchange rate, small-capitalized stocks and exchange rate were found not to have causality. The study only considered only one macroeconomic variable namely exchange rate and considered large-cap and small-cap stocks leaving out middle-cap stock.

Nishat and Shaheen (2004) studied data between years 1973 and 2004.The methods employed were Augmented Dickey Fuller(ADF) test, tests of Granger-causality, vector error correction model and unit root test. Their aim was to find out whether the five macroeconomic variables under study namely money market rate, inflationary rate, investment earnings value, indexed industrial production andsupply of money are connectedto stock market returns.Their findings were that a significant connection of a positive nature prevail between stock market returns and investment earnings value, money supplied, consumer price and indexed industrial production. Between money market rate and stock market returns there was observed to be a reverse causality. There was also observed to be considerable industrial production index and comparative lag lengths which connect oscillation in the stock market returns withthe real economy. The study considered five macroeconomic but left out exchange rate, 91-day T-bill and GDP.

Issahaku*etal.,* (2013) studied Ghana stock exchange in examining macroeconomic variables and its causality with stock market returns. Foreign direct investment (FDI),

Treasury bill rate, money supply, inflationary rate and exchange rate were studied. Time series monthly collected data, for the periods December 2010 and January 1995 while ADF, VECM and granger causality were utilized in analyzing the data. A relationship of a long-run nature was established connecting stock returns with inflation, FDI and money supply. The study did not consider inflation and Gross Domestic Variables and hence the long-run relationship that these two factors have on stock market returns were not captured.

Hsing, (2011) in his study used the model of GARCH to investigate relationship nature linking macroeconomic factors to Hungarian stocks index. He concluded in his findings that the real GDP, German stock index, ratio of state debt stock to the GDP, and thenominal effective exchange rate each has an effect of a positive nature on stock market index. M2 money supply, Euro zone bond yield, real interest rate and expected inflation rate were each found be negatively related to stock market index. The study did not consider inflation and interest rate which are key macroeconomic variables.

2.4.2 Local Studies

Nasibu (2013) used inflation, interest rate, GDP and governments spending to look at the effect these four macroeconomic variables have on market returns at the Nairobi Securities Exchange. He applied ordinary least square method to analyze monthly time series data for periods 2006 to 2012. Negative relationship was found to link inflation and interest rate with stock market returns, while government spending and GDP were found to posses nil significant impact stocks returns volatility. The study was done at a period when fluctuations in macroeconomic variables were not as intense as they are presently.

Kirui (2014) studied the relationship between 91-day T-bill rate, GDP, forex rate and returns in stocks traded at NSE. The intention was to determine the response stock returns has on fluctuations on the four each of the macroeconomic index. To capture volatility persistence and leverage effects at the NSE the T-Garch model was applied on quarterly time series data for twelve years starting year 2000 to year 2012. While 91-day Treasury bill and GDP were found as not being important explaining stocks returns, forex rate was shown to possess relation of a negative nature with stocks returns. The study considered only three macro-economic variables namely Treasury bill rate, GDP and Exchange rate and left out inflation and money supply.

Sakwa (2008) studied the nature of relationship linking macroeconomic factors with stock market return at the NSE. M2 supply, real exchange rate, inflationary rate, GDP, and rate of interest were the considered macroeconomic indexes in the study. Ordinary least squares (OLS) method was employed on time series annual data for years 1976 to 2008. Money supply, exchange rate and rate of interest were each discovered to be positively related with stock market returns. However, inflation and GDP were each shown as being negatively related with stock market returns. Though the study covered a period of 32 years, since 2008 new developments has taken place with regard to stock returns and Macroeconomic variables that need to be captured in a new study.

Gatebi (2013) in his study investigated the effects macroeconomic factors have on instability of stocks returns at the NSE. The macroeconomic indicators studied were money supply, inflation rate, economic growth, interest rates fluctuations. E-Garch was applied to analyze monthly data series period January 2007 to December 2011. Findings were that, a negative correlation was found between all the macroeconomic indicators and common stock returns. The study failed to consider exchange rate

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which is a key macroeconomic factor given exchange rate fluctuations have been experienced in Kenya in the recent past.

Ouma & Muriu (2014) investigated effects macroeconomic factors have on stocks returns in the Kenyan context where they used CAPM and APT framework. They applied ordinary least square model on a monthly time series 10 year data commencing December 2003 and ending December 2013. Macroeconomic variables under study included inflationary rate, Treasury bill's 91- day rate, and money supply and Kenya exchange rates with U.S Dollar. The findings were that, exchange rate has a negative impact on stocks returns. Inflationary rate and money supplied were each found to possess a positive impact established as being significant on stock returns. Interest rate was the only variable not found imperative in   long-run returns determination at the NSE.

Chirchir (2014) used Toda and Yamamoto method to perform causality test for existence of relationship connecting interest rates with stock market prices. He used NSE 20 share index and interest rate data collected from NSE and CBK respectively for the periods October 2002 and September 2012. He established in his findings an insignificant negative relationship connected share price with interest rates. The study considered only one macroeconomic variable namely interest rates.

Olweny & Omondi(2011) investigated the impact fluctuations in forex rate, inflationary rate and interest rate have on oscillations in stocks returns at NSE. E-Garch and T-Garch models were employed on time series monthly 10 year data for periods beginning January 2001 ending December 2010. Study findings were that returns on stock market were leptokurtic and symmetric and not normally distributed. All the three macroeconomic variables studied were observed as having effect on

stock return volatility. Further, the study identified exchange rate as having a relatively low but significant effect on stock returns and was also found to have low volatility persistence. Leverage effect was found on the study with implication that risk rises more during a large fall in price than during a rise in price of the same degree. The study failed to include money supply and Gross Domestic Product which are key macroeconomic factors.

2.5 Conceptual Framework

```
┌─────────────────┐
│ Exchange rate   │──────────────┐
│                 │              │
│ (Quarterly)     │              │
└─────────────────┘              │
                                 │
   ┌─────────────────┐           │
   │ Money Supply    │───────────►
   │                 │           │
   │ (Quarterly)     │           │          ┌──────────────────────────┐
   └─────────────────┘           │       ──►│ Stock Market Returns     │
                                 │          │                          │
                                 │          └──────────────────────────┘
   ┌─────────────────┐           │               Dependent Variable
   │ Inflation       │           │
   │                 │───────────►
   │ (Quarterly)     │           │
   └─────────────────┘           │
                                 │
┌─────────────────┐              │
│ Interest Rate   │──────────────►
│                 │              │
│ (Quarterly)     │              │
│                 │              │
└─────────────────┘              │
                                 │
┌─────────────────┐              │
│ Gross Domestic  │              │
│ Product         │──────────────►
│                 │              │
│ (Quarterly)     │              │
└─────────────────┘
 Independent Variables
```
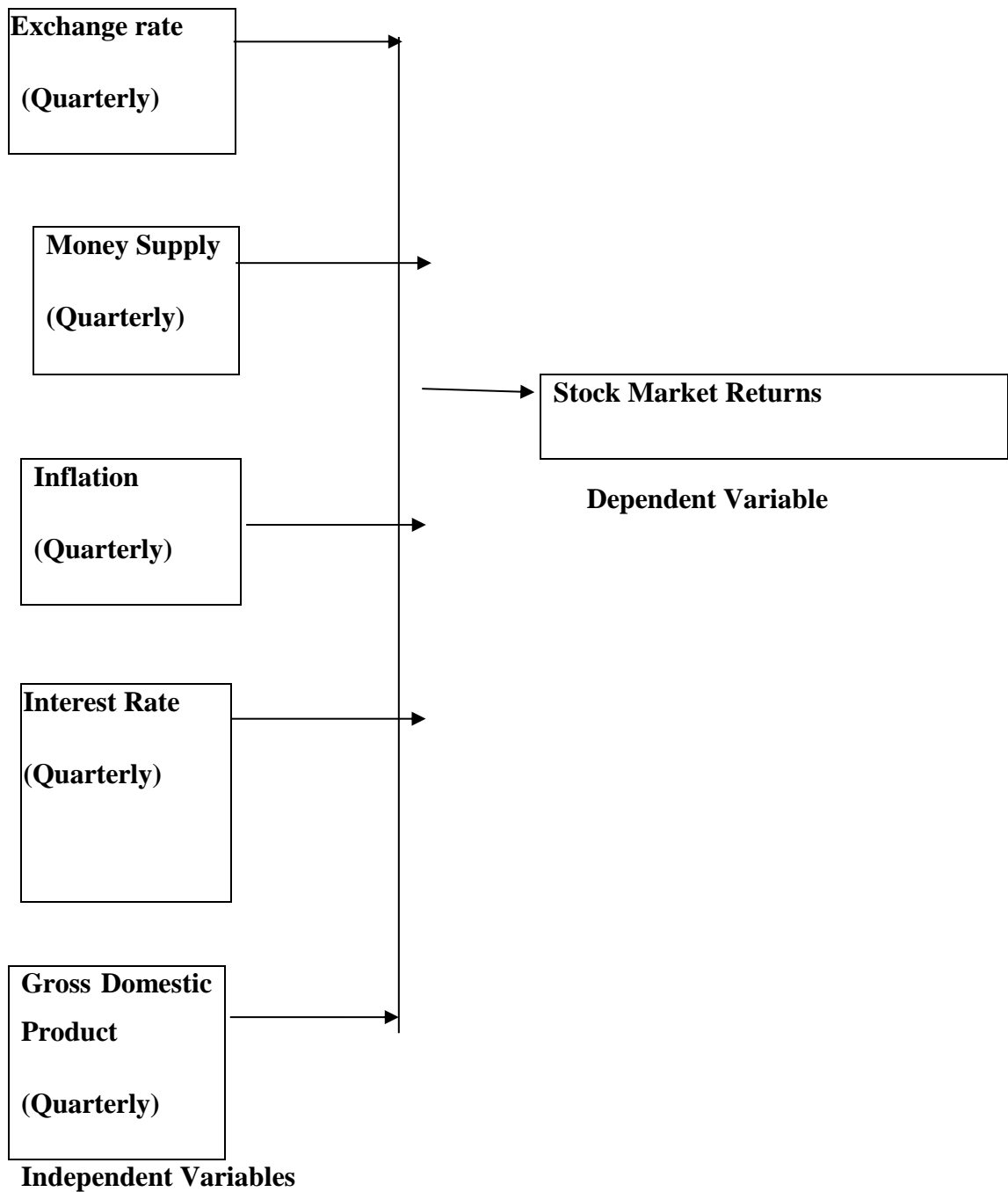
Figure 2.1: Conceptual Framework

2.6 Summary of the Literature Review

While the theories considered in this research show a relationship exist that link

macroeconomic variables with stock market returns, they fail to state how many

macroeconomic factors should be incorporated in a study for reliable results to be achieved. Thus, a vast range of macroeconomic variables have been used by different researchers as evidenced by empirical studies reviewed. While investigating the consequence of macroeconomic indexes on returns of the stocks at NSE, Olweny & Omondi (2011) used three variables which are Treasury bill's 91-day rate, exchange rate and inflationary rate. Sakwa (2008) used five variables namely: GDP, inflationary rate, , Kenyan exchange rate with United States and money supply while Gatebi (2013) used four variables namely money supplied, economic growth rate, inflationary rate and Treasury bills 91-day rate.

There also lacks a definitive rule provided in the selection of an appropriate model to use the examination the relationship that link macroeconomic indicators to stocks returns. As a result scholars have ended up applying models such GARCH models, VECM method, Granger causality tests, VAR framework, ARDL method and co-integration tests. Ahmad, (2015) while studying relationship of a casual nature connecting stocks returns with macroeconomic factors in Abuja Nigeria he applied ARDL method in analysis of data while Zakaria & Shamsuddin (2012) investigating the relationship linking macroeconomic variables with returns at the Malaysian stock market applied Garch (1, 1) in data analysis. Literature review on developed markets has shown that the stocks returns are influenced by the movement in macroeconomic variables. However, results on emerging markets is inconclusive.The empirical studies reveal either a negative or positive correlation that macroeconomic indexes have with stock market returns .However; the findings from the empirical studies have given mixed resultshence no consensus have been arrived at. The specific nature of the relation is not yet determined given that limited research exists for emerging market like NSE. This study aims at filling the gaps.

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

The chapter elaborates on research design utilized in the study, techniques of data collection applied and data analysis techniques.

3.2 Research Design

Research design regards a detailed outline of how the research is undertaken and procedures that are used to collect and analyze the data (Gall et al. 2006). A casual research design was employed in this study to explain the association that links macroeconomic variables with stock returns. Descriptive statistics was used to arrive at the objectives of the study. Mean and standard deviation techniques were carried out to establish the nature and basic characteristics of the variables.

3.3 Data Collection

Data collection is the procedure in which data is gathered and measured with a view of supplying answers to questions arising from the exploration being undertaken (Flick, 2009). This study utilized secondary data where quarterly data for a five year period starting October 2008 ending September 2018 was collected and analyzed. All the companies in the NSE 20 share index were included in determining the index for the period under review. Data on Interest rate, forex rate and money supplied were acquired from the CBK. Data on stock market returns as referenced by 20 NSE share index was acquired from NSE. While data on inflationary rate and gross domestic product, was obtained from Kenya Bureau of Statistics.

3.4 Diagnostic Tests

Diagnostic tests on normality, linearity, and homogeneity and sample adequacy wascarried on the collected data to establish its suitability in the formulation of multiple linear regression model.Normality was tested by Shapiro wilk which though common, fails to work well where large amount of data is involved and as such was supplemented by Kolmogorov-Smirnov test which is suitable for testing distributions of Gaussian nature which have specific mean and variance. Linearity in an equation shows that between the dependent variable used in the study and the independent

variable a direct proportionate relationship exists, such that a change of a given magnitude in independant variable results into correspondent changes in the dependent variable (Gall et al. 2006). Linearity and homoscedacity were tested usingscatter plot diagram.

Adequacy of sample data was tested usingtwo methodsnamely Kaiser-Meyer-Olkin measure (KMO) and Bartlett's test of sphericity. A variation of zero to one in KMO statistic tests represents the extent by which a variable can be predicted without the results being influenced by errors arising from another variable. Tests on Multicolinearity was carried out using variance inflation factors (VIF) to determine whether the independent variables considered in this study are significantly correlated with each other. According to Grewal *et al*., (2004) the main sources of multicolliearity are small sample sizes, low explained variable and low measure reliability in the independent variables. Unit root test was performed on the time series data to circumvent spurious regression results. The aim of conducting unit root test was to make sure the macroeconomic indexes under study were of order (1, 1) before estimation procedure could be proceeded into.

3.5 Data Analysis.

 In this study SPSS statistics analysis software version 19 will be employed in conducting quantitative analysis. Runs for the Granger causality tests will be done by use of Eviews. Regression and correlation analysis will be carried out to determine

whether macroeconomic indexes posses effect of a significant nature on returns of NSE stocks. The stock market return was regressed against the five predictor variables i.e. Treasury Bill's 91-day rate, GDP, Inflationary rate, money supplied and exchange rate. Regression model was formulated which determined whether all the model assumptions were valid before inferential statistic was performed.

Table 3.5 Definition and Measurement of Variables

Type	Factor	FactorMeasure	Explanation
Dependant Variable	NSE Stock Returns	$Rt=LnP_t-LnP_{t-1}$ [NSE20 SHARE INDEX]	Stock Market Return at NSE. 20 companies Weighted market capitalization index .Quarterly average indices used as its measure
Independent Variables	Treasury Bill Rate	$\Delta LnTBRt$	Quarterly average treasury Bill Rate used as a measure.
	Gross Domestic Product	LnGDPt [Kenya Shillings]	Final output total market value produced in the country. Measured quarterly.
	M2 money supply	$LnM2$[Kenya shillings in millions]	Quarterly measure of M1 and Long-term money supply.
Q	Exchange Rate	$LnER_t$(Percentage)	Exchange rate of KES and USD used as a measure
	Inflation	$LnIFL(Percentage)$	Measured by CPI

3.5.1 Tests of Significance

Significance of the individual co-efficient was established by carrying out T-test while significance of the overall model. To establish the significance of individual co-efficient T-test were conducted while F-tests were employed to ascertain the overall model's significance. The nature as well as the direction of the relationship was determined through correlation coefficient while the strength of the relationship was established through coefficient of determination.

CHAPTER FOUR: DATA ANALYSIS, RESULTS AND DISCUSSIONS

4.1 Introduction

In this section, a exhibition, interpretation and discussion of the findings are done. The chapter will be divided into four sections. It will include; descriptive statistics, diagnostic tests, inferential statistics, and the interpretation and discussion of findings. In summary, the chapter showcases data scrutiny, presentation, and interpretations of the study.

The undertaking analyzed impact of the macroeconomic variables that include; Treasury bill's 91-day rate, money supplied, GDP, exchange rates, and inflationary rate on the stocks returns.The average quarterly Treasury bill's 91-day rate was used as stand-in for real interest's rates with Consumer Price Index as standing-in for inflationary rate. The study covered forty quarters, from October 2008 to September 2018. Data will be obtained from the CMA, NSE, CBK and KNBS.

4.2 Descriptive Statistics

A descriptive study describes a matter by establishing an outline of a collection of glitches, individuals, or happenings, by collecting facts and the organization of the frequencies of research variables. It provides a range of research objectives such as; explanation of an event or physiognomies linked with a matter population, approximation of extent of the populace that possesses these features, and unearthing of linkages amongst varying variables (Ngechu, 2004). In this study, design of descriptive research was selected as it will enable the generalization of findings of population; it will allow analysis and relation of variables.

Table 4.1: Descriptive Statistics

	Returns (R_t=log (SI/SI(-1)))	Interest Rates (Log TBR_t)	GDP (Log GDP_t)	Money Supply (Log M2)	Change in Exchange Rates (Log (ER_t / ERt-1))	Inflation (Log I_t)
N STATISTIC	40	40	40	40	40	40
MINIMUM STATISTIC	-0.10706	-1.70721	-0.12853	-0.1139	-0.03964	-1.47712
MAXIMUM STATISTIC	0.096534	-0.7105	-0.10557	-0.09249	0.050813	-0.717
MEDIAN STATISTIC	-0.00253	-1.01063	-0.11029	-0.10058	0.00196	-1.16204
MEAN	-0.00512	-1.05868	-0.11071	-0.10135	0.003967	-1.15498

STATISTIC						
STANDARD DEVIATION	0.044897	0.197263	0.004026	0.00666	0.014975	0.202478
SKEWNESS	-0.07737	-1.79246	-2.18264	-0.39953	0.656443	0.602094
KURTOSIS	-0.13742	4.042554	8.800012	-1.10978	3.49182	-0.20437

From the above findings in Table 4.1, theuppermost value for the stock returns is 9.6% while the lowest value is -10.706%. The following measures of central tendency were exhibited; a mean of -0.512%, and a median of -0.253%.Also, the value of the standard deviation depicts variability in the stock returns of ±4.49%. The data in the series has a normal distribution because it has skewness ranging from -0.8 to +0.8, and a kurtosis within the range -3 to +3.

The results indicate that the data in the interest rate series does not exhibit normal distribution because its skewness lies slightly out of the array of -0.8 to +0.8, and the kurtosis out of the range -3 to +3. The data in the GDP series does not also exhibit a normal distribution because it has skewness that is out of the array of -0.8 to +0.8, and a kurtosis out of the array of -3 to +3.

The money supply and inflation data series is normally distributed because their skewness lie between the array of -0.8 to +0.8 and kurtosis within the range of of -3 to +3. The final results from the findings point out that the uppermost value of the change in forex rate variable is 5.018%, while the lowest value is -3.96%. The following measures of central tendency were exhibited; a mean of 0.397%, and a median of 1.96%.Also, the value of the standard deviation depicts variability in the variable of ±1.498%. The data in the series does not have a normal distribution because it has kurtosis that lies slightly out of the range of -3 to +3. However, its skewness lies within the range of -0.8 to +0.8.

4.3 Diagnostic Tests

Diagnostic tests carried out in this study included; normality tests, linearity tests, homogeneity tests, sample adequacy tests, multicollinearity tests, homoscedacity tests, and unit root tests. Normality test were performed using Shapiro wilk test which was supplemented by the Kolmogorov-Smirnov test. The linearity and homoscedacitytests were conducted by use of scatter plots diagrams. Adequacy of sample data was tested using two methods namely; Kaiser-Meyer-Olkin measure (KMO) and Bartlett's test of sphericity. Tests on Multicolinearity of data were carried out using variance inflation factors (VIF) and the. Unit root test was also carried out to avoid spurious regression results.

4.3.1 Normality Tests

For the data series of stock returns, the findings outcome is as below displayed in Table 4.2

Table 4.2: Stock Returns Test for Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	Df	Sig.	Statistic	df	Sig.
Stock_Returns	.091	40	.200[*]	.985	40	.863

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

The H0 hypothesis is that the data has a distribution that is normal. Since the p value in both tests has a valuesuperior than the α (0.05), The H0 hypothesis therefore is not rejected. Hence the data series is normally distributed.

For the data series of treasury bills rate, the outcomes are displayed in Table 4.3 below.

Table 4.3: Treasury Bills Rate Test for Normality

	Kolmogorov-Smirnov[a]	Shapiro-Wilk

	Statistic	Df	Sig.	Statistic	df	Sig.
LTBR	.244	40	.000	.780	40	.000

a. Lilliefors Significance Correction

Since the p value in both tests has a valuesmaller than the α (0.05), The H0 hypothesis is as such rejected. Hence the data series is not normally distributed.

For the data series GDP, the magnitudes are exhibited in Table 4.4 in the subsequent page.

Table 4.4: GDP Test for Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	Df	Sig.	Statistic	df	Sig.
LGDP	.108	40	.200[*]	.826	40	.000

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

The p value for the Shapiro-Wilk test is less than 0.05, but the one for the Kolmogrov-Smirnov test is greater than 0.05. Since the later test is more conclusive, then the H0 hypothesis is not rejected and hence the data sequence is normally distributed.

For the data series money supply, the findings outcome areas below exhibited in Table 4.5 .

Table 4.5: Money Supply Test for Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	Df	Sig.	Statistic	df	Sig.
LMS	.127	40	.105	.925	40	.011

a. Lilliefors Significance Correction

The p value for the Shapiro-Wilk test has a value less than 0.05, but the one for the Kolmogrov-Smirnov test has a value greater than 0.05. Since the later test is more conclusive, then the H0 hypothesis is not rejected and hence the data sequence is normally distributed.

For the data series change in exchange rates, the findings outcome isas below exhibited in Table 4.6.

Table 4.6: Change in Exchange Rates Test for Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	Df	Sig.	Statistic	df	Sig.
Change_ExchRates	.208	40	.000	.893	40	.001

a. Lilliefors Significance Correction

Since the p value in both tests has a value smaller than α (0.05), the H0 hypothesis is therefore rejected. Hence the data series does have a normal distribution.

Finally, the results for the data series of inflation are displayed in below Table 4.7 .

Table 4.7: Inflation Test for Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	Df	Sig.	Statistic	df	Sig.
LInfl	.186	40	.001	.941	40	.038

a. Lilliefors Significance Correction

Since the p value in both tests has a value smaller than the α (0.05), The H0 hypothesis is rejected. Hence data sequence is not normally distributed.

4.3.2 Tests for Homoscedacity

For the data series of treasury bills rates, the findings outcomeareas below shown in Figure 4.1

Figure 4.1: Treasury Bill Rates Scatter Plot
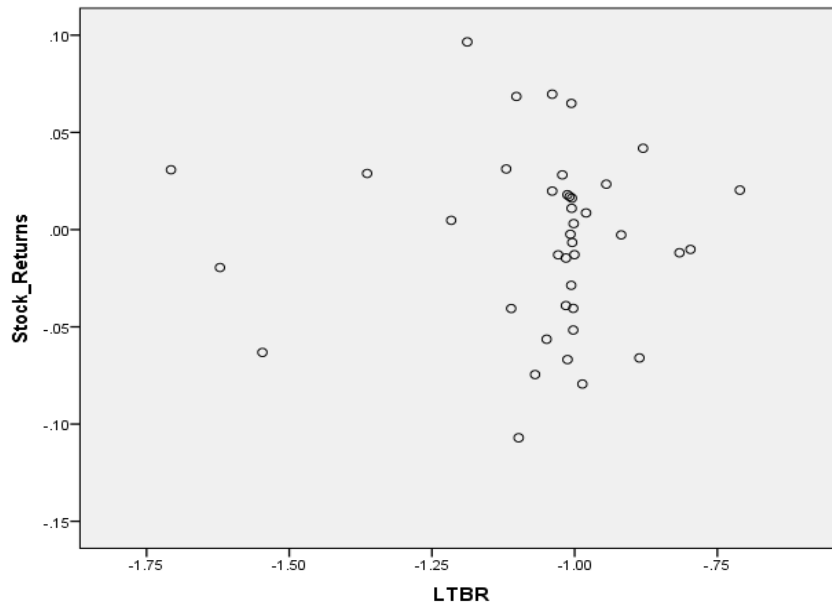
The plotted points indicate that there exist relationships that link treasury bills with stock returns. Thus there is presence of a homoscedacity between the two variables.

For the data series GDP, the findings outcome areas shown below inFigure 4.2

Figure 4.2: GDP Scatter Plot
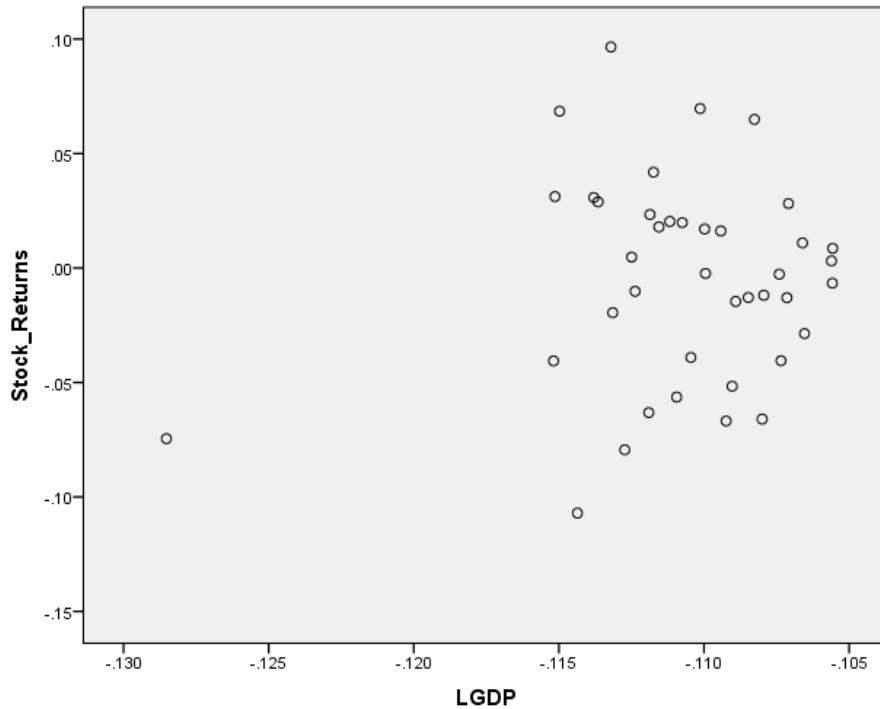
The plotted points indicate that a relationship does not exist linking GDP with stocks returns. Thus, there is presence of heteroscedacity between the two variables.

For data series of money supply, the findings outcome areas below exhibited in Figure 4.3

Figure 4.3: Money Supply Scatter Plot

The plotted points indicate that there is no kind of relationship connecting money supply with stock returns. Thus, there is

presence of heteroscedacity between the two variables.

For the data series of exchange rates, the findings outcomes areas below shown in Figure 4.4.

Figure 4.4: Exchange Rates Scatter Plot
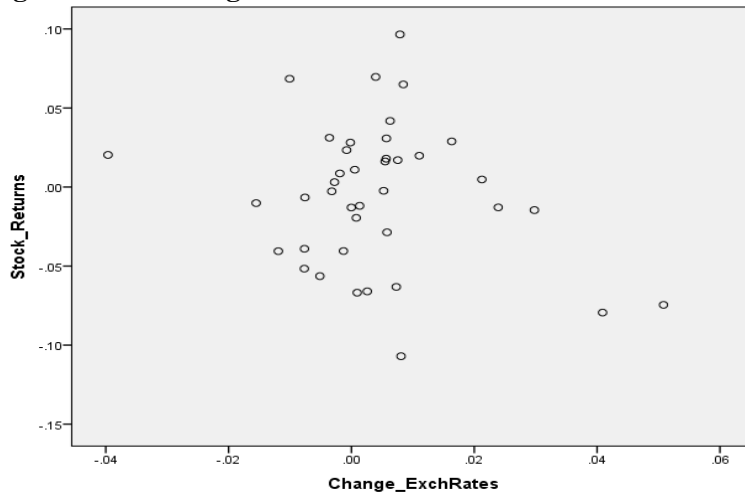
The plotted points indicate that there is no kind of a relationship connecting exchange rates with stock returns. Thus, there is presence of heteroscedacity between the two variables.

For the data series of inflation, the findings outcome are below revealed in Figure 4.5.
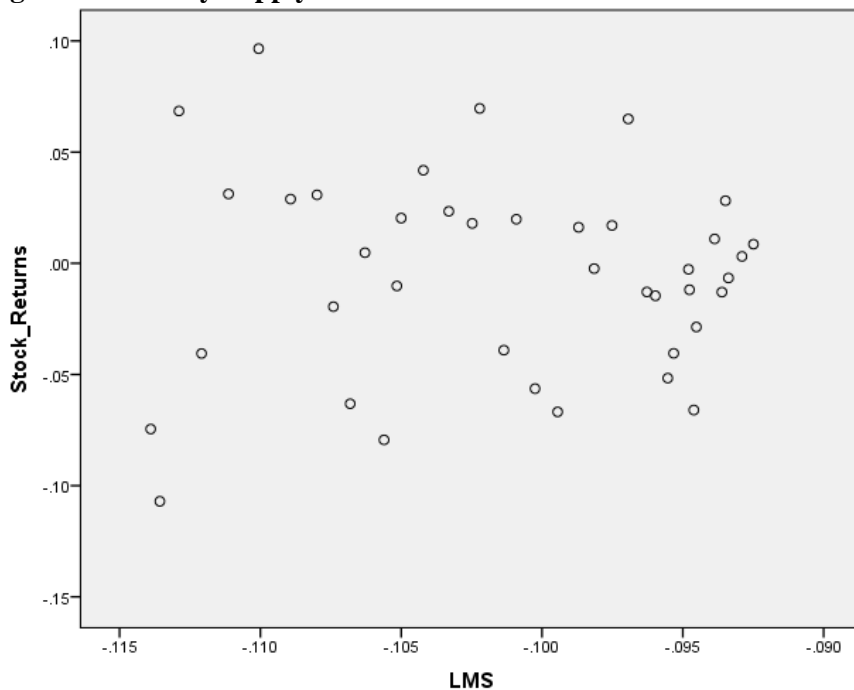
Figure 4.5: Inflation Scatter Plot
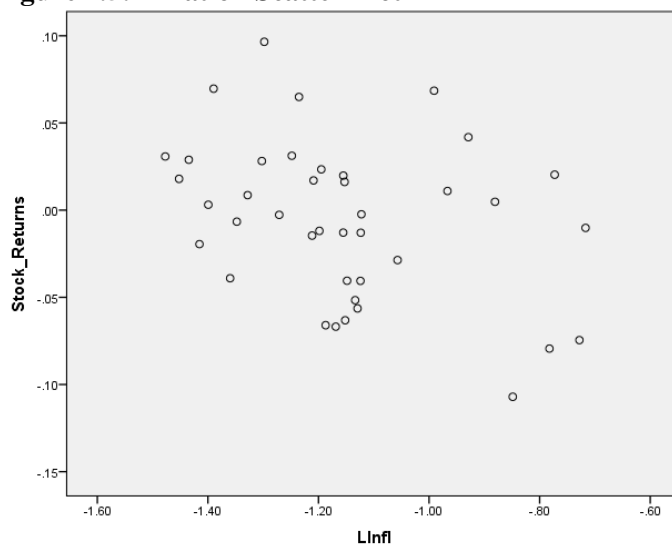
The plotted points indicate that a relationship does not prevail linking inflation with stock returns. Thus, there is presence of heteroscedacity between the two variables.

4.3.3 Adequacy of Sample Data Tests

The results for Kaiser-Meyer-Olkin measure (KMO) and Bartlett's test of sphericity used to assess sample adequacy are displayed in Table 4.8 in the subsequent page.

Table 4.8: KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.420
	Approx. Chi-Square	105.460
Bartlett's Test of Sphericity	Df	15
	Sig.	.000

The KMO value displayed above is below 0.5, which is classified as unacceptable. The Bartlett's test of sphericity displays a p value smaller than 0.05, thus we reject the H0 hypothesis that the matrix of intercorrelation of the variables is obtained from a noncollineearpopulationand the sample matrix non-zero correlations are due to sampling error. Hence, the sample chosen for this study is inadequate.

4.3.4 Test for Multicollinearity

Results on Test for Multicolinearity of data carried out using variance inflation factors (VIF) are displayed in Table 4.9 below.

Table 4.9: Multi-Collinearity Statistics

Variables	VIF
Treasury Bills Rate	2.186
GDP	5.940
Money Supply	6.134
Change in Exchange Rates	1.618
Inflation	1.836

a. Dependent Variable: Stock_Returns

The VIF statistics are less than 10, hence there is no presence of multicollinearity between the predictor variables included in the model.

4.3.5 Test for Linearity

The treasury bills rate is not linearly related to stock returns. This is because even though it exhibits homoscedacity in Figure 4.1, it is not normally distributed as shown in Table 4.3. GDP is not linearly related to stock returns. This is because even though it has a normal distribution as exhibited in Table 4.4, it exhibits heteroscedacity as shown in Figure 4.2. Money Supply is not linearly related to stock returns. This is because even though it has a normal distribution as exhibited in Table 4.5, it exhibits heteroscedacity as shown in Figure 4.3. Exchange rates is not linearly related to stock returns. This is because even though it has a normal distribution as exhibited in Table 4.6, it exhibits heteroscedacity as shown in Figure 4.4. Finally, Inflation is not linearly related to stock returns. This is because even though it has a normal distribution as exhibited in Table 4.7, it exhibits heteroscedacity as shown in Figure 4.5.

4.3.6 Unit Root Test

The outcome of unit root test carried for data sequence of stock returns areas below displayed in Table 4.11.

Table 4.11: Unit Root Test for Stock Returns

Null Hypothesis: RT_LOG__SI___SI__1__ has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=12)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.542092	0.0000
Test critical values:	1% level	-3.610453	
	5% level	-2.938987	
	10% level	-2.607932	

*MacKinnon (1996) one-sided p-values.

The H0 hypothesis is that the stock returns variable has a unit root. Since the ADF statistic is less than the critical value at the 5% confidence level, then the H0 Hypothesis is rejected. Thus, aunit root is absent in the data series.

The results for the unit root test conducted on the data sequence of Treasury bill rate is as below revealed in Table 4.12.

Table 4.12: Unit Root Test for Treasury Bills Rate
Null Hypothesis: LNTBRT has a unit root
Exogenous: Constant
Lag Length: 2 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.295518	0.0223
Test critical values:	1% level	-3.621023	
	5% level	-2.943427	
	10% level	-2.610263	

*MacKinnon (1996) one-sided p-values.

The null hypothesis is that the Treasury Bills Rates variable has a unit root. Since the statistic of ADF at 5% confidence level is less than the critical value, then the HO hypothesis is rejected. Thus, unit root is absent in the data sequence.

The results for the unit root test conducted on the data seriesof GDP is displayed in Table 4.13 below.

Table 4.13: Unit Root Test for GDP
Null Hypothesis: LNGDPT has a unit root
Exogenous: Constant
Lag Length: 3 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-1.370289	0.5858
Test critical values:	1% level	-3.626784	
	5% level	-2.945842	
	10% level	-2.611531	

The H0 hypothesis is that the GDP variables possess a unit root. Since the ADF statistic is more than the critical value at the 5% confidence level, then the H0 hypothesis is not rejected. Thus, unit root is determined as being present in the data series.

The outcomes for the unit root test conducted for data sequence money supply is displayed in Table 4.14 below.

Table 4.14: Unit Root Test for Money Supply
Null Hypothesis: LNM2 has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.384020	0.0012
Test critical values:	1% level	-3.610453	
	5% level	-2.938987	
	10% level	-2.607932	

*MacKinnon (1996) one-sided p-values.

The HO hypothesis is that the variable of money supply possess unit root. Since the statistic of ADF at 5% confidence level is less than the critical value, then the H0 hypothesis is rejected. Thus, unit root is absent in the data series.

The outcomes for the unit root test conducted for data sequence change in exchange rates is displayed in Table 4.15 below.

Table 4.15: Unit Root Test for Change in Exchange Rates
Null Hypothesis: LNERT has a unit root
Exogenous: Constant
Lag Length: 1 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.622071	0.0000
Test critical values:	1% level	-3.615588	
	5% level	-2.941145	
	10% level	-2.609066	

The H0 hypothesis is that the change in exchange rates variable has a unit root. Since the statistic of ADF at 5% confidence level is less than the critical value, then the null hypothesis is rejected. Thus, unit root is absent in the data series.

The outcomes for the unit root test conducted for the data series inflation is displayed in Table 4.16 below.

Table 4.15: Unit Root Test for Inflation
Null Hypothesis: LNIT has a unit root
Exogenous: Constant
Lag Length: 1 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.580585	0.0007
Test critical values:	1% level	-3.615588	
	5% level	-2.941145	
	10% level	-2.609066	

*MacKinnon (1996) one-sided p-values.

The null hypothesis is that the inflation variable has a unit root. Since the ADF statistic is less than the critical value at the 5% confidence level, then the H0 hypothesis is rejected. Thus, unit root is absent in the data series.

4.4 Inferential Statistics

The following inferential statistics techniques were employed in this section; runs for the Granger causality tests, correlation analysis and multiple linear regression. The investigates were carried out to define whether macroeconomic variables have some sought of effect on stock returns at the NSE.

4.4.1 Granger Causality Tests

The Granger Causality test findings outcome are as below displayed in Table 4.16..

Table 4.16: Granger Causality Test
Dependent variable: RT_LOG__SI___SI__1__

Excluded	Chi-sq	df	Prob.
LNERT	1.614005	2	0.4462
LNGDPT	5.187702	2	0.0747
LNIT	3.464752	2	0.1769
LNM2	4.335664	2	0.1144
LNTBRT	0.309977	2	0.8564
All	28.00465	10	0.0018

There is no significant causality at the 5% significance level between stocks returns and all the macro-economic variables.

4.4.2 Correlation Analysis

Correlation analysis establishes whether there exists an association amongst two variables lying between negative strong correlation and positive perfect correlation. Pearson correlation was employed to evaluate the degree of association linking stock returns with macroeconomic variables. The study employed a Confidence Interval of 95%, as it is the most utilized in social sciences. A two tailed test was utilized. The outcome of the correlation analysis isas displayed in Table 4.17 in the subsequent page

The study findings signpost that stocks returns are significantly correlated at the 5% significance level only to inflation.The findings imply that there prevail significant relationship of a negative nature amongst inflation and stock returns. In conclusion no correlation exists amongst stocks returns and the other four macro-economic variables used in this study.

Table 4.17: Correlation Analysis

		Stock_Returns	LT BR	LGDP	LMS	Change_ExchRates	LInfl
Stock_Returns	Pearson Correlation	1	-.023	.126	-.013	-.210	-.353[*]
	Sig. (2-tailed)		.890	.438	.937	.193	.025
	N	40	40	40	40	40	40
LTBR	Pearson Correlation	-.023	1	.306	.431[**]	-.232	.393[*]
	Sig. (2-tailed)	.890		.055	.005	.149	.012
	N	40	40	40	40	40	40
LGDP	Pearson Correlation	.126	.306	1	.862[**]	-.388[*]	-.373[*]
	Sig. (2-tailed)	.438	.055		.000	.013	.018
	N	40	40	40	40	40	40

LMS	Pearson Correlation	-.013	.431**	.862**	1	-.144	-.289
	Sig. (2-tailed)	.937	.005	.000		.376	.070
	N	40	40	40	40	40	40
Change_Exch Rates	Pearson Correlation	-.210	.232	-.388*	-.144	1	.125
	Sig. (2-tailed)	.193	.149	.013	.376		.442
	N	40	40	40	40	40	40
LInfl	Pearson Correlation	-.353*	.393*	-.373*	-.289	.125	1
	Sig. (2-tailed)	.025	.012	.018	.070	.442	
	N	40	40	40	40	40	40

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

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

4.4.2 Multiple Linear Regression Analysis

The variables of the study were analyzed using regression model. The Stocks returns variable was regressed against the macro-economic variables. The stock returns and fluctuations in forex rates were continuously compounded. The logarithm function was introduced on the treasury bills rate, GDP, money supply, exchange rate and inflation. The regression inquiry was undertaken at a level of 5% significance. Compared with F test and T test is the critical value were obtained in the analysis.Te results are displayed below.

Table 4.18: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.486a	.236	.124	.04202

a. Predictors: (Constant), LInfl, Change_ExchRates, LMS, LTBR, LGDP

The coefficient of determination is R squared and it indicates deviations in the response variable that is as an outcome of variations in the predictor variables. From

the outcome in the above Table 4.18, R squaredvalue was 0.236, a discovery that 23.6% of the deviations in stock returns was caused by the macro-economic variables included in the study. Other variables exempted in the model justify for 76.4% of the variations in stock returns in the NSE.

Table 4.19: Analysis of Variance

Model		Sum of Squares	df	Mean Square	F	Sig.
	Regression	.019	5	.004	2.105	.089[b]
1	Residual	.060	34	.002		
	Total	.079	39			

a. Dependent Variable: Stock_Returns

b. Predictors: (Constant), LInfl, Change_ExchRates, LMS, LTBR, LGDP

F-tests were performed to ascertain the significance of the overall model. The formulae for calculating the critical value for the F test is;

$$F = (SSE_1 - SSE_2 / m) / SSE_2 / n\text{-}k$$

Where;

SSE = Residual sum of squares,

m = Number of restrictions

k = Number of independent variables.

A critical value of 2.64146519 was obtained from the F-Test tables. The F statistic indicated in the study findings is less than the critical value, thus the overall model is deemed not significant in predictingstock market returns.

Table 4.20: Model Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	-.053	.287		-.183	.856	-.636	.531
	LTBR	.078	.050	.343	1.549	.131	-.024	.181
	LGDP	3.868	4.073	.347	.950	.349	-4.410	12.145
	LMS	-4.159	2.502	-.617	-1.662	.106	-9.244	.925
	Change_ExchRates	-.053	.571	-.018	-.092	.927	-1.214	1.109
	LInfl	-.119	.045	-.535	-2.633	.013	-.210	-.027

a. Dependent Variable: Stock_Returns

The significance of the individual coefficients was established using the T-Test. The T-Test critical value of ±1.990847 was obtained from the T tables. It was a two tailed test at the 5% significance level.Only inflation has a significant effect of a negative nature on stock returns at 95% confidence interval as exhibited by its t-statistic value.

4.5 Interpretation and Discussion of Findings

The study sought to determine how the selected macro-economic variables affect stock returns. Each of the five independent variables effect on the dependent variable was explored in terms of strength and direction.

The descriptive statistics in Tables 4.1 reveal that stock returns has a negative mean; this means the returns have been mainly negative. Investors have been obtaining negative returns on equity investments for the forty-quarter period employed in the study, from October 2008 to September 2018. They also exhibit that the variables; stock returns, money supply, and inflation have a normal distribution. However, the variables; treasury bills rates, GDP, and change in exchange rates are not normally distributed despite the fact that logarithmic functions had already been introduced to the variables. These findings agree with those of osisanwa and Atanda (2012) who found the variables under study as not being normally distributed.

The tests for normality from Table 4.2 to Table 4.7 exhibit that only stock returns, GDP, and money supplied data series are normally distributed. The tests for homoscedacity using scatter plot diagrams contained in Figure 4.1 to Figure 4.5 reveal that all the predictor variables exhibit heteroscedacity, apart from treasury bills rates which exhibits homoscedacity. Thus, a linear relationship does not existbetween the predictor variables and the response variables because none of them are both normally

distributed and exhibit homoscedacity. This is despite the fact that logarithmic functions had already been introduced to the predictor variables. The test for multi-collinearity in Table 4.9 shows that multicollinearity is not present,this findings agree with those of Kirui (2014) and Sakwa (2008). Thus, there is no redundancy and the predictor variables can be used in the model to forecast the response variable. The unit roots tests displayed in Table 4.11 to Table 4.15 indicate that only GDP contains a unit root, all other variables do not contain it. This implies that the GDP data series has a systematic problem that is unpredictable.

The granger causality test in Table 4.16 reveals that no macro-economic variable included in the study has a significant causality with stock returns, the findings concur with those of Zakaria and Shamsuddin (2012) who found that when all the macroeconomic variables under study were considered as a cluster they did not granger cause volatility of returns in stock market. However, the test for correlation contained in Table 4.17 shows that only the variable inflation is significantly correlated to stock returns at the 5% level of significance. The outcomes imply that there existsa negative link between the two variables. In the regression analysis, the analysis of variance which is exhibited in Table 4.19 prove that the model developed is not significant as evidenced by the F value obtained when compared to the critical value. This implies that the model is not appropriate in predicting stock market returns by utilizing selectedmacro-economic variables used in this undertaking.

The model coefficients in Table 4.20 exhibit that only inflation posses a significant effect of negative nature on stocks returns. One unit upsurge in inflation would cause a 0.119 shrinkage in stocks returns. However, the model developed is not appropriate

for predicting the stock returns by employing the macro-economic variables chosen in the the study.The study findings from the correlation analysis, and regression analysis sections to some extent agree with the studies done by Issahaku *etal.,* (2013) and Gatebi (2013) which established that the macro-economic variable inflation posses a relationship with stock returns. However, the study findings to some extent disagree with those of Gay (2008) which found out that the macro-economic variables chosen for the study did not posses significant effect on stock market returns and the researcher opined that the countries in which the studies were conducted exhibited the weak form of market efficiency. In the current study, only inflation was found to have a significant effect on response variable when correlation and regression analysis was utilized. From findings the NSE exhibitsweak form efficiency.

CHAPTER FIVE: SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

5.1 Introduction

This section discusses the study's findings summary, conclusionsand recommendations on the nature of the relationship macro-economic indicatorshave on stock market returns. It further goes on to state the limitations of the study and provide suggestions for further research.

5.2 Summary

This undertaking intended at establishing the nature of the relationship that exists amongst selected macro-economic variables and the stock market returns.Five macro-economic variables were picked for the study namely:, GDP, money supplied, 91-day T-bill rate, forex rates, and Inflation. The unit period of analysis was quarterly, and data was poised for the period from October 2008 to September 2018. The period comprised of forty quarters. Secondary data was obtained from CMA, NSE, CBK and KNBS on NSE 20 Share Index, Average Treasury Bills Rate, GDP, money supplied, forex rates, and the inflationary rate. The study employed the use of descriptive statistics, granger causality tests, correlation analysis, and regression analysis to ascertain the effect of the selected macro-economic variables on stock market returns. Through correlation and regression analysis the study determined a significant relationship of a negative nature connecting inflationwith stock market returns.

5.3 Conclusion

From the findings, inflation was found to posses a significant effect of a negative nature on stock returns i.e. as inflation increases stock returns declines. A persistent rise in the price of commodities in an economy causes the cost of living to be on the rise causing the public to spend more on consumption of goods and services. The disposable income of individuals significantly reduces and very little is left to invest in the stock market. On the other hand, companies that are not able to pass inflationary cost to consumers, incur high cost of production significantly impacting on profits. For listed companies a reduction in profit means that their stocks become unattractive to potential investors and the price of their shares fall subsequently reducing stock market returns.

Findings from the multiple linear regression analysis were that the macroeconomic variables considered in the study only affect stock returns by 23.6%. This means other factors not considered in the study affect the returns by the remaining 76.4%, those factors could be oil prices whose effects is felt across all sectors of the economy. The other could be export earnings which influences growth of local firms and increases Gross Domestic Product. Foreign Direct investments, real estate growth, cash repatriated from abroad are among many other variables that can either negatively or positively impact on stock returns.

The findings that GDP has no significant impact on returns of the NSE imply that the increased national productivity may permeate other sectors of the economy whose stocks are not listed. It can as well imply that the NSE exhibits weak form market efficiency. Exchange rates have also been found to possess an insignificant effect on

stock market returns at the NSE. This implies that the firms in the NSE mainly do not participate in cross-border trading or are not multinationals operating across borders hence they are insulated from volatile exchange rates. The study findings that there lacks asignificant relationship linking money supply to stock returns at the NSE postulates that the increase in money supply does not result in expanded productivity by the quoted companies and consequently an increase in trade resulting in increased earnings for the firms which leads to enhanced dividend outlays for firms increases the price of stocks

5.4 Recommendations

Policy recommendations are that since inflation has been established to exhibit significant negative effect stock market returns, the governments through its various arms can device methods of influencing the stock market. The central bank can regulate the prevailing inflation rate through Open Market Operations (OMO) to stimulate the stock market.

Recommendations can also be made to investment banks, stock brokerage firms, institutional investors, and individual investors, to enable them 'beat the market' and make above average market returns. They can achieve this by investing in the stock market when they anticipate a decrease in inflation rates because the returns are likely to increase during the period.

5.5 Limitations of the Study

As a result of time and cost limitations, the scope of the study has been limited to forty quarters, between October 2008 and September 2018 and also limited to only five macroeconomic variables. Thus, it has not been established if the result findings would hold for a longer time period. The cost involved in getting the data also limited

the time period which could be studied since the study employed secondary sources of data, some of this data was not readily available, especially the stock market returns, and it took great lengths and costs to obtain it

The topic of this study was relationship macroeconomic variables have with stock market returns at the NSE. Given only a small number of the population in developing countries like Kenya invest in stock market; the study only represented a very small impact that macroeconomic variables have on the entire economy. The study also considered only five macroeconomic variables in the study, a consensus cannot there be reached based on only this five variables, given that there so many macroeconomic variables that can affect stock returns.

The data considered in this study was quarterly, and this was because Gross Domestic data was not available on monthly basis. Macroeconomic variables are constantly changing from time to time and hence short intervals of time are the most appropriate in determining macroeconomic effects on stock market returns. Some data could not be used in its raw form, for instance the stock market index, and further calculations and manipulations of the data was required to deduce meaningful results. Converting the data into a useful form is time consuming and costly and required sophisticated formulas and calculations to be employed. This further impacted on time and cost of carrying out this study

5.6 Suggestions for Further Study

On the basis of information gathered and the knowledge gained in this study, the researcher has suggested some areas for further research. First, the current study's scope was limited to forty quarters; further research can be done beyond forty quarters to ascertain if the findings would hold.A time period longer than ten years could be

considered in future research in order to draw conclusions based on a longer span of time.. A longer time period is important in capturing events which occur after extended period of time such as elections which takes place every five years and which has adverse effects on stock returns .Future researchers should avail more time in order to cover more macroeconomic variables given that their list is inexhaustible.

The fluctuations in macroeconomic variables affect a wide spectrum of the economy and not only stock market returns considered in this study. Future study could consider the effects of macroeconomic variables have on other sectors of the economy like agriculture which is the backbone of the economy, Real estate which is fast growing and has significant impact on the development of the economy as well as the hospitality industry whose growth is influenced by the disposable income of the residents of a country.

Monthly data should be considered in the future studies due to its ability to capture events of a short term nature. Fluctuations in macroeconomic variables are unpredictable and occur frequently hence their impact cannot be forecasted with utmost precision. Given that the stock market data is available on daily basis means that the effect that fluctuations in macroeconomic variables have on stock returns can be captured and computed over short periods to determine whether they are in any way related to the changes in stock returns. The Central bank, Kenya bureau of statistics and Nairobi Stock Exchange which are the sources of the data used in this study could release the data in a useable form for ease of use and application.

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APPENDICES

Appendix I: Research Data

Year	Quarter	Returns Rt=log (SI / SI(-1))	Average Treasury Bills Rate *LnTBRt*	GDP LnGDPt	Money Supply *LnM2*	Change in Exchange Rates *LnERt*	Interest Rates LnIt
2008	Q4	-0.07452	-1.06934	-0.1285	*-0.1139*	0.050813	-0.72808
2009	Q1	-0.10706	-1.09812	-0.1144	*-0.1136*	0.008079	-0.84863
	Q2	0.068475	-1.10207	-0.115	*-0.1129*	-0.01007	-0.99097
	Q3	-0.04057	-1.1111	-0.1152	*-0.1121*	-0.0119	-1.12417
	Q4	0.031199	-1.11985	-0.1151	*-0.1111*	-0.00358	-1.24821
2010	Q1	0.096534	-1.18817	-0.1132	*-0.1101*	0.0079	-1.29814
	Q2	0.028888	-1.36352	-0.1137	*-0.1089*	0.016324	-1.43455
	Q3	0.030782	-1.70721	-0.1138	*-0.108*	0.00569	-1.47712
	Q4	-0.0195	-1.62136	-0.1131	*-0.1074*	0.000778	-1.41529
2011	Q1	-0.06315	-1.54692	-0.1119	*-0.1068*	0.007302	-1.15181
	Q2	0.004795	-1.21623	-0.1125	*-0.1063*	0.021241	-0.88074
	Q3	-0.07941	-0.9864	-0.1127	*-0.1056*	0.040887	-0.78234
	Q4	-0.01017	-0.79713	-0.1124	*-0.1052*	-0.01552	-0.717
2012	Q1	0.020337	-0.7105	-0.1112	*-0.105*	-0.03964	-0.77288
	Q2	0.041844	-0.88009	-0.1117	*-0.1042*	0.006295	-0.92898
	Q3	0.023373	-0.94453	-0.1119	*-0.1033*	-0.00078	-1.19495
	Q4	0.017942	-1.01276	-0.1116	*-0.1025*	0.005652	-1.45223
2013	Q1	0.069665	-1.0393	-0.1101	*-0.1022*	0.003941	-1.38969
	Q2	-0.03906	-1.01533	-0.1105	*-0.1014*	-0.00765	-1.35985
	Q3	0.019835	-1.0393	-0.1107	*-0.1009*	0.01105	-1.15511
	Q4	-0.05636	-1.04905	-0.11094	-0.10025	-0.00513	-1.1294
2014	Q1	-0.06681	-1.01256	-0.10924	-0.09945	0.000928	-1.16877
	Q2	0.016204	-1.00476	-0.10942	-0.0987	0.005485	-1.15284
	Q3	-0.00236	-1.00739	-0.10995	-0.09815	0.005237	-1.12244

	Q4	0.017033	-1.00869	-0.10998	-0.09751	0.007544	-1.20901
2015	Q1	0.064937	-1.00578	-0.10826	-0.09694	0.008443	-1.23533
	Q2	-0.01288	-1.00037	-0.10847	-0.09628	0.023908	-1.15532
	Q3	-0.01459	-1.01522	-0.10891	-0.09597	0.029792	-1.2116
	Q4	-0.05165	-1.00251	-0.10903	-0.09553	-0.00767	-1.13371
2016	Q1	-0.04049	-1.00248	-0.10735	-0.09533	-0.00129	-1.14833
	Q2	-0.00271	-0.91842	-0.10741	-0.0948	-0.0032	-1.27111
	Q3	-0.0119	-0.81637	-0.10794	-0.09476	0.001339	-1.19837
	Q4	-0.06599	-0.88658	-0.108	-0.09461	0.002581	-1.18709
2017	Q1	-0.02864	-1.00606	-0.10654	-0.09452	0.005796	-1.057
	Q2	0.010955	-1.00533	-0.10661	-0.09387	0.000538	-0.96671
	Q3	-0.01296	-1.02895	-0.10714	-0.09361	-2E-05	-1.12359
	Q4	0.028142	-1.02158	-0.10709	-0.09349	-0.00017	-1.30248
2018	Q1	-0.00661	-1.00427	-0.10558	-0.09338	-0.00757	-1.34775
	Q2	0.003088	-1.00168	-0.10561	-0.0929	-0.00276	-1.39939
	Q3	0.008599	-0.98002	-0.10557	-0.09249	-0.00188	-1.32821

Appendix II:NSE 20 Share Index Constituent Companies (As at January 2017)

No	Company
1	Athi River Mining
2	Bamburi Cement Ltd
3	Barclays Bank Ltd
4	British American Investments Company Ltd
5	British American Tobacco Kenya Ltd
6	Centum Investments Ltd
7	CFC Stanbic Holdings Ltd
8	CIC Insurance Group
9	Diamond Trust Bank Ltd
10	East African Breweries Ltd
11	Equity Bank Ltd
12	Kengen Ltd
13	KenolKobil Ltd
14	Kenya Commercial Bank
15	Kenya Power &LightingLtd
16	Nation Media Group
17	Safaricom Ltd
18	Sasini Ltd
19	The Cooperative Bank
20	WPPScangroup Ltd