

**THE EFFECT OF EXCHANGE RATE ON STOCK MARKET  
PERFORMANCE IN THE NAIROBI SECURITIES EXCHANGE**

**BY**

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**DECLARATION**

This research project is my original work and has not been submitted for a degree in any other University or Institution.

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## LIST OF ABBREVIATIONS

<b>ADF</b>	Augmented Dickey-Fuller
<b>APT</b>	Arbitrage Pricing Theory
<b>ANOVA</b>	Analysis of Variance
<b>CAPM</b>	Capital Asset Pricing Model
<b>CBK</b>	Central Bank of Kenya
<b>EGARCH</b>	Exponential Generalized Autoregressive Conditional Heteroskedastic
<b>EMH</b>	Efficient Market Hypothesis
<b>EPS</b>	Earnings per Share
<b>FX</b>	Foreign Exchange
<b>KNBS</b>	Kenya National Bureau of Statistics
<b>MPT</b>	Modern Portfolio Theory
<b>NSE</b>	Nairobi Securities Exchange
<b>OLS</b>	Ordinary Least Square

## ABSTRACT

Exchange rates are encountered by humanity in different aspects of life since time in memorial. The current paper analyzes the impacts of exchange rate changes on stock market performance in the Nairobi Securities Exchange (NSE). The study used descriptive research design on the population of 65 companies listed in the NSE for the period between December, 2006 and December 2016. It applied the census inquiry. Accordingly, it used time series data, the daily stock market prices data which was sourced from the NSE 20 share index and then averaged to monthly data, monthly exchange rate, inflation rate, interest rate 91-day treasury bill rate) and money supply which were sourced from the CBK and KNBS official websites. The secondary data was analyzed using the Augmented Dickey Fuller Test (ADF), which found that the time series was stationary. Granger causality test showed that there is a causal relationship from exchange rate on the stock market performance but no causal relationship from stock market performance on the exchange rate changes. The correlation analysis result show that there is a significant negative relationship between exchange rate and stock market performance, a significant inverse relationship between inflation rate and stock market performance, an insignificant positive relationship between stock market performance and interest, then lastly an insignificant negative relationship between money supply and stock market performance. Regression analysis indicates that returns are highly affected by other external factors other than the independent factors in the study. EGARCH showed that exchange rate changes has a leverage effect on the stock market performance. Descriptive statistics indicated that securities market returns had a negative mean and a positive standard deviation. Exchange rate, Interest rate, Inflation rate, and money supply have a positive mean. In Jarque-Bera test, all the variables, did not meet the conditions for normal distribution  $s=0$  and  $k=3$ . Therefore, the study, concluded that Exchange rate has a negative effect on stock market returns in NSE. The study recommended that Capital Market Authority should understand the effect of exchange rates changes and implement sound policy which will steer development in financial markets by containing adverse exchange rate change levels. A further study can be done to establish the contribution of different macro-economic factors when it comes to the returns allied to stock markets.

# CHAPTER ONE

## INTRODUCTION

### 1.1 Background of the Study

There exists a great relationship between the financial and economic sectors. These two areas profoundly depend on each other. It has been proved from different studies done from various scholars on the relationship between these two areas. Various researchers and academicians have divergent views on the issue of the effect and relationship of the stock market performance and the change of exchange rate. Currency exposure occurs where a company has a balance sheet of different currencies (Mun, 2007). Exposure could also occur to locally based companies (Kisaka & Mwasaru, 2012). This exposure takes place when the cash flows fluctuate; consequently affecting the company's earnings. The fluctuation of these earnings is because of the extreme changes of exchange rate (Chen, Roll, & Ross, 1986).

The path to a variety of investment opportunities is due to the drastic changes in the international financial systems such as coming up or the emergence of stock markets, some abolishment of capital flow restrictions. Because of this, there is fear of increased changes of exchange rates due to the abolition of these cash inflow barriers. Such will result to volatility in the stock market performance. Though some researchers believe that the economy cannot be left alone to react to unpredictable market forces, which require their guidance for controlled growth. Domestic currency might appreciate due to these free capital inflows (Kim & Singal, 2000). Mostly, export oriented countries are affected

by this. Any appreciation of exchange rates is likely to influence the local country's competitive position negatively.

In their transactions, multinational companies have some exposures namely, transaction exposure, translation exposure and lastly but not least the economic exposure. These exposures occur due to the exchange rate changes. Stock market performance of these MNC is likely to be affected due to the impact of exchange rate changes on local companies, which results in the general MNC stock market performance. Exchange rate movements will definitely affect the value of a company's future transactions. Some exposures occur because of the company's cash flows being affected by fluctuations in the exchange rates; this is known as economic exposure. Since MNCs financial statements are as a result of a combination of its subject financial statements, translation exposure occurs when the subsidiaries financial statements have to be converted to the MNC'S parent currency. An exposure will always occur in any incidence of conversion of currencies (Madhura, 2006).

### **1.1.1 Exchange Rate**

Either exchange rate is the degree at which one currency will be traded for another. Exchange rate change can be as a result of volatility in other macroeconomic factors such as inflation, and interest rates (Ozturk, 2006). This uncertainty in exchange rate is also caused by the liberalization of capital flows. For an exchange rate to be volatile, it must be floating. Before this, exchange rates were fixed until the introduction of the floating rate which was as a result of the many conferences held in regard to international payments balances. As a result, governments have established their own home economy's

exchange rate type. Before the current valuation of currencies, currencies were valued against expensive metals such as gold and silver. Thanks to the current mode of valuation for different economies and the mode of weighing the most superior currency over the others. These conferences, which brought such a fabulous change, took place between 1944 and 1971 (Meese, 1990).

Exchange rate risk occurs as a result of investing in foreign stock markets. Higher exchange rate uncertainty leads to a high-risk premium. With the drastic exchange rate changes, higher investment returns are demanded because of the high expected risk. This leads to a decline in the stock market performance due to lowered discounted value of expected future cash flow. Exchange rate is measured by a home currency against the foreign currency (Rabai & Khakan, 2016).

### **1.1.2 Stock Market Performance**

The stock market is an essential constituent of a financial sector of any economy. The stock market performance thus plays a big role in determining the direction of the financial sector of that economy. Higher stock return is an indicative of firms and other institutions making profits. Volatility of stock market performance is the uncertain change of stock market performance over a given time period (Aliyu, 2012).

A number of macroeconomic factors like inflation rate, exchange rate, interest rate, money supply, as well as the GDP do affect the stock market performance in many different ways. Mogire (2016) found out that Interest rate negatively influenced the stock market performance and money supply and exchange rate insignificantly affected the

stock market performance. Inflation negatively impacts the stock market performance. Their study continues to show that stock market performance is also affected by the level of saving of a country citizens. When savings are low, the demand of stocks also falls thus decreasing the stock market return (Ibrahim & Agbaje, 2013).

A number of ways measures stock market performance considerably. The key stock market performance measures include market capitalization, stock market indexing as well as stock turnover. Stock market Indexing gives a measure to understand the direction in the movement of the aggregate market. When the index increases, this indicates that the market is moving upwards and vice versa. Market Capitalization refers to the total value of shares of stock allied to a particular company. It is calculated by taking the stock price then multiplying it by the total available shares. Stock turnover is a measure of the inflows and outflows in the stock market, which is always built on the actively traded shares (Daferighe & Sunday, 2012).

### **1.1.3 Exchange Rate and Stock Market Performance**

The impacts allied to the movement in exchange rate have raised a big concern of a number of studies to be done on this topic and on other macroeconomic factors on the performance of stock market. There are a number of theories in relation to this study. To start with, it is the flow-oriented theory of Dornbusch and Fischer (1980) which states that, "exchange rate movements results to movements in the stock market performance". The performance of the stock market is inversely impacted with any slight drift of the exchange rate (Ma & Kao, 1990). Exchange rate movements has a profound effect on a company's foreign operations, this in turn affects or influences the stock market

performance. This leads to a need for the examination of the effect of exchange rate changes on the value of a firm so as to understand the effect on stock market performance (Aggarwal, 1981).

Another theory is the Efficient Market Hypothesis (EMH) established by Fama (1965) which states that, in an efficient market, any new information would have an impact on the fundamental value seen on the prices. In this case, the new information is information on the Exchange rate which will have an impact on the stock market performance. The continuous anticipation of unpredictable information on exchange rate will either positively or negatively influence the stock market performance (Sichoongwe, 2016).

Stock market performance is usually sensitive to any new news on macroeconomic changes. Unexpected macroeconomic news events influence the stock market performance and usually, some of these events have unescapable influence on the stock market performance (Chen, Roll, & Ross, 1986). For multinational companies (MNC), exchange rate risk is such a sensitive risk. This exchange rate risk exposure is as a result of investing in foreign stock markets. In such a case, higher exchange rate will tend to highly result to the local stock market volatility thus highly affecting the local stock market performance. The inverse is experienced in the foreign stock market performance. This comes as a result of the exchange rate being more correlated with the performance of the local stock market than the foreign market performance (Mun, 2007).



### **1.1.4 Nairobi Securities Exchange**

NSE was first formed in the year 1954 and is the most developed security market in Eastern Africa region. It is numbered among the most vibrant African Bourse. It's classified as an emerging market (Wabwire, Owuor, Onyuma, & Njuguna, 2013). Wabwire et al. (2013) stated that effective mechanisms are improvised to cater for this fare and professional distribution of the resources. Thus, the NSE acts as an intermediary between the buyers and sellers. This will open doors for maximization of the investment at a low cost in the economy. This also avoids misuse or poor allocation of scant resources to poorly run or less productive investment.

Thus, the NSE plays a big role in the economic growth, especially under financial intermediation. The NSE is made up of 65 listed companies; its daily trading volume presently is around USD 5 billion with a total market capitalization of around USD 24 billion. In Kenya, the changing exchange rate is so alarming, back in the years 2012 and 2013, the exchange rate in relation to the USD was at 0.0117USD/KES but presently the rate is at 0.0098USD/KES. This shows a 16% drop in the Kenya shilling against the USD. For an export leaning country, currency fluctuations tend to positively or negatively influence the exports. In Kenya, an import-oriented economy, the uncertain fluctuation affects stock market performance of the Kenyan economy. In the recent past, the Kenyan currency has had a steady moment but which has recently become so unpredictable thus unpredictable stock market performance (Kirui, Wawire, & Onono, 2014). From the study of Kirui et al. (2014), it showed that the other entire economic variable did not influence the NSE performance thus the stock market performance. Only the exchange rate affects the stock market performance negatively.

Portfolio managers will panic with frequent uncertain fluctuations in stock prices which occur as a result of exchange rate. This will cause the portfolio managers to opt to sell portions of their equity portfolios. They do this to evade currency losses. In return to this action, the NSE index will droop showing a weak condition effect on stock market performance. Nairobi Securities Exchange face similar problems, particularly in exposure to foreign exchange risk. However, publicly owned companies that heavily rely on imports suffer from devaluation in the Kenyan currency, ultimately affecting their earnings because of reliance on imports as main activities. Corporate profitability is also affected evidenced by a reduction in EPS. A government that does not control its foreign exchange market might cause a disturbance in market development. Firms are highly advised to employ currency hedging to counter this (Kisaka & Mwasaru, 2012).

## **1.2 Research Problem**

A number of theories explain the effect of exchange rate on the stock market performance. The Capital Asset Pricing Model (CAPM) which was founded by Lintner (1965) deals with one factor impact on return of an investment. For this case, the factor is the exchange rate as a factor on the stock market performance. In their study, Mugambi and Koech (2016) states that investors are compensated for the time value of money, measured by the risk free rate and the risk which is measured by Beta. The other theory is the Arbitrage Pricing Theory (APT) founded by Ross (1976) came in to cater for the CAPM weaknesses. APT considers various macroeconomic facets that affect the performance of stock market.

A number of researches have been done on the topic using these two financial variables. For an up and coming markets the studies are considerably very narrow. In their study, Kirui et al. (2014) found that, a look at analyzing of the correlation between these two variables of study is so vital to the country and its economic performance. Policies are founded to establish mechanisms in managing the extreme movements on the exchange rate to improve the investment conditions. This brings us to the idea of currency hedging using the currency options. Need for a more detailed appraisal on the affiliation between the stock market performance and exchange rate is required.

Some local and international researchers have looked at the relationship between these two variables. In his study, Aggarwal (1981) stated that stock prices are influenced by exchange rates. It is evident from the economic value and stock price of a firm that has foreign investments, export sales, or uses imported products is likely to be influenced directly by changing exchange rates.

In their study to examine stock price reactions to exchange rate changes, Ma et.al. (1990) found that with the associated increase in risk for international investment, the preference of currency quantities adds a vital element to the overall portfolio judgment. In relation to the goods-market theory, it was concluded that in an export-oriented country, when a currency's value increases, it will lower the country's stock market performance (Ma & Kao, 1990). On the other hand, for an import majoring economy, an appreciation of the currency's value will result to a positive reaction to the stock market performance of that particular economy. This is because the economy importing will actually need less of the foreign currency to do its importation. Such is not the case for export dominated

economy because less of its exports are likely to be purchased because they will definitely be expensive to other economies.

In his study, Dekle (2005) found that the power of the Japanese currency uncertain changes on the yen profit margins of Japanese exporters, especially competing ones, are rather small. That is, the impact of time-varying margins on profitability is small, although, for exporters that collude, margins vary more. Thus, a typical Japanese exporter's exposure elasticity arises almost entirely from the change in profits at the initial profit margin. The profits of Japanese firms collapse when the yen appreciates because foreign sales become smaller in yen terms.

This awakens the need for the study of the relationship between these two financial markets. On the impact of some macroeconomic variables, the exchange rate as one of them found that in both the long-lived and short-lived terms, there exists a relationship between these two variables of study (Irungu & Muturi, 2015). A study by Kitati et.al (2015) found that exchange rate for both Euro and US Dollar had an adverse impact on the stock market performance for companies quoted on the stock market, the stock market gain as the Kenya shilling appreciates.

A study by Rao (2016) on selected firms in the energy and petroleum industry showed no connection between the companies financial positions and the kenyan currency movement. Most of the studies done are on the effect of the other macroeconomic factors other than exchange rate on the financial performance. Very few studies on the effect of exchange rate on stock market performance on the NSE using the NSE 20 Share index

have been conducted. Thus the need of this study which aims to establish, the effect of exchange rate on stock market performance in the Nairobi Securities Exchange.

### **1.3 Research Objective**

The study aims to establish the impact of exchange rate on the performance of stock market in the NSE.

### **1.4 Value of the Study**

The study shall be of great help to a number of stakeholders, the Capital Market Authority, Corporations, Government entities, Investment banks, Stock-brokers, investors, students for their academic research. This can be summarized as the contribution to academic and business research. With a knowledge on this relationship, investors shall intelligently and tactfully make their upright financial decision. On the hedging issue, the degree of correlation will play a big role in guiding the investor to do the hedging strategy wisely.

To the investor, identification of the currency risk for their portfolio will be easy thus diversification. The investor shall gain a profound quantity of information which shall even make the investor complacent with the foreign exchange market thus playing a big role in opening more investment channels for local investors who can now access the foreign market. This wise hedging by portfolio diversification on both domestic and international portfolios will not only benefit the financial sector but the economy at large. This is because the risk taken by investors will be decreased. This research will also assist students who are doing their academic research on this two variables and closely related topics.

## **CHAPTER TWO**

### **LITERATURE REVIEW**

#### **2.1 Introduction**

This division gathers works earlier done by past studies on the effect of exchange rate on the performance of the stock market. This segment sketches the theoretical framework, the determinants of stock market performance, the empirical literature review and a summary of the literature reviewed.

#### **2.2 Theoretical Review**

This segment is used to converse different theories that are vital in answering the research question. The first one to be looked at is the Efficient Market Hypothesis and Random Walk Theories followed by The Modern Portfolio Theory then lastly but not least is the Good market theory or the flow oriented model.

##### **2.2.1 Efficient Market Hypothesis and Random Walk Theories**

In a paper by Fama (1965) on efficient markets, he stated that in an efficient market, any new information would have an impact on the intrinsic value which will immediately be seen on the prices. In this study, the new information will be the information on the exchange rate in the past, present and the uncertainty of the future which is to be predicted. For this study, the available information is information about expected exchange rate changes. It is believed that no investor can take advantage of making more profits by using this information, this is because the information is available to every investor.

Though popularly used for so many years, this theory for the recent years has had many and very powerful opponents. One of the opponents comes from the Behavioral Finance which states that an investor is likely to earn an excess profit by making decisions by influences of emotions and psychology which makes investors behave in unpredictable or irrational ways. In a study on the connection between EMH and the random walk theory it was concluded that information new in the market is always unpredictable thus the feedback will always be unpredictable (Sharma & Mahendru, 2009).

In their study, it was concluded that information on exchange rate and the price movements must be random and unpredictable (Phan & Zhou, 2014). There are three versions of E.M.H. depending on the type of all available information; Weak form efficiency, strong form efficiency, and semi-strong efficiency.

### **2.2.2 Modern Portfolio Theory**

MPT is the most popular theory designed to aid in portfolio selection. This theory was invented by Markowitz (1952) in his detailed study on portfolio selection. In MPT, portfolios are analyzed by the degree of the expected risk and return. The expected risk is commonly referred to as volatility of expected returns, which is measured by the standard deviation. It is well known that the finest portfolios are built by lessening the expected risk for a certain intensity of expected return or maximizing return for an expected capacity of risk.

A portfolio is considered of better quality to another when it maximizes its return for a given capacity of expected standard deviation. Calculation of portfolio expected return and the portfolio variance is to be done. The square-root of the variance which gives the

standard deviation indicates how volatile or risky the portfolio is. Whether two assets connect to each other positively or negatively, this is also measured. It results to diversification of the company assets by adding assets that aren't perfectly correlated. It was concluded that the degree of branching out that will actually have an impact will always come from the degree of interrelation of the assets (Omisore, Yusuf, & Christopher, 2012).

### **2.2.3 Good Market Theory/ Flow Oriented Model**

Established by Dornbusch and Fischer (1980) states that, “exchange rate results to stock market performance”. Domestic currency depreciation/ increase in exchange rate makes the local firms more competitive, in return, this makes exports cheaper thus higher exports which lead to higher incomes and increase in firm's stock price. This directly affects export-oriented countries.

For import oriented countries like Kenya, domestic currency depreciation/ increase in exchange rate makes imports expensive thus lower imports of raw materials, capital goods and consumer goods leading to low production thus less purchase of finished goods thus decrease in firm's stock price.

In their study, Ma et.al (1990) proved that the performance of the stock market is inversely impacted with any slight drift of the Kenyan currency. In his study, Aggarwal (1981) stated that stock market performance could be subjected either positively or negatively in some ways by exchange rate. It is evident that the economic value and stock price of a firm that has foreign investments, export sales, or uses imported products is likely to be influenced directly by changing exchange rates.



## **2.3 Determinants of Stock Market Performance**

There are a number of determinants of the stock market performance. Some researchers and academicians have done studies on the impact and relationship of various factors in some markets in both developed and emerging markets.

### **2.3.1 Inflation**

Godby (2011) defines inflation as “a continuous non-breaking increase of prices”. The increase of inflation erodes a country's real value of money. In return, it lowers the stock price thus the stock market performance is negatively affected. Inflation also results to the increase in commodity prices. This makes the consumers daily life very expensive, in return, it makes the investor liquidate their shares and investments thus pushing down the stock market performance.

The resultant relationship is that inflation has a negative impact on share prices, thus lowers stock market performance. A substantial effect is visible on the total return of the companies due to the negative effect from inflation in the economy. High inflations negatively impact or influence the profits of firms. This is as a result of low capital injection by investors because of low availability of extra funds to be invested. As a result, the performance of the economy's stock performance diminishes (Vena, 2014).

### **2.3.2 Interest Rate**

This is the cost charged by any lending institutions, it is more uncertain for a country to have a high-interest rate. When there is scarcity of funds or resources on the lenders side, the borrowing rate by the consumers will be quite high as objected when there is more to

lend than the demand from the borrowers. Thus, the interest rate in an economy will tend to drift depending on the availability of funds to be borrowed (Ali, 2014).

In a study on the Colombo Stock Exchange, it was concluded that interest rate will always be a factor in the performance of any economy's performance (Amarasinghe & Sabaragamuwa, 2015). In their study in the Jordan market, Khrawish et.al (2010) concluded that there is an important factor of the government intervention in the control of interest rate to control investment and transaction in the stock market.

### **2.3.3 Money Supply**

Money supply is the total amount of monetary assets available in an economy at a specific time. In his study, Sellin (2001) found that an increase in the supply of money will lower interest rates, causing more demand of money which in turn generates more investment and puts more money in hands of consumers. These more money with consumers stimulates spending causing thus raises the stock market performance.

Sirucek (2012) states that, the performance of stock market is established by the present value allied to the future cash flows. Note that the future cash flow's present value is obtained when future cash flows are discounted at a discount rate. It is well known that money supply has a significant relationship with the discount rate and, therefore, with the present value of stock returns.

## **2.4 Empirical Studies**

The current increase of financial hedging and diversification and the emerging, growing integration has resulted studies on these two variables and their relationship between each other.

### **2.4.1 Global Empirical Studies**

Perera (2016) concluded that the movement of Euro exchange rate has a positive and important effect on ASPI return volatility even as the change of US Dollars and British Pounds exchange rates are found to be negative and unimportant. This study provides important openings for local as well as foreign investors concerning their equity investments while the findings are also of the fundamental issue to the policymakers in coming up or establishing monetary policies. The population data is the daily time series data for stock market and the currency market of the country of study. This study was done from January, 2010 to December, 2015.

Sichoongwe (2016) in his study on the study of exchange rate on the performance of the stock market which was conducted in Zambia found a negative effect of the exchange rate on the stock market performance. Time series data between the year 2000 to 2015 was used using the GARCH(1,1) model to establish the relation. This study opens way for more studies of the same in the Zambian market.

Rabai and Khakan (2016) in the study on the relationship between exchange rate and stock market volatility in India Stock Market for a period between October 2008, and March, 2010 There study found that the exchange rate and the performance of the stock

market are negatively related and the data are non-normally distributed. There is a unidirectional causality between these two variables of study.

Diala, Kalu, and Igwe (2016) in their study on the interaction between commercial property market and exchange rate against the USD in Nigeria between the years 2000 and 2010 found an insignificant relationship between the two variables of study. This makes investment returns to follow a negative trend thus discouraging investments in the real estate sector. In his study, Chikashi (2011) did a detailed study to come up with the interaction between these two variables. The study took place in Japan for the Japanese machinery and banking industries. This took place between January, 1995 and February, 2011. In line with the stock-oriented approach, an inverse connection was seen in the banking industry and for the machinery industry, in the study of flow-oriented approach, it reflected a very weak but converse relationship.

#### **2.4.2 Local Empirical Studies**

Mugambi and Koech (2016) in their exploration on the effect of exchange rate and other macroeconomic variables on the stock market performance of the listed banks in the NSE they had a conclusion that exchange rate had a significant effect on the stock market performance of these banks. The period under study was from 2000 to 2015 of which they used quarterly time series data. In their study, so as to compute the regression of the coefficients, a linear regression model using the OLS under Fixed effect model was applied.

Nyongesa and Muchoki (2016) in their study to find the relationship between the exchange rate and the performance of the NSE, they used correlation analysis, ADF test

and Engle and Granger cointegration test and the data used was the monthly time series data between January 1996 to December 2011. They found a weak negative correlation between the variables.

In his study Musa (2014) found that there exists an inverse and unimportant relationship between these two variables of study. The entire 55 companies were used as the sample, and the study was between 2009 and 2013. The multiple regression models were used. According to the researcher, additional studies are recommended which should be conducted on exchange rate in Kenya and how this has affected the oil market particularly using the recent exits by MNC and the coming-up of local and regional companies. There is need to identify and study other macroeconomic factors affecting company's financial performance. Research can also be administered to establish whether there is a relationship between companies' net worth and the strategies adopted to counter exchange rate. The research also instructs for another study to come up with the effects of exchange rate on the financial performance of other industries apart from the oil marketing industry.

Wekesa (2012) found that good exchange rate risk management increases the profitability of airlines in Kenya. The study population was the 46 major airlines operating in Kenya with a sample size of 26 airline companies in the years 2006 to 2010. A regression model was used using SPSS (Statistical Package for Social Science) software. Information gathered from the study is that exchange rate and fuel price risk are the most important risk incurred by airlines in Kenya. Mbithi (2013) had a study, which was carried out in Kenya with a population of 46 listed firms excluding the financial and investment companies in Kenya. Its sample size was the broad economic sectors. This study was

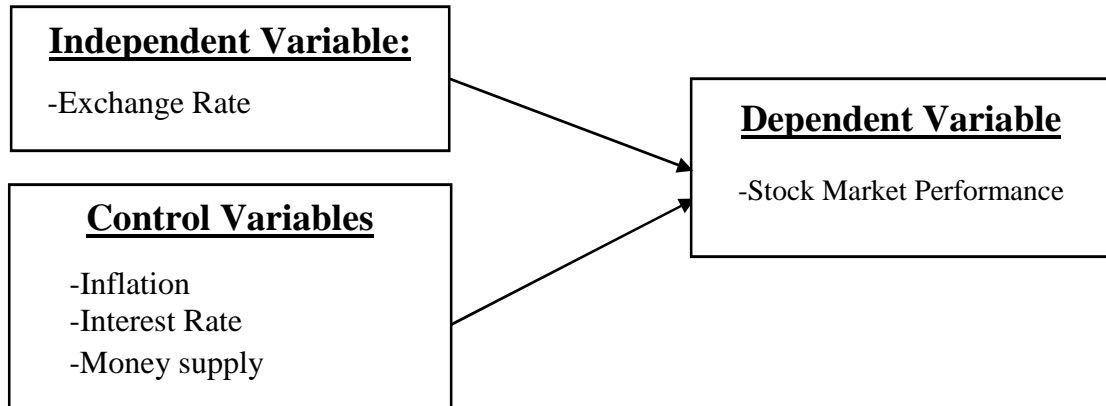
carried out between 2002 and 2012 using a linear regression model. The software used for analysis is the SPSS.

Kisaka and Mwasaru (2012) concluded that exchange rates Granger-causes stock prices in Kenya thus implying that if the exchange rate becomes more volatile, the stock prices also follows the same trend. This study was done in the Kenyan market for the period between 1993 and 1999. This was after-floating exchange rate period. At this period, the derivative market had not yet been introduced to the local market, and this was one of the proposals from the researcher that derivative market to be introduced to the Kenyan market. A lowering of the value of a currency for an import oriented economy will lower the performance of the stock market.

## **2.5 Conceptual Framework**

This refers to a diagrammatical demonstration of the alliance between different variables. The independent variable is the Exchange Rate, and the dependent variable is the Stock market Performance. The diagram also holds the control variable; inflation, interest rate, and money supply.

**Figure 2. 1: Conceptual framework**



## **2.6 Summary of Literature Review**

The chapter has looked at three theories; Efficient Market Hypothesis and Random Walk Theories, Modern Portfolio Theory, and Good Market Theory. Efficient Market Hypothesis should adequately exhibit available information, in this case, exchange rate changes and its likely power on the value of the firm. Modern Portfolio Theory is the theory in charge of selection of the best portfolios possible for any investment. Lastly, the Good Market Theory is on the unidirectional causal relationship, for this study the causality is that exchange rate causes stock market performance.

Additionally, some research studies have been done, both international and local which indicate a connection between the variables of study. International studies by; Perera (2016), Sichoongwe (2016), Rabai and Khakan (2016), Diala, Kalu and Igwe (2016) and Chikashi (2011) and the local studies are by Mugambi and Koech (2016), Nyongesa and Muchoki (2016), Musa (2014) Wekesa (2012), Mbithi (2013), Kisaka and Mwasaru (2012) all reviewed the connection between these variables. It is alarming that all these researchers did studies on the relationship between all the macroeconomic factors in

which exchange rate was inclusive and the stock market performance. Thus a study exclusively on exchange rate and the stock market performance is in need of a study. The conceptual framework shows the relationship between the variables in a diagrammatical representation.



## **CHAPTER THREE**

### **RESEARCH METHODOLOGY**

#### **3.1 Introduction**

In this section, we shall have a look at various sections namely, research design, population to be studied, the data collection method to be applied and lastly but not the least, the data analysis.

#### **3.2 Research Design**

This study used the descriptive type of research design. This design type involves the compilation of structured statistical data, which shall later be statistically confirmed (Zidmund, Babin, Carr, & Griffin, 2013). The descriptive study design was used in determining the causal relationship of Exchange Rate on Stock Market Performance.

#### **3.3 Population**

A population is a defined set of elements or group of elements. In this study, the population shall be the 69 firms listed at the NSE as at December, 2016. A census inquiry of the 69 firms was conducted.

#### **3.4 Data Collection**

This study is using secondary data. Data on stock market performance was measured using the daily time series data for NSE 20 share index which was obtained from the Nairobi Securities Exchange. In this study, the series of index values for each month was calculated by averaging the daily values of the index. Data on exchange rate, inflation, interest rate (91-day Treasury bill), and money supply was obtained from the CBK and

the KNBS. The data shall cover a period of 10 years starting from December 2006 to December 2016.

### **3.5 Data Analysis**

Data collected was analyzed quantitatively by using descriptive and inferential statistics. Data shall be analyzed using E-views version 8. Descriptive statistics of the study variables is to be calculated and offered in mean, standard deviation, skewness, kurtosis, Jarque-Bera test and p-value.

### **3.6 Analytical Models**

Some analytical models were applied in analyzing the affiliation between the dependent and independent variables. The study used the Augmented Dickey fuller model to determine unit root ,that is, whether data is stationary or not, Arch test to test for heteroscedasticity the Granger causality test for observing the direction of causality and lastly but not least regression analysis to determine the connection between the independent and dependent variable.

#### **3.6.1 Augmented Dickey-Fuller Model**

The ADF test is useful in determining the unit root, i.e., whether data is stationary or not. The outcome of ADF statistics shall either nullify or legitimate either of the hypothesis of the model.

#### **3.6.2 Granger Causality Test**

This is the determination of the variable causing another. NSE has some effects for individual investors, corporate investors, financial regulators and market intermediaries.

Uncertain fluctuations as a result of changes in exchange rates can help portfolio managers to fear and think otherwise. This will result to the portfolio managers deciding to convert a good portion of their equity portfolios to cash to avoid any currency drops. The NSE will drop as a result of this conversion of some equity to cash thus resulting to a poor stock market performance (Kisaka & Mwasaru, 2012).

### 3.6.3 Regression Analysis

The role of the Regression analysis is to define the association of the variables on study. Regression model that was used is as below. The use of the Exponential Generalized Autoregressive Conditional Heteroskedastic (EGARCH) model was applied since it explains the leverage effect i.e, the fact that negative news on exchange rate often increase stock market performance to a greater extent than positive news.

$$Y = \alpha_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 \ln X_4 + \varepsilon$$

Where;

Y= Stock market return measured in NSE 20 Share Index

X<sub>1</sub> = Exchange rate measured monthly Kenya shilling per unit US Dollar

X<sub>2</sub> = Inflation measured by inflation rate

X<sub>3</sub> = Interest rate measured using the 91 – day Treasury Bill Rate

X<sub>4</sub> = Money supply measured using monthly broad money supply (M3)

$\alpha_0$  = Constant

$\beta_1 - 4$  = Regression Coefficients

$\varepsilon$  = Is the Error Term

Ln= Natural Log

Exchange Rate = (Current rates-Previous rates)/Previous rates

$R_t = \ln P_t - \ln P_{t-1}$

$R_t$  – represents the returns of the NSE 20 share index

$P_t$  – represents the prices of the NSE 20 share index

### **3.7 Test of Significance**

This is a test that is used to establish the statistical significance of the study done. The study used F-Test so as to study the behavior of the general idea expressed here. The t-test is also applied to measure the regression coefficients at 95% confidence interval.

## CHAPTER FOUR

### DATA ANALYSIS, PRESENTATIONS AND DISCUSSION

#### 4.1 Introduction

This chapter covers the data analysis with respect to study variables, presentation of the findings and discussion. In the analysis, the chapter detail, the response rate, descriptive statistics, test of stationary using ADF model, test of leverage of effect using EGARCH and regression analysis.

#### 4.3 Descriptive Statistics

Descriptive statistics in this study includes, mean, median, maximum, minimum, Std. dev, skewness, kurtosis, and Jarque-Bera.

**Table 4. 1: Descriptive Statistics**

	<b>Exchange Rate (ExR) (Ksh.s/USD)</b>	<b>Inflation (%)</b>	<b>Interest Rate -91 Day Treasury Bill (IntR) (%)</b>	<b>Money Supply (MS) (Ksh)</b>	<b>Return (Rt) (%)</b>
Mean	0.003449	8.287083	8.436167	14.18911	-0.004690
Median	0.002726	6.610000	8.240000	14.22744	0.002716
Maximum	0.075478	19.72000	21.65000	14.83431	0.144054
Minimum	-0.079040	1.850000	1.630000	13.39584	-0.256647
Std. Dev.	0.022454	4.792123	3.519295	0.444380	0.056100
Skewness	-0.406367	1.094038	1.197676	-0.140936	-1.009290
Kurtosis	7.058291	2.987556	6.207907	1.748435	6.949380
Jarque-Bera	85.65131	23.93914	80.14191	8.229331	98.36136
Probability	0.000000	0.000006	0.000000	0.016331	0.000000
Sum	0.413832	994.4500	1012.340	1702.693	-0.562756
Sum Sq. Dev.	0.059996	2732.768	1473.867	23.49931	0.374517
Observations	120	120	120	120	120

Stock market returns in this study had a negative mean of -0.004690 and a standard

deviation of 0.0561. The other variable, exchange rate, Inflation, Interest rate and money supply have a positive mean (0.003449, 8.287083, 8.436167 and 14.18911 respectively). Exchange rates, money supply and stock market returns are negatively skewed while inflation, and interest rate are positively skewed.

For distribution of data, skewness test data distribution around the mean value. Under normal distribution, skewness is zero. If skewness is positive it shows long right tail and negative long left tail. Kurtosis on the other end determines how peak or flat is the distribution of the series. The critical value for kurtosis is 3 which implies a normal distribution. If the kurtosis is greater than 3 then the distribution is peaked and if less than 3 it's flat.

To ascertain that the NSE stock market returns and macro-economic variables in this study have normal distribution, the Jarque-Bera (JB) test was performed. Jarque-Bera statistic uses kurtosis and skewness to determine normality of distribution. The formula is;

$$JB = \frac{N}{6} \left[ s^2 + \frac{(k - 3)^2}{4} \right]$$

Where

N= sample size

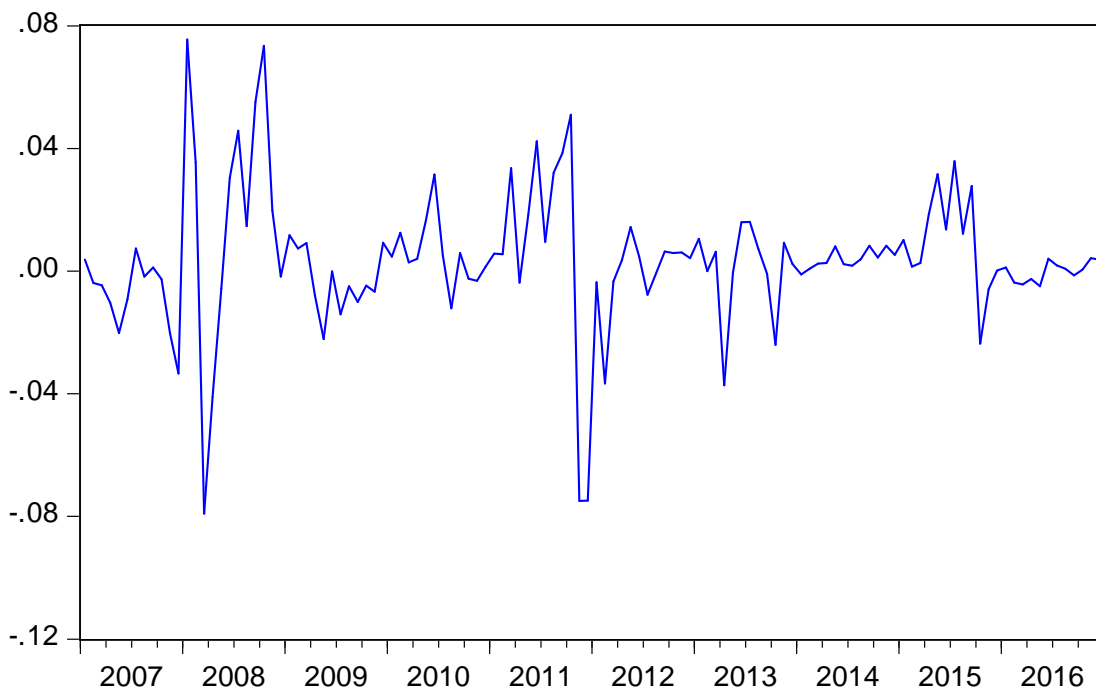
k = kurtosis.

s=skewness coefficient

In JB test, a variable has a normal distribution if jointly, skewness = 0 and kurtosis =3. If the condition for normal distribution are met with p value less than 5%, then the null

hypothesis is upheld that the data has normal distribution. If the conditions are not met, with p value  $<0.05$ , then the null hypothesis is rejected.

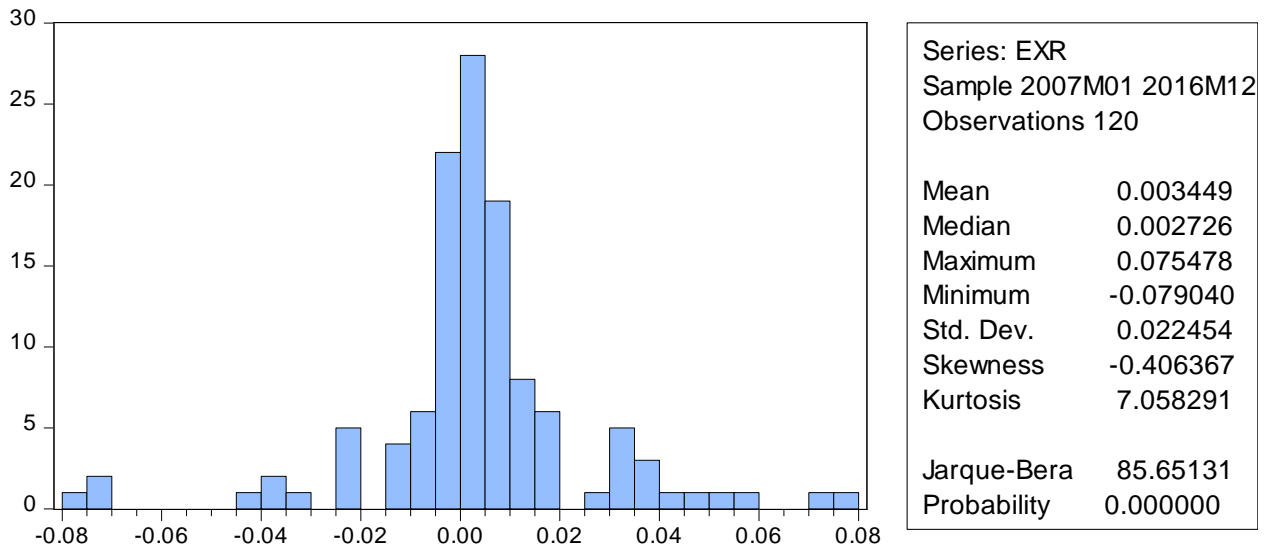
In this study, all the variables, have not met the conditions for normal distribution  $s=0$  and  $k=3$ . Therefore, at 95% confidence level, the null hypothesis was dropped and hence, the macroeconomic variables and stock market return are not normally distributed. Therefore, exchange rates and stock market returns as the major study variables do not follow normal distribution.



**Figure 4. 1: Exchange Rate Line Graph**

The exchange rate line graph shows the distribution of data along the zero line. The highest value recorded is 0.075, on January 2008 while the lowest was -0.079 recorded March 2008. From the graphical representation, exchange rate is high in mid-2007-mid 2008, mid 2010-mid 2011). Between mid-2008 to mid-2010, there is prolonged period of

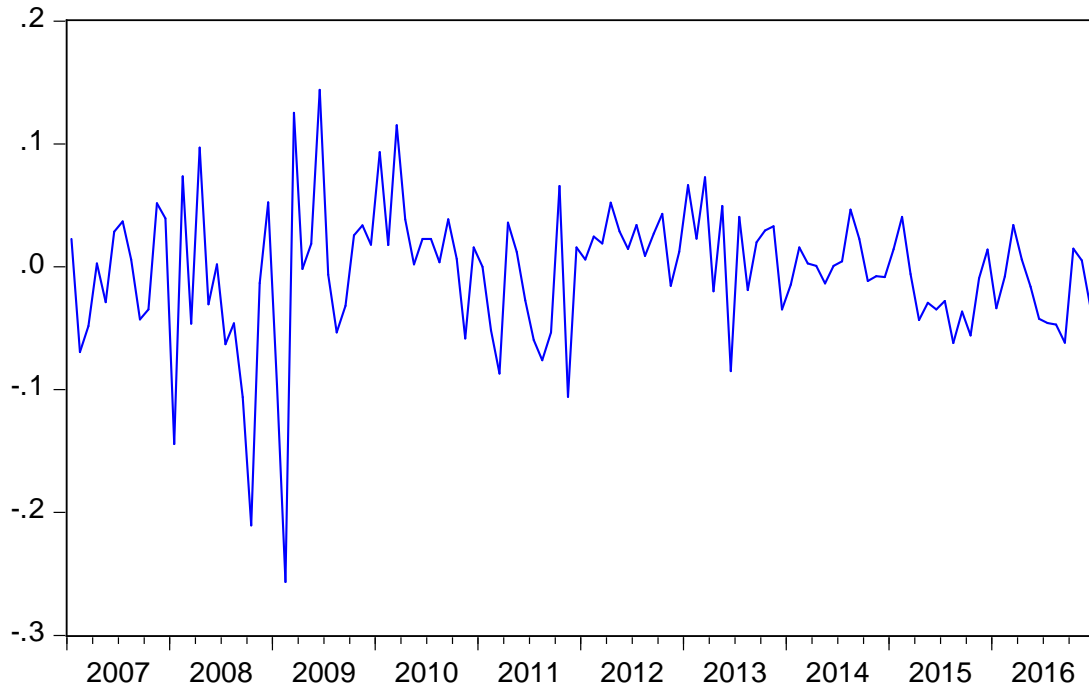
low exchange rate. The same phenomenon is witnessed between mid-2011 to almost 2015.



**Figure 4. 2: Exchange Rate Histogram**

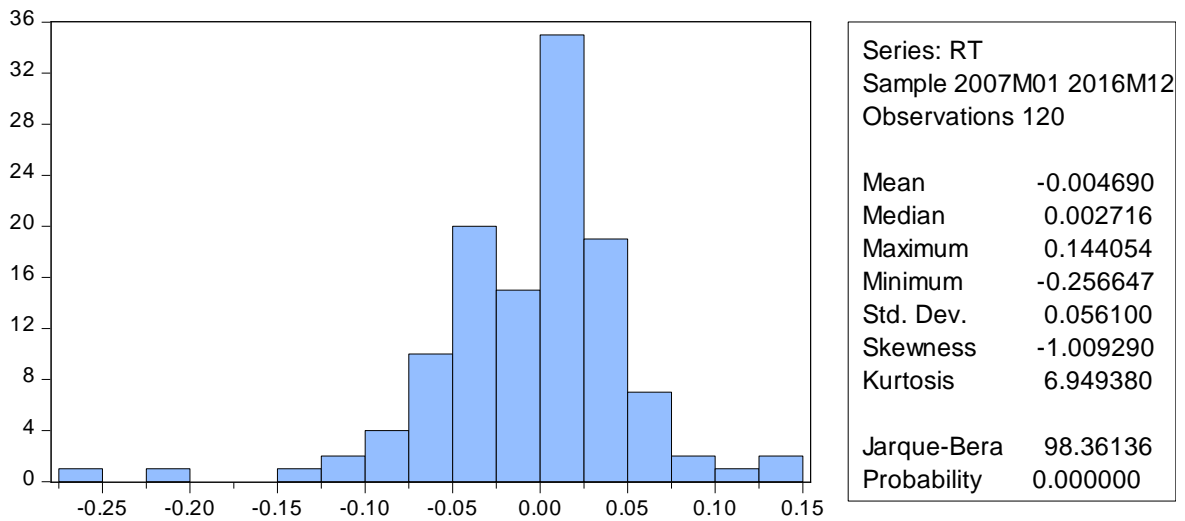
Exchange rate histogram indicates that Jarque-Bera values are above critical values at 95% confidence level. Therefore, exchange rate does not follow a normal distribution.





**Figure 4. 3: Stock Market Returns Line Graph**

Stock market returns were increasing in 2007 until Dec 2007 when they fell terribly to record the lowest value of -0.26 in Feb 2009. From March the returns increased but decreased in 2011. The highest value ever recorded with the observation period is 0.14 in June 2009. The lower market returns witnessed between Dec 2007 and 2009 are attributable to the post-election violence that succumbed Kenya after 2007 general election. In comparison, exchange rate and stock market return appear to move in tandem based on the distribution of data.



**Figure 4. 4: Stock Market Returns Histogram**

Stock Market Returns histogram indicates that Jarque-Bera values are above critical values at 95% confidence level. Therefore, Stock Market Returns do not follow a normal distribution.

#### **4.4 Augmented Dickey-Fuller Model**

ADF test is employed in empirical statistics to test stationary in a series. Unit root test ensures that there is no spurious regression in a data series. A time series of the form  $Y_t$  ( $t=1,2,\dots$ ) is stationary if the data is moving along a constants mean, that, values like variance, expectation and autocorrelation do not change with time.

In the augmented Dickey-Fuller test the t-values of ADF are compared to MacKinnon critical values at 95% confidence level to make a decision to reject null hypothesis or accept it. A null hypothesis using ADF model holds that a series is not stationery while alternate hypothesis hold that the variable is stationary. A ADF t-value greater than MacKinnon critical and significant, indicates that the series doesn't have a unit root hence its stationary and thus, null hypothesis is rejected.

**Table 4. 2: Unit Root Test**

<b>Series trend and Intercept (ADF Test)</b>	<b>ADF t-values</b>	<b>MacKinnon Critical value at 95% confidence level</b>	<b>Durbin Watson</b>	<b>P value</b>
ExR	-12.81013	-3.448681	2.149454	0.0000
Rt	-11.5162	-3.44902	2.051065	0.0000
Inflation	-4.394487	-3.449365	1.983257	0.0033
InR	-5.450902	-3.44902	1.978188	0.0001
MS	-12.24202	-3.448348	1.978957	0.0001

P values for exchange rate, Return, inflation, Interest rate and money supply all are below 0.05 indicating significant test at 95% confidence level. ADF t-values are bigger than the Mackinnon Critical values for all the series, done in 1<sup>st</sup> difference unit test. Therefore, all the variables are stationary hence null hypothesis is dropped.

#### **4.5 Granger Causality Test**

Granger causality test is a statistical measure used to test if a series can predict another in a given period of time. In this study, the dependent variable is stock market returns (rt).

**Table 4. 3: Granger Causality Test**

<b>Null Hypothesis:</b>	<b>Obs</b>	<b>F-Statistic</b>	<b>P value</b>
INFLATION does not Granger Cause RT	117	5.33752	0.0061
RT does not Granger Cause INFLATION		4.05577	0.0199
InR does not Granger Cause RT	117	0.22144	0.8017
RT does not Granger Cause InR		0.17933	0.8361
MS does not Granger Cause RT	117	0.71134	0.4932
RT does not Granger Cause MS		0.89053	0.4133
ExR does not Granger Cause RT	117	4.33203	0.0154
RT does not Granger Cause ExR		1.06143	0.3494

The unit root test indicated that the study series are stationary at 1<sup>st</sup> difference. With the stationary series, Granger causality test was performed pairwise with stock market return. Table 4.4 shows the null hypotheses that a series does not Granger Cause another. P values form the basis for rejecting or accepting the null hypothesis.

From the results, two-way granger causality is evident between Inflation and returns (rt). The alternate hypotheses was accepted that, inflation and returns Granger Cause each at 95% confidence level. Interest rates and Returns (rt) do not Granger Cause each other. This is inferred from the p value since the test causality is insignificant at 95% confidence level. Therefore, neither can returns nor Interest rates predict each other in future.

Money supply (MS) and Returns (rt) have p values (0.4932 and 0.4133) greater than 0.05. This means that null hypothesis cannot be rejected, hence there is no Granger Causality between the two series. Unilateral Granger Causality was evident between exchange rate (ExR) and Returns (rt). From the p values, the alternate hypothesis confirmed that ExR Granger Cause RT. Therefore, Exchange rates can predict Stock market Returns.

## **4.6 Exponential Generalized Autoregressive Conditional**

### **Heteroskedastic**

EGARCH model explains the leverage effect, in the view that negative news on exchange rate often increase securities performance than positive news.

**Table 4. 4: Exchange Rate and Stock Market Returns (EGARCH Model)**

Dependent Variable: RT				
Method: ML ARCH - Normal distribution (BFGS / Marquardt steps)				
Date: 11/21/17 Time: 16:25				
Sample: 2007M01 2016M12				
Included observations: 120				
Convergence achieved after 27 iterations				
LOG(GARCH) = C(3) + C(4)*ABS(RESID(-1)/@SQRT(GARCH(-1))) + C(5)				
*RESID(-1)/@SQRT(GARCH(-1)) + C(6)*LOG(GARCH(-1))				
Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	-0.003798	0.005365	-0.707876	0.4790
EXR	-0.299164	0.163929	-1.824958	0.0480
Variance Equation				
C(3)	-6.414926	1.849911	-3.467694	0.0005
C(4)	0.547408	0.232201	2.357469	0.0184
C(5)	-0.304284	0.103954	-2.927099	0.0034
C(6)	-0.004374	0.304500	-0.014366	0.9885
R-squared	0.041326	Mean dependent var		-0.004690
Adjusted R-squared	0.033202	S.D. dependent var		0.056100
S.E. of regression	0.055161	Akaike info criterion		-3.041903
Sum squared resid	0.359039	Schwarz criterion		-2.902529
Log likelihood	188.5142	Hannan-Quinn criter.		-2.985303
Durbin-Watson stat	1.972385			

ExR has a negative coefficient (-0.2992) significant at 95% confidence level. This implies that, higher exchange rates causes a decrease in stock market returns at NSE. The R square of the modal is 0.041 equivalent to 4.1%. This means that, stock market returns are also affected by other variables like money supply, inflation among other macroeconomic variables. The coefficient of C(5) is -0.3043 significant at 95%

confidence level. This indicates that there is leverage effect in stock market returns. Therefore, bad news have a big, negative effect on stock market changes than good news.

#### 4.7 Correlation Analysis

Correlation analysis is a statistical measure of how study variable co-move. It establishes the association between the variables by giving the direction and density of the affect. A bigger coefficient indicates strong relationship while smaller coefficient close to zero indicates weak relationship.

**Table 4. 5: Correlation Analysis**

		<b>Rt</b>	<b>ExR</b>	<b>Inflation</b>	<b>InR</b>	<b>MS</b>
Rt	Pearson Correlation	1				
	Sig. (2-tailed)					
	N	120				
ExR	Pearson Correlation	-.232*	1			
	Sig. (2-tailed)	.011				
	N	120	120			
Inflation	Pearson Correlation	-.215*	.105	1		
	Sig. (2-tailed)	.018	.256			
	N	120	120	120		
InR	Pearson Correlation	-.016	-.206*	.420**		
	Sig. (2-tailed)	.862	.024	.000		
	N	120	120	120		
MS	Pearson Correlation	.015	.020	-.205*	.341**	1
	Sig. (2-tailed)	.873	.828	.025	.000	
	N	120	120	120	120	120

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

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

A significant, negative and weak relationship is established between Exchange rate and stock market returns ( $r=-0.232$ ;  $p$  value =  $0.011 < 0.05$ ).

There is a weak and negative correlation between inflation and stock market return ( $r = -0.215$ ). The p value of 0.018 confirms that the association is significant at 95% confidence level. Therefore, inflation has an inverse effect on stock market return.

Interest rates have a weak and negative correlation with exchange rates and moderate and positive association with inflation ( $r = -0.206$  and  $0.420$  respectively). These relationships are significant at 95% confidence level. Therefore, an increase in interest rates decrease exchange rate and increase inflation.

Money supply has a weak and positive association with interest rate and weak, negative relationship with inflation ( $r = 0.341$  and  $-0.205$  respectively). This association is significant at 95% confidence level hence, an increase in money supply increase interest rates and has an inverse effect on inflation rate.

#### 4.8 Regression Analysis

Regression analysis gives a combined effect of all variables on the dependent variable. This study sought to analyze exchange rate on Stock market performance on NSE. Independent variables were exchange rates, Interest rate measured using the 90 – day Treasury Bill Rate, Inflation measured by CPI and money supply. The dependent variable was stock market returns.

**Table 4. 6: Model Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.305 <sup>a</sup>	.093	.062	.05434

a. Predictors: (Constant), MS, ExR, Inflation, InR

Model summary give the results of goodness of fit of the model. R square, the coefficient of determination was 0.093. This indicates that the model can predict 9.3% on the variations in stock market returns given the independent variables. Therefore, returns are highly affected by other external factors other than the predictor variables in this study.

**Table 4. 7: Analysis of Variance**

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.035	4	.009	2.952	.023 <sup>b</sup>
	Residual	.340	115	.003		
	Total	.375	119			

*a. Dependent Variable: Rt*

*b. Predictors: (Constant), MS, ExR, Inflation, InR*

Analysis of variance indicates general significance of the model. The p value of 0.023<0.05 reveal that, at 5% significance interval, the model was significant. Therefore, it can be employed to predict change in stock market returns.

**Table 4. 8: Coefficients of Regression Analysis**

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.095	.186		.512	.610
	ExR	-.491	.237	-.196	-2.067	.041
	Inflation	-.003	.001	-.228	-2.038	.044
	InR	.001	.002	.055	.463	.644
	MS	-.006	.013	-.047	-.442	.660

*a. Dependent Variable: Rt*

Coefficient analysis indicate that the model has a positive coefficient 0.095. This implies that holding all independent variable at zero, stock market returns (Rt) is equivalent to the



constant. Analysis on the p value indicate that the constant is insignificant at 95% confidence level (p value  $0.610 > 0.05$ ).

Exchange rate has a negative coefficient of -0.491 significant at 95% confidence level (p value =  $0.041 < 0.05$ ). Therefore, a decrease in Exchange rates contribute to increase in stock market returns and vice versa. Inflation also has a significant inverse effect on stock market returns. Inflation has a coefficient of -0.003 and p value of 0.044.

Interest rates affect returns positively ( $r = 0.001$ ) while Money supply negatively influence securities market returns ( $r = -0.006$ ). These variables, Interest rates and money supply however are insignificant at 95% confidence level.

#### 4.8.1 Fitting the Regression Model

The regression model in this study was,

$$Y = \alpha_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 \ln X_4 + \varepsilon$$

Where;

Y= Stock market return measured in averaged monthly NSE 20 Share Index

X<sub>1</sub> = Exchange rate measured in averaged monthly Kenya shillings per unit US Dollar

X<sub>2</sub> = Inflation measured using monthly inflation rate

X<sub>3</sub> = Interest rate measured using the 90 – day Treasury Bill Rate

X<sub>4</sub> = Money Supply measured in monthly broad money supply (M3)

$\alpha_0$  = Constant

$\beta_1 - 4$  = Regression Coefficients

$\varepsilon$  = the Error Term

Ln= Natural Log

Using only the significant variables, model became,

$$Y = -0.491X_1 - 0.003X_2 +$$

Where,

Y= Stock market return measured in monthly NSE 20 Share Index

X<sub>1</sub> = Exchange rate measured using monthly Kenya shillings per unit US Dollar

X<sub>2</sub> = Inflation measured using the monthly inflation rate

= the Error Term

#### **4.9 Discussion of Research Findings**

The study showed that stock market returns had negative mean of -0.004690 and a standard deviation of 0.0561. On the other hand, the other variables, exchange rates, inflation, interest rate and money supply have positive means ( 0.003449, 8.287083, 8.436167 and 14.18911 respectively). The higher standard deviation than the mean signifies high volatility in the securities market. The study also shows that exchange rate, money supply and stock market returns are negatively skewed while inflation and interest rates are positively skewed. With the Jarque-Bera test, the study shows that all the variables did not meet the condition for normal distribution. Therefore the major study variables, exchange rates and stock market returns do not follow normal distribution.

The unit root test showed that at 1<sup>st</sup> difference, the variables are stationary. This implies that the changes oscillates around a constant mean. The study further established that, Exchange rates Granger Cause stock market returns. These results concur with Kisaka and Mwasaru (2012) who concluded that exchange rates Granger-causes stock prices in Kenya thus implying that if the exchange rate becomes more volatile, the stock prices also follows the same trend.

Exchange rate has a weak negative coefficient significant at 95% confidence level. Therefore, an increase in Exchange rate will lead to a decrease in stock market returns.

These findings agree with Nyongesa and Muchoki (2016) who established the association between exchange rates and performance of the NSE. They used correlation analysis, ADF test and Engle and the data used was the monthly time series data between January 1996 to December 2011. They found a weak negative correlation between the variables. Inflation rates have an inverse effect on stock market returns. Therefore, an increase in inflation is linked to decreased stock market returns. The Granger Causality test confirm that inflation Granger Cause stock market returns at 95% confidence level.

The study further established that exchange rates have a leverage effect, as indicated by negative coefficient and significant p value in the EGARCH model. This implies that, bad news influence negatively stock market returns than good news. These findings concur with Mugambi and Koech (2016) who explored exchange rate and other macroeconomic variables effects on the stock market performance of the listed banks in the NSE. In their study, they had a conclusion that exchange rate had a significant effect on the stock market performance of these banks.

## CHAPTER FIVE

### SUMMARY, CONCLUSIONS AND RECOMMENDATION

#### 5.1 Introduction

This chapter covers summary of the findings, conclusions and recommendations. The study sought to analyze the effect of exchange rate on stock market performance in the Nairobi Securities Exchange. The chapter also tackles limitation of the study and suggestion of further research.

#### 5.2 Summary of the Findings

Descriptive statistics indicated that Securities market returns had a mean of -0.004690 and a Std. deviation of 0.0561. Exchange rate, Inflation, Interest rate and money supply have a positive mean (0.003449, 8.287083, 8.436167 and 14.18911 respectively). The higher standard deviation than mean signifies high volatility in the securities market. Exchange rates, money supply and stock market returns are negatively skewed while inflation, and interest rate are positively skewed.

In Jarque-Bera test, all the variables, did not meet the conditions for normal distribution  $s=0$  and  $k=3$ . Therefore, at 95% confidence level, the macroeconomic variables and stock market return are not normally distributed. Therefore, exchange rates and stock market returns as the major study variables do not follow normal distribution. P values for exchange rate, Return, inflation, Interest rate and money supply all are below 0.05 indicating significant test at 95% confidence level. ADF t-values are bigger than the Mackinnon Critical values for all the series, done in 1<sup>st</sup> difference unit test. Therefore, all the variables are stationary in 1<sup>st</sup> difference in this study.

From the results, two-way granger causality is evident between Inflation and returns (rt). The null hypotheses is rejected and alternate hypotheses accepted that, inflation and returns Granger Cause each at 95% confidence level. Unilateral Granger Causality was evident between exchange rate (ExR) and Returns (rt). From the p values, the study established that Exchange rates Granger Cause stock market returns.

Exchange rate has a negative coefficient (-0.2992) significant at 95% confidence level. This implies that, an increase in exchange rate causes a decrease in stock market returns at NSE. The R square of the modal is 0.041 equivalent to 4.1%. This means that, stock market returns are also affected by other variables. The coefficient of C(5) is -0.3043 significant at 95% confidence level. This indicates leverage effect in stock market returns.

The correlation analysis found out that a negative and significant association exists between Exchange rate and stock market returns ( $r=-0.232$ ). There is a weak and negative correlation between inflation and stock market return ( $r=-0.215$ ). The p value of 0.018 confirms that the association is significant at 95% confidence level. Therefore inflation has an inverse effect on stock market return.

Exchange rate has a negative coefficient of 0.491 significant at 95% confidence level (p value =  $0.041 < 0.05$ ). Inflation also has a significant inverse effect on stock market returns. Inflation has a coefficient of -0.003 and p value of 0.044. Thus, an increase in inflation will contribute to decrease in stock market returns. All the other variables had insignificant effect on stock market returns in regression analysis.

### **5.3 Conclusion**

The Granger causality test indicated that exchange rates Granger Cause Stock Market returns. Correlation examination likewise recognized that there is negatively weak but significant relationship between Exchange rates and stock market returns. The correlation analysis confirmed that indeed exchange rate and inflation are the only variables with substantial negative effect on stock market returns.

The EGARCH model established that exchange rate has a leverage effect on the stock market returns. Reading from the negative coefficient, exchange rates affect stock market returns such that higher exchange rates cause low stock market returns. The leverage effect indicated that, bad news have negative effect on stock market returns. Therefore, this study adds to the body of knowledge that, exchange rates have negative effect on stock market returns at NSE and that bad news have greater impact on stock market returns.

The findings of the study also showed a significant negative relationship between inflation rate and stock market returns. Interest rate and money supply are insignificantly related to changes in stock market return. This is because their p-value in the correlation analysis measure is a number greater than 0.05. The findings from the regression analysis show that the dependent variable, stock market return only depends on the exchange rate and inflation rate. The findings show that the model can only predict 9.3% on the disparities in the stock market returns given the independent variables. This indicates that stock market returns are extremely influenced by other exterior factors other than the predictor variables in the study.

The value of the  $R^2$  indicate that stock market returns are also affected by other variables like money supply, inflation, interest rates. The analysis of the study indicates that the model was significant, it can be used to predict changes in stock market returns. This is because the p-value in the ANOVA is a figure less than 5% significance interval  $0.023 < 0.05$ . From the coefficient of regression analysis, the constant was concluded to be insignificant.

#### **5.4 Recommendation**

The study has established that exchange rates have a negative effect on stock market returns. Therefore, the study acclaims that Capital Market Authority should understand the effect of exchange rate and implement sound policy which will steer development in financial markets by containing adverse exchange rate levels. The fact that exchange rate have inverse effect on stock market returns relates to the operation of foreign exchange market. This implies that there should be policy framework to ensure the Kenyan shilling is stable which is likely to attract foreign investors hence enhancing market liquidity.

Very unpredictable exchange rate could evidently cause premeditated and administrative issues because it could clearly lead to damages. Such scenarios result to uncertainty whether to invest in that economy. Thus in times of extreme movements of exchange rate, the CMA needs to intervene as fast as possible. Investors are also recommended to keenly study the trend and nature of the exchange rate and the change of the other macro-economic variables so as to make an informed decision on where to direct their investments.

The study recommends well use of the hedging strategies available in the Kenyan market. More of the hedging strategies need also to be introduced to the Kenya financial market so as to cater for proper financial and economic risks which are always present because of the uncertainties of the future in the financial industry. Kenya being an import oriented country, the use of forward contracts to hedge their payables is highly recommendable.

### **5.5 Limitations of the Study**

The study was limited to 10 years data with 120 months observations. Including a bigger sample could generate different results. In calculating stock market returns, the study factored NSE 20 Share Index for the listed companies. Therefore, companies not listed in NSE are excluded from the analysis. There are also other indices of stock returns such as all share index which could have generated different results if used.

Exchange rates were limited to US currency. This means exchange rate measured in other foreign currencies unlike US dollar could lead to a different results. The study took monthly observation to estimate changes in exchange rates and stock markets. In reality, changes in these variables occur in measure of seconds in all the week days. Therefore, the results may not be perfectly accurate.

The data obtained for monthly record since 2006 is dependent on the records at Kenya National Bureau of Statistics (KNBS). Therefore, any error involved in the source data is transferred to the study results. There could also be wrong figure typo error which could affect the results, though the chances of this happening is low because there was great keenness in data entry. Fetching data from the NSE took long period than expected thus



giving pressure in the completion of the analysis. At the same time, data from the NSE is quite expensive considering that the research is for academic matters.

## **5.6 Suggestion for Further Research**

A similar research on effect of exchange rate on stock market returns can be undertake but with other measures. For instance instead of US currency studies should be done to involve multiple foreign currencies against the Kenya shilling. So that each single exchange rate is analyzed so as to know which foreign currency affect the country's stock market return highly. Stock market returns can also be measured whether in Pine Bridge 27 index or all share index.

This study established that exchange rates have leverage effects on stock market returns. Consequently the study proposes additional research works to be done on leverage effects on stock market returns. Other studies on stock market returns can also be done on the effect of inflation on the stock market return using the CPI because this study used inflation rate in the measure of inflation.

The study established that, money supply and interest rate 91 T-bill have insignificant effect on stock market returns. A further study can be done to establish the contribution of macro-economic variables on stock market returns. From the model summary, the results indicate that stock market returns are highly affected by other external factors other than the macro-economic variables in the study. A further study can be done on comparing different stock market performances by the effect of the exchange rate volatility and the other macro-economic variables of the respective countries.

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## APPENDICES

### Appendix I: Research Data

Period	NSE 20 Share Index (Ksh.s)	$R_t$	Exchange rates (Ksh/USD)	ExR	Inflation rate (%)	InR (%)	Money Supply (Ksh.s)	MS (Ln Money Supply)
Dec-06	5645.7		69.627				653,036	
Jan-07	5774.3	0.022	69.885	0.0037	4.63	6.00	657,262	13.395
Feb-07	5387.3	-0.069	69.616	-0.0038	3.02	6.22	659,949	13.400
Mar-07	5133.7	-0.048	69.293	-0.0046	2.19	6.32	677,349	13.426
Apr-07	5148.1	0.003	68.577	-0.0103	1.85	6.65	682,168	13.433
May-07	5001.8	-0.029	67.191	-0.0202	1.96	6.77	690,543	13.445
Jun-07	5146.7	0.029	66.575	-0.0092	4.07	6.53	708,392	13.471
Jul-07	5340.1	0.034	67.068	0.0074	5.48	6.52	713,613	13.478
Aug-07	5372.0	0.006	66.946	-0.0018	5.30	7.30	730,511	13.501
Sep-07	5146.5	-0.043	67.024	0.0012	5.53	7.35	733,329	13.505
Oct-07	4971.0	-0.035	66.844	-0.0027	5.38	7.55	739,663	13.514
Nov-07	5234.5	0.052	65.49	-0.0203	6.08	7.52	748,761	13.526
Dec-07	5444.8	0.040	63.303	-0.0334	5.70	6.87	777,596	13.564
Jan-08	4712.7	-0.144	68.081	0.0755	9.40	6.95	801,247	13.594
Feb-08	5072.4	0.074	70.496	0.0355	10.58	7.28	810,206	13.605
Mar-08	4843.2	-0.046	64.924	-0.0790	11.90	6.89	811,214	13.606
Apr-08	5336.0	0.097	62.256	-0.0411	16.12	7.35	864,105	13.669
May-08	5175.8	-0.030	61.899	-0.0057	18.61	7.76	839,239	13.640
Jun-08	5185.6	0.002	63.783	0.0304	17.87	7.73	840,679	13.642
Jul-08	4868.3	-0.063	66.704	0.0458	17.12	8.03	850,412	13.653
Aug-08	4648.8	-0.046	67.679	0.0146	18.33	8.02	854,952	13.659
Sep-08	4180.4	-0.106	71.409	0.0551	18.73	7.69	859,328	13.664

Oct-08	3386.7	-0.211	76.657	0.0735	18.74	7.75	883,739	13.692
Nov-08	3341.5	-0.013	78.176	0.0198	19.54	8.39	890,233	13.699
Dec-08	3521.2	0.053	78.04	-0.0017	17.83	8.59	901,132	13.711
Jan-09	3198.9	-0.096	78.95	0.0117	13.22	8.46	895,397	13.705
Feb-09	2474.8	-0.257	79.533	0.0074	14.69	7.55	900,031	13.710
Mar-09	2805.0	0.125	80.261	0.0092	14.60	7.31	906,067	13.717
Apr-09	2800.1	-0.002	79.626	-0.0079	12.42	7.34	928,824	13.742
May-09	2852.6	0.019	77.861	-0.0222	9.61	7.45	928,604	13.741
Jun-09	3294.6	0.144	77.851	-0.0001	8.60	7.33	950,239	13.764
Jul-09	3273.1	-0.007	76.751	-0.0141	8.44	7.24	973,623	13.789
Aug-09	3102.7	-0.053	76.372	-0.0049	7.36	7.25	984,026	13.799
Sep-09	3005.5	-0.032	75.605	-0.0100	6.74	7.29	986,901	13.802
Oct-09	3083.6	0.026	75.244	-0.0048	6.62	7.26	1,006,009	13.822
Nov-09	3189.6	0.034	74.739	-0.0067	5.00	7.22	1,022,339	13.838
Dec-09	3247.4	0.018	75.431	0.0093	5.32	6.82	1,045,533	13.860
Jan-10	3565.3	0.093	75.786	0.0047	5.95	6.56	1,067,271	13.881
Feb-10	3629.4	0.019	76.73	0.0125	5.18	6.21	1,084,345	13.896
Mar-10	4072.9	0.115	76.947	0.0028	3.97	5.98	1,107,896	13.918
Apr-10	4233.2	0.039	77.254	0.0040	3.66	5.17	1,122,790	13.931
May-10	4241.8	0.002	78.541	0.0167	3.88	4.21	1,159,595	13.964
Jun-10	4339.3	0.023	81.018	0.0315	3.49	2.98	1,198,930	13.997
Jul-10	4438.6	0.023	81.426	0.0050	3.57	1.63	1,213,212	14.009
Aug-10	4454.6	0.004	80.44	-0.0121	3.22	1.83	1,216,829	14.0118
Sep-10	4629.8	0.039	80.912	0.0059	3.21	2.04	1,243,601	14.034
Oct-10	4659.6	0.006	80.714	-0.0024	3.18	2.12	1,254,488	14.042
Nov-10	4395.2	-0.058	80.46	-0.0031	3.84	2.21	1,258,812	14.046
Dec-10	4464.9	0.016	80.568	0.0013	4.51	2.28	1,271,638	14.056



Jan-11	4465.0	2.240	81.029	0.0057	4.52	2.41	1,285,452	14.067
Feb-11	4240.0	-0.052	81.473	0.0055	6.53	2.57	1,306,395	14.083
Mar-11	3887.0	-0.087	84.206	0.0335	9.19	2.77	1,324,685	14.097
Apr-11	4029.0	0.036	83.89	-0.0038	12.05	3.26	1,334,898	14.104
May-11	4078.0	0.012	85.433	0.0184	12.95	5.35	1,351,380	14.117
Jun-11	3968.0	-0.027	89.049	0.0423	14.49	8.95	1,380,732	14.138
Jul-11	3738.0	-0.060	89.898	0.0095	15.53	8.99	1,412,702	14.161
Aug-11	3464.0	-0.076	92.786	0.0321	16.65	9.23	1,436,877	14.178
Sep-11	3284.0	-0.053	96.357	0.0385	17.32	11.93	1,484,198	14.210
Oct-11	3507.0	0.066	101.27	0.0510	18.91	14.8	1,513,656	14.230
Nov-11	3155.0	-0.106	93.676	-0.0750	19.72	16.14	1,489,751	14.214
Dec-11	3205.0	0.016	86.663	-0.0749	18.93	18.3	1,514,152	14.230
Jan-12	3224.0	0.006	86.343	-0.0037	18.31	20.56	1,505,814	14.225
Feb-12	3304.0	0.025	83.176	-0.0367	16.69	19.70	1,504,798	14.224
Mar-12	3367.0	0.019	82.897	-0.0034	15.61	17.80	1,517,126	14.232
Apr-12	3547.0	0.052	83.188	0.0035	13.06	16.01	1,536,287	14.245
May-12	3651.0	0.029	84.384	0.0144	12.22	11.18	1,561,704	14.261
Jun-12	3704.0	0.014	84.789	0.0048	10.05	10.09	1,595,059	14.282
Jul-12	3832.0	0.034	84.14	-0.0077	7.74	11.95	1,613,102	14.294
Aug-12	3866.0	0.009	84.075	-0.0008	6.09	10.93	1,638,708	14.309
Sep-12	3972.0	0.0270	84.613	0.0064	5.32	7.77	1,671,318	14.329
Oct-12	4147.0	0.043	85.112	0.0059	4.14	8.98	1,703,002	14.348
Nov-12	4083.0	-0.016	85.629	0.0061	3.25	9.80	1,740,868	14.370
Dec-12	4133.0	0.012	85.994	0.0043	3.20	8.30	1,728,386	14.363
Jan-13	4417.0	0.066	86.9	0.0105	3.67	8.08	1,730,597	14.364
Feb-13	4519.0	0.023	86.9	0.0000	4.45	8.38	1,747,890	14.374
Mar-13	4861.0	0.073	87.446	0.0063	4.11	9.88	1,755,742	14.378

Apr-13	4765.0	-0.020	84.189	-0.0372	4.14	10.38	1,802,430	14.405
May-13	5006.0	0.049	84.146	-0.0005	4.05	9.46	1,823,398	14.416
Jun-13	4598.0	-0.085	85.488	0.0160	4.91	6.21	1,820,879	14.415
Jul-13	4788.0	0.040	86.86	0.0161	6.02	5.92	1,835,816	14.423
Aug-13	4698.0	-0.019	87.493	0.0073	6.67	10.03	1,849,974	14.431
Sep-13	4793.0	0.020	87.413	-0.0009	8.29	9.58	1,885,784	14.450
Oct-13	4936.0	0.029	85.31	-0.0241	7.76	9.72	1,900,194	14.457
Nov-13	5101.0	0.033	86.103	0.0093	7.36	9.94	1,953,621	14.485
Dec-13	4927.0	-0.035	86.309	0.0024	7.15	9.52	1,996,243	14.507
Jan-14	4856.0	-0.015	86.214	-0.0011	7.21	9.26	2,026,568	14.522
Feb-14	4933.0	0.012	86.278	0.0007	6.86	9.16	2,030,488	14.524
Mar-14	4946.0	0.003	86.489	0.0025	6.27	8.98	2,060,313	14.538
Apr-14	4949.0	0.001	86.716	0.0026	6.41	8.80	2,100,610	14.558
May-14	4882.0	-0.014	87.412	0.0080	7.3	8.82	2,147,600	14.580
Jun-14	4885.0	0.001	87.612	0.0023	7.39	9.81	2,151,574	14.582
Jul-14	4906.0	0.004	87.769	0.0018	7.67	9.78	2,190,076	14.599
Aug-14	5139.0	0.046	88.106	0.0038	8.36	8.29	2,253,316	14.628
Sep-14	5256.0	0.023	88.836	0.0083	6.60	8.38	2,251,762	14.627
Oct-14	5195.0	-0.012	89.227	0.0044	6.43	8.67	2,260,023	14.631
Nov-14	5156.0	-0.008	89.963	0.0083	6.09	8.64	2,295,147	14.646
Dec-14	5113.0	-0.008	90.444	0.0054	6.02	8.58	2,329,979	14.661
Jan-15	5187.0	0.014	91.36	0.0101	5.53	8.59	2,350,802	14.670
Feb-15	5402.0	0.041	91.49	0.0014	5.61	8.59	2,407,825	14.694
Mar-15	5370.0	-0.006	91.73	0.0026	6.31	8.49	2,398,762	14.690
Apr-15	5142.0	-0.043	93.44	0.0186	7.08	8.42	2,464,482	14.717
May-15	4994.0	-0.029	96.39	0.0316	6.87	8.26	2,501,589	14.732
Jun-15	4824.0	-0.035	97.7	0.0136	7.03	8.26	2,552,995	14.753

Jul-15	4692.0	-0.028	101.2	0.0358	6.62	10.57	2,549,292	14.751
Aug-15	4410.0	-0.062	102.43	0.0122	5.84	11.54	2,570,188	14.759
Sep-15	4252.0	-0.036	105.27	0.0277	5.97	14.61	2,556,222	14.754
Oct-15	4021.0	-0.056	102.78	-0.0237	6.72	21.65	2,574,751	14.761
Nov-15	3983.0	-0.009	102.17	-0.0059	7.32	12.34	2,604,514	14.773
Dec-15	4039.0	0.014	102.19	0.0002	8.01	9.81	2,658,166	14.793
Jan-16	3905.0	-0.034	102.31	0.0012	7.78	11.36	2,613,710	14.776
Feb-16	3874.0	-0.008	101.93	-0.0037	6.84	10.63	2,627,504	14.782
Mar-16	4008.0	0.034	101.49	-0.0043	6.45	8.72	2,662,198	14.795
Apr-16	4032.0	0.006	101.23	-0.0026	5.27	8.92	2,691,693	14.806
May-16	3967.0	-0.016	100.73	-0.0049	5.00	8.15	2,708,753	14.812
Jun-16	3802.0	-0.042	101.14	0.0041	5.80	7.25	2,756,115	14.829
Jul-16	3632.0	-0.046	101.33	0.0019	6.40	7.41	2,713,596	14.814
Aug-16	3465.0	-0.047	101.41	0.0008	6.26	8.48	2,739,586	14.823
Sep-16	3257.0	-0.062	101.27	-0.0014	6.34	8.06	2,764,910	14.833
Oct-16	3305.0	0.015	101.32	0.0005	6.47	7.76	2,753,396	14.828
Nov-16	3322.0	0.005	101.75	0.0042	6.68	8.22	2,769,873	14.834
Dec-16	3216.0	-0.032	102.13	0.0037	6.35	8.44	2,756,128	14.829

## Appendix II: Companies Listed in the NSE as at 23<sup>rd</sup> Nov 2017

### AGRICULTURAL

Eaagads Ltd Ord 1.25 AIMS

Kapchorua Tea Co. Ltd Ord Ord 5.00 AIMS

Kakuzi Ord.5.00

Limuru Tea Co. Ltd Ord 20.00

Rea Vipingo Plantations Ltd Ord 5.00

Sasini Ltd Ord 1.00

Williamson Tea Kenya Ltd Ord 5.00

### AUTOMOBILES AND ACCESSORIES

Car and General (K) Ltd Ord 5.00

Sameer Africa Ltd Ord 5.00

### BANKING

Barclays Bank Ltd Ord 0.50

CFC Stanbic Holdings Ltd ord.5.00

I&M Holdings Ltd Ord 1.00

Diamond Trust Bank Kenya Ltd Ord 4.00

HF Group Ltd Ord 5.00

**KCB Group Ltd Ord 1.00**

**National Bank of Kenya Ltd Ord 5.00**

**NIC Group PLC**

**Standard Chartered Bank Ltd Ord 5.00**

**Equity Group Holdings Ord 0.50**

**The Co-operative Bank of Kenya Ltd Ord 1.00**

**COMMERCIAL AND SERVICES**

**Express Ltd Ord 5.00**

**Kenya Airways Ltd Ord 5.00**

**Nation Media Group Ord. 2.50**

**Standard Group Ltd Ord 5.00**

**TPS Eastern Africa (Serena) Ltd Ord 1.00**

**Scangroup Ltd Ord 1.00**

**Uchumi Supermarket Ltd Ord 5.00**

**Longhorn Publishers Ltd**

**Atlas Development and Support Services**

**Deacons (East Africa) Plc Ord 2.50**

**Nairobi Business Ventures Ltd**

## CONSTRUCTION AND ALLIED

Athi River Mining Ord 5.00

Bamburi Cement Ltd Ord 5.00

Crown Berger Ltd Ord 5.00

E.A.Cables Ltd Ord 0.50

E.A.Portland Cement Ltd Ord 5.00

## ENERGY AND PETROLEUM

KenolKobil Ltd Ord 0.05

Total Kenya Ltd Ord 5.00

KenGen Ltd Ord. 2.50

Kenya Power & Lighting Co Ltd

Umeme Ltd Ord 0.50

## INSURANCE

Jubilee Holdings Ltd Ord 5.00

Sanlam Kenya PLC Ord 5.00

Kenya Re-Insurance Corporation Ltd Ord 2.50

Liberty Kenya Holdings Ltd

Britam Holdings Ltd Ord 0.10

**CIC Insurance Group Ltd Ord 1.00**

**INVESTMENT**

**Olympia Capital Holdings Ltd Ord 5.00**

**Centum Investment Co Ltd Ord 0.50**

**Trans-Century Ltd**

**INVESTMENT**

**Home Afrika Ltd Ord 1.00**

**Kurwitu Ventures**

**INVESTMENT SERVICES**

**Nairobi Securities Exchange Ltd Ord 4.00**

**MANUFACTURING AND ALLIED**

**B.O.C Kenya Ltd Ord 5.00**

**British American Tobacco Kenya Ltd Ord 10.00**

**Carbacid Investments Ltd Ord 5.00**

**East African Breweries Ltd Ord 2.00**

**Mumias Sugar Co. Ltd Ord 2.00**

**Unga Group Ltd Ord 5.00**

Eveready East Africa Ltd Ord.1.00

Kenya Orchards Ltd Ord 5.00

Flame Tree Group Holdings Ltd Ord 0.825

**TELECOMMUNICATION AND TECHNOLOGY**

Safaricom Ltd Ord 0.05

**REAL ESTATE INVESTMENT TRUST**

Stanlib Fahari I-REIT

**EXCHANGE TRADED FUND**

New Gold Issuer (RP) Ltd

**Source: [www.nse.co.ke](http://www.nse.co.ke)**



### **Appendix III: Companies Constituting the NSE 20 Share Index.**

1	ARM Cement
2	Bamburi Cement
3	Barclays Bank Kenya
4	Britam
5	British American Tobacco Kenya
6	Centum Invest
7	CfC Stanbic
8	Co-operative Bank
9	East African Breweries
10	Equity Group
11	KCB Group
12	KenolKobil
13	Kenya Airways
14	Kenya Electricity Generating
15	Kenya Power Lighting
16	Nation Media
17	Safaricom
18	Sasini
19	Standard Chartered Bank
20	WPP-Scangroup

**Source: [www.nse.co.ke](http://www.nse.co.ke)**