

**THE EFFECT OF EXCHANGE RATE MOVEMENT ON THE  
PERFORMANCE OF THE NAIROBI SECURITIES EXCHANGE**

**BY**

**OMONDI JOHN OCHIENG**

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## DECLARATION

I the undersigned declare that this research project is my original work. It is being submitted for the Degree of Master of Business Administration at the University of Nairobi. It has not been submitted before for any degree or examination in any University.

Signature ..... Date .....

John Ochieng

**D61/72762/2014**

This research project has been submitted for examination with my approval as the University of Nairobi Supervisor.

Signature ..... Date .....

**Dr. Mirie Mwangi,**

**Chairman, Department of Finance and Accounting,**

**School of Business,**

**University of Nairobi**

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## **DEDICATION**

I inscribe this research project to my spouse, Pamela Atieno, and Daughter, Marion Meeky. Thank you for all your love, support and endless patience. It is my belief that we will enjoy the fruits of this course together.

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## LIST OF ABBREVIATIONS

APT	—	Arbitrage Pricing Theory
ARMA	—	Autoregressive Moving Average Model
BREXIT	—	British Exit
CAPM	—	Capital Asset Pricing Model
CBK	—	Central Bank of Kenya
CBR	—	Central Bank Rate
FOREX	—	Foreign Exchange
GARCH	—	Generalized Autoregressive Conditional Heteroskedascity
GDP	—	Gross Domestic Product
HKD	—	Hong Kong Dollar
KSHS	—	Kenya Shillings
NASI	—	NSE All Share Index
NSE	—	Nairobi Securities Exchange
SAP	—	Structural Adjustment Programme
SOM	—	Stock Oriented Model
PPP	—	Purchasing Power Parity
SPSS	—	Statistical Package for Social Sciences
US	—	United States
USD	—	United States Dollar

## **ABSTRACT**

The increasing level of integration progressively amongst the international foreign exchange and equity markets has led to an increased scholarly interest in stock prices in relation to exchange rate and. This has in turn led to the increasing influx of alien investors in both the foreign exchange and Nairobi Securities Exchange markets in Kenya, it would be thus of much interest to explore how foreign exchange rate changes have impacted the stock market performance in Kenya. Much of the studies that have been done in Kenya have focused majorly on NSE listed entities' performance and how they are affected by foreign currency fluctuations. This study sought to take a departure and analyse the effect of exchange rate movement (shilling dollar parity) on NSE Market performance while taking into account the movement in the major indices. The study used a descriptive design as well as a longitudinal design to attain the objectives of the research. The variables being investigated are the NSE All and 20 Share Indices and Foreign Exchange Rate. The researcher utilized secondary data sourced from the Central Bank of Kenya (CBK) rates and statistics and Nairobi Securities Exchange. The stock index data was obtained from NSE reports while the exchange rate data was obtained from the CBK rates and statistics report. The data set for the study consisted of monthly data observations covering the period December 2010 to August 2016 for both index movement and FOREX volatility. The data distribution decided on was monthly to guarantee an acceptable quantity of observations. The data was modelled in time series. The data was analysed using both the Statistical Package for Social Sciences and Microsoft Excel Spreadsheet. The results of the model are presented using tables in order to display the effect of the independent variable (Exchange Rate) on the specific dependent variables NSE All and 20 Share Indices. Correlation and Regression analyses were utilized in analysing the data collected. Albeit not statistically significant, results from both the Pearson's partial correlation and regression analyses reveal weak and negative associations between the Nairobi Securities Exchange Market Performance as measured by both the NSE All and 20 Share Indices, controlling for interest rates and inflation.

# CHAPTER ONE

## INTRODUCTION

### 1.1 Background of the Study

Stock prices and exchange play an essential mantle in a nation's economic growth. Securities market contributes significantly in financial intermediation all over the world. It pools different investor funds and avails to listed organizations long-term capital thus allowing them to expand in business through alternative investment vehicles. Thus securities market index gives a historic securities market performance, the standard to assess individual portfolio performances (Ologunde, Elumilade & Saolu, 2006). Such factors, as dividends, firm performance, stock prices for other countries, GDP, interest rates, employment, current account, supply of money and exchange rates have an impact on daily stock prices (Kurihara, 2006).

Inter-temporal link between returns in stock and exchange rates has become a major concern to economists for varied reasons, as both contribute immensely towards influencing the level of development of a country's economy. Continuing increases in capital movements and world trade have rendered exchange rates key equity price and business profitability determinants (Kim, 2003). The impact of exchange rate on both output and input price directly determine the value and international competitiveness of firms (Joseph, 2002). Thus, demystifying this association will assist foreign and local investors in both portfolio diversification and hedging.

Studies by Naik (2013), Osamuonyi and Evbayiro-Osagie (2012), Ochieng and Oriwo (2012) in the developing markets, show a connection between macroeconomic variables and stock market performance. Whereas economic theory postulates that changes in foreign exchange can have a significant effect on stock prices by affecting

investment, cash flow and firm profitability, empirical studies on this relationship remains mixed and inconclusive (Vygodina, 2006; Joseph, 2002). As such, the securities market analysis is crucial since it is the delicate most economic segment and the country's gateway segment to the outer world exposure.

### **1.1.1 Exchange Rate Movement**

Exchange rate invariability and sustained growth in capital market are required for financial system steadiness and monetary policy success. The Kenyan financial system has improved significantly over the years. Exchange rate instability has a momentous impact on the whole economy of a state, industry, companies and foreign investors. The appreciation of Kenya Shilling against the US dollar is a signal of the strengthening of Kenya's economy with reference to the US economy and vice versa (Abor, 2005).

Over the years, the monetary authority has put in place various exchange rate regimes to achieve a sound financial system. The exchange rate policy applied at any time depends on the prevailing conditions in the economy. The 1986 Structural Adjustment Programme (SAP) introduction with a supple exchange rate regime and later improved to full deregulated system has marked the turning point in Kenya's exchange rate management. SAP-instigated 1994 first quarter reforms installed a volatile exchange rate policy, with the Kenyan shilling value subsequently being subject to its supply and demand in the money markets internationally (Abor, 2005).

Preceding the reform, the government of Kenya conformed to a static exchange era whereby the shilling was set at a fixed rate to the US dollar reliant on alterations only to remedy considerable spins. From the time when the flexible exchange era was installed, the shilling has to a large extent depreciated in relation to the US dollar. In

the year 1995, the exchange rate had a mean of Kshs 51.430 per US \$1, with the rate depreciating to a mean of Kshs 70.326 per US\$1 in 1999, and a mean of Kshs 76.93 per US\$1 in 2000. After the reform in 1994, the Shilling exchange rate has been highly unstable. Depreciation of the domestic currency makes exporting commodities ravishing, upsurges external demand and therefore the firm proceeds and value increase hence stock prices upsurge. On the contrary, domestic currency growth diminishes an exporting company's profit and hence adversely affecting the stock price value (Jorion, 1991).

Dornbusch and Fischer (2013) suggest that vacillations in exchange rate can materially have an effect on firm value, as they direct the terms of competition, the value of firm's liabilities and assets denominated in foreign currencies, the input and output prices. Therefore, the fluctuations affect the cost of a firm's funds and its earnings competitiveness and thereby impacting on the value of its shares. Whilst enterprises with alien operations, from global production to exporting, are affected compared to local firms, virtually no firm can be considered wholly protected from exchange rate implication changes.

### **1.1.2 Performance of Securities Exchanges**

The performance of any securities exchange market is measured using indices. An index can be used to not only see how the stock market has increased over time, but also allows easy comparison between securities that represent different sectors. Stock markets can be volatile and can be affected by factors such as: internal company developments, world events, inflation and interest rates, hype and exchange rates (Wolski, 2007). Movement in global stock markets pose profound economic consequences on the economies and its citizens. A fall in share prices has the latent to

cause pervasive economic disruption such as the stock market crash of 1929 which was a vital reason for the great depression of the 1930s.

Securities markets play an essential part in the global fiscal system as well as in a country's longstanding economic development. This perspective is supported by the most recent empirical data at both the micro and macroeconomic levels. The study offers that both financial as well as thriving stock markets are prized essentials in encouraging an all-inclusive economic stability and growth (Levine & Zervos, 1998). The marketplaces run by exchange rates have over time grown at an unexpected pace, earning them a primary responsibility and role in the international financial system.

Security exchanges and payment institutions integrate guidelines, expertise, and technology to enhance clear, effectual and unified settlement and trading of assets. In this regard, they increase efficacy across the value chain of transaction, enhance the multi-layered financial information quality and enhance all capital market players' input. As such, payment institutions and security exchanges are significant players in the international financial sector and ought to achieve a discrete role within the financial industry (Rajan & Zingales, 1998).

### **1.1.3 Exchange Rate Movement and Performance of Securities Exchanges**

Securities market is a principal economic activity indicator. Pan, Chi-Wind & Angela (2007) pointed out that constant rising fluctuations in stock prices are normally indicative of economic developments, which light growth of money as commercial banks respond to growing demand for supplementary loans. Growing money demand will consequently result in an increase in interest rates; rising interest rates in turn cause domestic currency increase as well as capital inflows. This means that stock

price changes may impact outflows and inflows capital, which consequently results in domestic currency changes in exchange rate.

Aggarwal (1981) shows that there exists a positive exchange rate change impact on the US stock market, while Solnik (2000) reveals that exchange rate fluctuations can considerably affect the values of firms, and the foreign currency value disparities in denominated assets. According to Bodnar and Gentry (1993), in their study on Japan, Canada and the US firms' stock prices and exchange rate movements, their findings show that the causality direction runs from exchange rates to stock prices.

A devaluing currency causes stock prices decline due to inflation expectations (Ajayi & Mougoue, 1996). The nominal exchange rate downswing generates inflation forecasts. Generally, the exchange rate influence on stock prices is mixed and unsettled as there exists some validation for both a negative and positive association. According to Ajayi and Mougoue (1996), the negative influence is evidently predominant.

#### **1.1.4 Nairobi Securities Exchange and Exchange Rate Movement in Kenya**

The securities market is a fundamental body in an economy and is of immense concern to the government, investors, companies and stakeholders. In different economies, it plays a fundamental role in economic development and growth by assembling economic resources inside and outside the economy. The NSE has been regulated since 1989 and currently lists fixed income securities and small-cap shares as well as cross listing equities with neighbouring bourses (NSE, 2016).

In the year 2008, the NSE All Share Index (NASI) was announced as an auxiliary index in order to provide investors with a comprehensive measure of stock market performance. Its gauge is a global indicator of market performance. NASI is a



weighted index market cap encompassing all the NSE securities. It has risen gradually throughout the period signifying the expansion in the capital market; for example in 2008 to 2015 the index has improved by more than 100 percent. The equities market has been on a downward trend in the past six months with NASI, NSE 25 and NSE 20 declining by 3.5%, 9.9% and 5.7%, respectively (NSE, 2016).

The NSE market performance has stayed erratic over the past twelve months which have led to actual and fair value investor losses. However, literature links NSE performance with volatility in exchange rates and interest fluctuation (Obura & Anyango, 2015). Modelling foreign exchange rate exposure to firms has been an increasing area of research in the last decade. Fluctuations in exchange rates could influence the future activities of the firm. This can affect stock returns of different industries of listed firms in the NSE.

Kenya Shilling US dollar parity denotes the exchange rate concerning the currencies of both Kenya and the United States making the purchasing power of both currencies substantively equivalent. During the last five years, the Kenya Shilling exchange rate has unrelentingly exhibited a significantly high degree of unpredictability in response to inconsistent variations in international risk aversion and has lost ground to the US Dollar as a result of the USD strengthening against world currencies. In January 2014, the exchange rate between the USD and Kshs stood at 86.4167 as compared to a rate of 101.3889 representing a decline in the value of Kenya Shillings to the USD by about 17.3%. Notably, the monetary policy measures that have been adopted by the Central Bank of Kenya (CBK) have resulted in the exchange rate being slightly stable averaging about 101.4336 between the months of January to June 2016 (Central Bank of Kenya, 2016).

The dollar has been chosen as the foreign currency because it is the dominant currency of the world. It is the world's main reserve currency. A number of global currencies namely the Euro, US Dollar, and the Japanese Yen are accredited with a majority of global transactions. The US Dollar, of these currencies is the most broadly used. Of the international output as indicated by Gross Domestic Product (GDP), greater than one third is attributed to countries that have attached their currencies to the US dollar (Goldberg, 2010). The dollar is the most dominant in the exchange market since it is attributed to both over 85% of FOREX trading and world's debt distribution at 39%. Consequently, foreign commercial banks need a lot of dollars for business transactions. In the year 2013, greater than 80% of global trade and 90% of foreign exchange transactions was done in US dollars (Presad, 2014).

## **1.2 Research Problem**

After the introduction of flexible exchange rate following the Bretton Woods system collapse, exchange rates became more unstable (Fraser-Sampson, 2011). As a result of the high unpredictability associated with flexible exchange rates, currency risk exposure has augmented, and should be considered by foreign investors doing international investments. Several empirical studies have been conducted on the currency risk topic. Lee (2010), Raheman (2012), Horobet and Ilie (2010) and Asaolu (2011) for instance all established that risk to currency has a significantly great impact on cash-flows either for international investors or firms. Currently, when there is an easy flow of money across international borders, opportunity is granted to investors in foreign markets the world over (Ekonomifakta, 2016).

There are not many researches that have been done on this subject; however, a positive relationship was established by Tian and Ma (2010) between stock prices and

exchange rate movements in the Chinese stock market, with a focus on USD/Yuan and Hong Kong Dollar (HKD)/ Yuan. Further, Muller and Verschoor (2009, 2007 and 2006) found a negative association between the European stock returns and the European currency against a foreign currency. Similar findings were established when they analysed the Asian against foreign currencies in Asian markets.

The increasing level of integration progressively amongst the international foreign exchange and equity markets has intensified the demand for studies in the exchange rate and stock prices sphere. This has been coupled with financial crises experienced in the past 10 years that had a deleterious effect on the global economy bringing to light the need to appreciate the association between various financial markets. As a result of the increasing influx of NSE investors of foreign origin and the enormously large Kenyan foreign exchange market, it would be captivating to assess how foreign exchange rate changes have impacted stock market performance in Kenya. The Kenyan Shilling lost ground to the dollar in the year 2015 but of late has remained resilient against the US dollar; it has however gained against the Sterling Pound following the BREXIT shock. The equities market has been on a downward trend in the past six months with NASI, NSE 25 and NSE 20 declining by 3.5%, 9.9% and 5.7%, respectively (NSE, 2016).

Much of the studies that have been done in Kenya have focused majorly on NSE listed entities' performance and how they are affected by foreign currency fluctuations. This study sought to take a departure and analyse the effect of exchange rate movement (shilling dollar parity) on NSE Market performance while taking cognizance of the movement in the major NSE indices. The present study is an endeavour to analyse the foreign exchange rates impact on stock prices and the

security market performance in general in Kenya. The research on securities market has become of interest as it is the delicate most economic segment and the country's gateway segment to the outer world exposure.

### **1.3 Research Objective**

To determine the exchange rate movement (KES/USD) effect on the performance of Nairobi Securities Exchange Market (as determined by changes in the NSE All Share and NSE 20 Share Indices respectively).

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

Value of the Study This study is undertaken for investors, researchers and students with interest in various financial instruments and the financial market. The Nairobi Securities market has experienced ups and downs with the currency fluctuation which has been of immense impact to investors, businesses and the general public. An analysis of the effect of shilling dollar parity on the performance NSE will be very crucial to all the stakeholders.

The study intended to examine the link that exists between the foreign exchange fluctuations and the securities market in Kenya. Currency risk comprises a diversification contradiction and can be deemed as an international diversification obstacle yet international diversification can yield fruits which may be good for the general economic growth. Therefore, this study will play a part in clearer currency risk understanding for the investors and lessen their delusion. It will help investors in making decisions with regards to formation of efficient portfolios equally in terms of risk and return distribution.

The study has contributed to prevailing literature on currency risk and securities market performance and thus will be of benefit to academicians, commercial research

use and also a source of information to investors. It will be instrumental in adding to the core of empirical literature on exchange rate exposure to firms. The area of stock return and exchange rate is a very striking research field owing to their extraordinary unstable features. The shareholders will also be able to understand and learn the effects of foreign currency fluctuation on the firm's profit.

## **CHAPTER TWO**

### **LITERATURE REVIEW**

#### **2.1 Introduction**

This chapter explores the literature that has been documented on foreign exchange exposure, security market performance and possible connection between exchange rate movement and security market return as measured by stock prices and market indices. This involves review of relevant theories as well as review of relevant empirical studies. Literature review is an imperative area that facilitates the unearthing of past work and knowledge in a research study.

#### **2.2 Theoretical Review**

This section scrutinizes the theories pertinent to this study on foreign exchange exposure, security market performance and theories that support the association between foreign exchange rate movement and the shifts in main indices of world security markets. These theories include: The Purchasing Power Parity Theory, Flow Oriented and Stock Oriented Models, as well as Arbitrage Pricing Theory.

##### **2.2.1 Purchasing Power Parity Theory**

Developed by Cassel (1918), the Purchasing Power Parity Theory (PPP), is an exchange rate setting theory and a means to contrast the average costs of services and goods among countries. It is postulated in the theory that the action importers and exporters stimulated by price differences across countries, prompts spot exchange rate changes. The theory is based on both the variation and an extension of the “law of one price” relating to a collective economy. It is articulated by the law of one price that similar prices should be attached to indistinct goods in two separate markets with absent variant taxes and transportation costs functional in the two markets. An

arbitrage opportunity emanates each time one can buy a commodity at a low price in one locality and resell at a higher price and thus make a profit (Shapiro & Rutenberg, 1976).

The exchange rate is the endogenic variable in PPP theory. This theory postulates that the low-priced US basket will lead to an increase in goods demand in market basket in the US by Kenya resulting in the escalation of demand for US dollar in the foreign exchange market. The subsequent alteration in supply and demand will lead to a surge in the dollar value and therefore the exchange rate will upswing. Thus movements in foreign exchange rate are provoked by relative price level changes between two markets across two countries. The theorem states with the flexible exchange rate system, a relative PPP change for any two currencies would prospectively be projected by a fluctuation in the even exchange rate between the two currencies (Shapiro & Rutenberg, 1976).

### **2.2.2 Flow Oriented Model Approach**

The flow oriented model was first considered by Dornbusch and Fisher (1990), and recommends that movements in exchange rates cause stock price volatility. It is subject to the macroeconomic affirmation that because discounted present value is typified by stock prices, then any activity that impacts on the cash flow of a firm will be replicated in the company's stock price with an efficient market as asserted by the Efficient Market Hypothesis. Exchange rate variations directly impact the value and competitiveness on a global scale for corporations, in view of their impact on output and input prices (Joseph, 2002). Study by Dornbusch and Fisher (1980) report that global competitiveness is impacted by currency changes as well as trade position

balance and subsequently state's real output, which ultimately impacts future and current corporation cash flows as well as stock prices thereof.

Whenever the value of the local currency rises, exporters will be undesirably affected in the international market as their commodities will become costly causing decline in exports. In addition, the volume of sales and exporters' profits will reduce and prices of stock will drop off. Contrary, importers' competitiveness will increase in the local markets. Their stock prices and profit will therefore increase. Therefore, the domestic currency increase exhibits both a positive and negative significance on the local securities market for a country which is dominant in export and a dominated in import respectively (Kao & Ma, 1990). Fluctuation in exchange rates can impact prices of stock not only for export-oriented and multinational companies but even for local firms.

### **2.2.3 Stock Oriented Model (Portfolio Balance Approach)**

The portfolio balance approach, introduced by Branson, Halttunen and Masson (1977), opines that stock price movements can lead to exchange rate changes owing to dealings in capital account. The selling and buying of local stock by local population transferring funds into local equities from offshore in response to local movements in stock market has a direct effect on the currency market. As per exchange rate calculation monetarist models, equities could affect exchange rate being part of wealth, through demand for money (Gavin, 1989). With open capital accounts, the demand for financial assets like bonds and stocks depend on their risk-return trade-offs as perceived by foreign and domestic investors.

Pilbeam (2013) points out that there are large international capital movements with advancement of globalization which dominate the foreign currency market hence the



capital account plays a vital role in exchange rate determination. According to the stock oriented model (SOM), supply and demand for financial assets including stocks and bonds is equated by exchange rate (Adjasi & Biekpe, 2005). Therefore, the currency variations anticipations have a significant effect on price fluctuations of assets held financially and could thus affect stock price fluctuations. The unstable foreign exchange market attribute poses a significant risk of extreme and abrupt fluctuations in foreign exchange rate that may bring about significant undesirable losses financially from otherwise profitable sales from export. As such, majority of foreign buyers favour trading in their domestic currencies to evade risk exposure in foreign exchange.

#### **2.2.4 Arbitrage Pricing Theory**

Developed by Rose (1976), the Arbitrage Pricing Theory (APT) was as an improvement on the Capital Asset Pricing Model (CAPM) and assumes that the equilibrium return rate of an asset is reliant on many variables and not just the market beta. According to Iqbal and Haider (2005), the APT elements of risk emanate from some central economic changes and such financial variables as real business activity, exchange rate, inflation and interest rate among others. The nature and magnitude of the interlinkage between stock prices and exchange rates have consequences for global finance and whether security markets price exchange rate risk is very crucial. The risk-reward trade-off of international diversification and management of multi-currency equity portfolios is of interest especially with significant rise in cross-border equity investments (Prakash, Chang, & Pactwa, 2003).

Rashid and Karachi (2007) assert that with respect to APT, the present value is diminished by an increase in real interest rate of the future cash flows of a firm and

leads to falling of stock prices. Similarly, capital inflow is fuelled by a higher interest rate and consequently, exchange rates fall. Precisely, a positive association between exchange rates and the average stock price levels may result from real interest rate disturbance. As such, APT postulates that such as macroeconomic variables as foreign exchange rate can affect security market. The currency volatility has financial system inferences particularly for the stock and thus currency risk represents a probing problem (Mlambo, Maredza, & Sibanda, 2013). Using APT, the expected return of a security is given:

$$E(R_i) = R_f + \beta_1(R_1 - R_f) + \beta_2(R_2 - R_f) + \dots + \beta_n(R_n - R_f) + \epsilon_i$$

Where  $E(R_i)$  is the anticipated security return;  $R_f$  stands for the risk free rate; while  $B_i$  implies sensitivity to changes in factor  $i$ ; and  $\epsilon_i$  is a random error term. The above equation illustrates how in the APT model, the anticipated return on asset is predicted by the risk free rate plus a risk premium subject to sensitivity to various macroeconomic variables.

### **2.3 Determinants of Security Market Performance**

Usually, the stock market index is deemed the economic barometer and a reflection of the future profitability of the companies. The growth in the stock index signifies a good sign implying that the investors are flexible about the economic outlook. Variables such as information and news about a company, industry performance, investor sentiment and economic factors play important roles in the performance of the security market and can result in the price of a stock to rising or falling. Therefore, governments could come up with policies to stimulate economic growth, increase stock market liquidity, ease political risk and enhance law and order implementation to entice foreign investors which will have an effect of enhancing market

capitalization and foreign direct investments thereby promoting stock market performance (Rashid, 2008).

### **2.3.1 Firm Specific Factors (Company News and Performance)**

The securities markets are affected profoundly by rumours and news. The news can affect the sentiments and prospect of the investors and performance of corporations as people construe news differently depending on their own cognitive power. The enterprise particular factors that may influence the share price include: change of management; earnings news releases, profits and future projected earnings; declaration of dividends; introduction of new products; obtaining a new large contract; accounting errors or scandals; employee layoffs; and expected takeover or merger. Study by Alanyali, Moat and Preis (2013) provides found that financial markets movements and financials news are strongly associated.

Certain enterprises are exposed more to own-industry specific circumstances as opposed to the wide conditions of the economy thus investors monitor price movements of the industry's products, entry into the industry and industry sales forecasts. An improvement in dividends may signify the prospect that the company can certainly afford to pay more dividends. The declaration of less than anticipated incomes can lead to investors trimming their company's valuation of stock and flows. The diversities are often considered as an encouraging indicator about a company if the stripped assets isolated from the company's core business. This naturally leads to an enhanced stock demand and as a result increases stock prices (Mayo, 2016).

### **2.3.2 Economic Factors**

Mukhrjee and Naka (1995) showed that macroeconomic variables influence returns in stock market based on their influence on discounts rates and dividends. Most popular

variables include: interest rates, economic outlook, inflation, money growth, industrial production, economic and political shocks, changes in economic policy and exchange rates. For instance, higher interest rates would reduce the cash flow present value, which would reduce investment's attractiveness hence reducing stock return value. In addition, the amount of dividend and cash flow are reduced by exchange rate mainly in open economies (Eita, 2012). The global trade significance in an economy predicts the exchange rate impact on stock price. The future cash flows is epitomized by a company's present value.

An enhancement in economic growth is anticipated raise the service and product demand produced by the firms hence increasing a firm's valuation and cash flows. Investors monitor economic indicators such as the government's fiscal and monetary policies, employment, GDP, retail sales and personal income. Generally, unanticipated promising economic information leads to a promising review of a company's anticipated cash flows and thus puts mounting pressure on the company's value (Mayo, 2016). According to Mayo (2016), granted a risk-free capital securities choice or stocks, the latter ought to only be bought if high expected returns to the investor are sufficiently offered thereby yielding a risk premium.

### **2.3.3 Market Related Factors**

Market related factors such as the January effect and investor sentiment also influence stock prices. The sentiment of investors depicts the overall mood of investors in the securities market. This can make the security market to fluctuate which can lead to stock prices rising or falling. While the economy could be fragile, stock prices may upsurge if majority of the investors believe that economic recovery will happen in the near future based on positive prospects. The stock prices fluctuations may be slightly

attributed to the dependence by investors upon other investors for valuation of the security market. As a result of this, the general market can be bullish or bearish. In addition, most portfolio managers have a prefer investing in small riskier stocks at the year's beginning to shift later to larger, more unwavering firms approaching the year's end with a view to lock in gains. The propensity places mounting pressure on small stocks every year in January, following the January effect.

Some studies have revealed that a majority of the yearly stock market achievements occur in January (Madura, 2008). At certain times in the year, security market performance is not significantly associated with conditions of the economy. Uneven volatility securities can be displayed since their prices are partially predicted by fashions and fads (Mayo, 2016). Baker and Wurgler (2007) established that both local and international sentiments forecast the stock market returns and also relative stock returns for the highly volatile, small and troubled growth portfolios. In addition, they found out that sentimentality impact on returns is gripping for countries whose financial markets and institutions are not well developed and for culturally prone countries to investor overreaction.

#### **2.3.4 Industry Performance**

The profitability and success of the industry or sector in which the company operates has a significant part to play in influencing the company's stock price. Typically, stock prices for firms in the same sector will fluctuate in tandem. Investors usually evaluate a firm owing to its earnings per share (EPS), future earning prospect and revenue. The reason for this being that conditions of the market will mainly affect companies in the same industry in a similar way. Nevertheless, the firm's stock price

may at times gain from bad news in its rival if the two firms are targeting the same market (Madura, 2008).

The market share gains and losses can lead to substantial effects on a company's stock performance, depending on the economic sector's conditions. Market share is primarily a sector's total sales percentage that the firm earns. Market share shifts have a greater effect on firm performance in cyclic industries with low growth. Corporation's securities tend to track with the market and with their industry peers or sector (Acheampong, Agalega and Shibu, 2014). According to Mayo (2016) the mixture of general sector and market movements compared to a firm's performance individually predicts most of a stock price changes.

## **2.4 Empirical Review**

This section provides a review of pertinent empirical findings on the link between foreign exchange rate movement and security market performance and how they impact on each other across the globe. It covers the studies done globally as well as local evidence.

### **2.4.1 International Evidence**

Mlambo, Maredza and Sibanda (2013) analysed the Johannesburg Stock Exchange with respect to the impact of volatility of currency thereof. The study conducted a literature evaluation of the volatility of exchange rate lead to an empirical model specification. The study used the 20 Generalized Autoregressive Conditional Heteroskedascity (GARCH) model in examining the relationship, employing monthly data between 2000 and 2010. The study established a weak association between performance of the security market and currency volatility. This outcome is not favourable to the deduction that the unlikelihood pertaining foreign exchange market

distorts the efficient allocation of investment. Nonetheless, stock market was deemed has being determined such macroeconomic variables as interest rates, money supply, the United States interest rates and total mining production. These interest rates were found to exhibit a negative effect on the stock market.

Sekmen (2011) researched on the impact of volatility of exchange rate on US returns of stock for the 1980 to 2008 period utilizing the Autoregressive Moving Average (ARMA) models' squared residuals. The ARMA model was used to generate estimates of unpredictability. The study also used the federal funds rate to examine the relationship between monetary policy and stock returns. The study discovered that foreign exchange rate variations adversely affected US returns of stock because the hedging tools' convenience could not limit the exchange rate instability's undesirable effect on trade volume. The other findings from the study shows that there is a substantial link between US stock returns and monetary policy; and that federal funds rate, surprising inflation and existing probable inflation had no major effect on stock returns.

Olugbenga (2012) carried out a research on the existing association between security market behaviour and exchange rate volatility from the Nigeria standpoint. The researched investigated the long and short-run exchange rate advancement effects in Nigeria during the 1985 to 2009 period utilizing the Johansen co- integration tests. The study specified a bivariate model with the results showing a positive and significant stock market performance in the short-run to exchange rate and a negative significant stock market performance in the long-run to exchange rate. The Granger causality test was also applied and the test result showed firm proof that the

association runs to security market performance from exchange rate; implying that Nigerian stock market index variabilities are attributed to exchange rate movements.

Muhamad and Rasheed (2011) conducted a survey on foreign exchange rate and stock prices relationship in South Asian countries including Sri-Lanka, India, Bangladesh and Pakistan (1994 to 2000). The study utilized vector error correction modelling, co-integration and standard Granger causality techniques to study the short and long- run exchange rates and stock prices relationship. No short-run link was found between the variables for all four countries. Similarly, no long-run causality was found between stock prices and exchange rates for India and Pakistan. For Sri-Lanka and Bangladesh conversely, a bidirectional causality was found.

Baharom, Habibullah and Royfaizal (2008) assessed the causality between stock prices and exchange rates in Malaysia. The data sets comprised of monthly stock prices and real effective exchange rates between the periods 1988 to 2006. The study divided the period into two sample periods with the first sample period being the pre-crisis (January 1988 to June 1997); and the second being the post-crisis (July 1998 to December 2006). Johansen co-integration technique was employed in both sample periods. The findings from the research revealed short term relationship but no long-run relationships.

#### **2.4.2 Local Evidence**

Nyaga (2014) investigated the impact of operating exchange rate exposure of foreign currency on share prices in services and commercial segment of NSE listed firms. The study was conducted through an event study methodology by scrutinizing the response of the share price around the event (exchange rate movement). An annual aggregated data was adopted to approximate equity's sensitivity to exchange rate of



the particular segment of NSE (January 2009 to December 2013). Sample firm's stock returns were regressed on foreign exchange rate fluctuation, interest rate, inflation and market return. The study employed Pearson product moment correlation to assess the variables' strength of relationship. A negative relationship was revealed between share prices and volatility of exchange rate.

Mbithi (2013) studied foreign exchange rate effect on the financial performance of NSE listed firms. Data was gathered with the aid of unstructured and structured questionnaires. Descriptive statistic and linear regression model were used to analyse the data with relative frequencies used in some questions. The study examined the risk exposure levels of foreign exchange rate among NSE listed businesses (January 2002 to December 2012). Study findings revealed that most of the listed firms at the NSE are considerably suffer from exposure to foreign exchange risk owing to all major international trade currencies. The study established that a firm's financial performance is affected by the firm's foreign exchange variations through exports, imports, accounts receivables and payables and therefore affecting their net income as well as the balance sheet via the equity reserves.

Sifunjo and Mwasaru (2012) assessed the connection between foreign exchange rates and stock prices in Kenya. Data was composed of monthly NSE stock price index observations and the nominal Kshs/ US dollar exchange rates (November 1993 to May 1999). They carried out stationary and cointegration tests between exchange rates and stock prices employing VECM for causality test. Findings revealed that both in first differences and level forms foreign exchange rates and stock prices are non-stationary, and an order one integration exists between the two variables. Study finding further show that foreign stock prices are Granger caused by exchange rates in

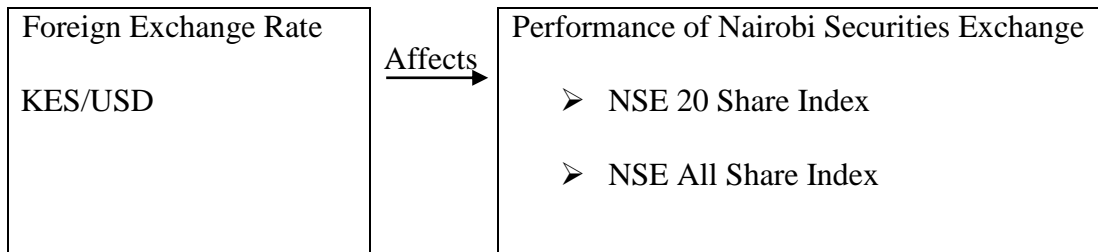
Kenya. There is a one directional causality to stock prices from exchange rates whereby exchange rate changes impart substantial effect on price determination of stock.

## 2.5 Conceptual Framework

The conceptual framework demonstrates an understanding of what variables influences what (Mugenda & Mugenda, 2009). The present study variables are: foreign exchange rate and NSE performance as indicated by NSE 20 Share Index and the NSE All Share Index.

### Independent Variable

### Dependent Variable



**Figure 2.1 Conceptual Model**

## 2.6 Summary of Literature Review

The classical economic theory postulates that an association can exist between security prices and exchange rates and through the flow and stock oriented models. There has been substantial interest about the presence of an association between exchange rate fluctuation and stock prices. As shown from literature review, exchange rate fluctuation impacts on stock market are country dependent and thus not consistent. It is thus evident that there lacks empirical and theoretical unanimity on nature of the causal relationship between exchange rates and stock prices.

A majority of the studies revealed that mixed views exist on the relationship between the two variables with empirical results showing both negative and positive impact of exchange rates towards stock market index. For instance, the study by Mlambo,

Maredza and Sibanda (2013) revealed a weak association between currency exchange rate fluctuations and the security market; Sekmen (2011) determined that fluctuations in exchange rate negatively impact US stock returns; Muhamad and Rasheed (2011) found no short-run association between the two variables in India, Sri-Lanka Pakistan and Bangladesh and how they would impact on each other.

Therefore, it is imperative that continuous research is carried out in the field of securities markets and foreign exchange rates so as to establish completely the true overflow nature to stock markets from exchange rates. Most of the existing literatures on the currency movement in Kenya have focused on its effect on firm performance. For Instance, Mbithi (2013) studied foreign exchange rate the effects on the financial performance of NSE listed companies at the. The present study is principally analytical since it embraces the secondary data use in examining the exchange rate volatility effect on the Nairobi Securities Market. The paper attempts to provide evidence from another empirical investigation ascertaining the exchange rate fluctuation impact on the security market indices.

## **CHAPTER THREE**

### **RESEARCH METHODOLOGY**

#### **3.1 Introduction**

This chapter presents the methods employed in the study by providing a description and explanation of the procedures and methods used in conducting the study. It describes key methodologies such as the study design, population, samples, data collection procedures and instruments as well as data analysis and tools utilized.

#### **3.2 Research Design**

A research design is a step by step guideline which shows how the current study will be undertaken (Mugenda & Mugenda, 2009). The study used a descriptive design as well as a longitudinal design to accomplish the objectives of the research. Sarma and Misar (2006) define descriptive research as a fact finding study conducted to reveal what exists with respect to the variables being tested while the longitudinal design helps track changes over time. In this method, the researcher has no control over the variables and reports objectively what exists naturally and the aim is to establish that a relationship exists between the variables and their behaviour. Descriptive and correlation approach is appropriate since the researcher sought to examine the link between foreign exchange movement and security market performance and impact of the exchange rate fluctuation on major stock indices' performance at the NSE. The variables being investigated are the NSE 20 and All Share Index and Foreign Exchange Rate.

### **3.3 Data Collection**

The researcher utilized secondary data sourced from the Central Bank of Kenya (CBK) rates and statistics and Nairobi Securities Exchange. The stock index data was obtained from NSE reports while the exchange rate data was obtained from the CBK rates and statistics report. The data set for the study consisted of monthly data observations covering the period December 2010 to August 2016 for both index movement and FOREX volatility. The data distribution decided on was monthly to guarantee an acceptable quantity of observations. Data collected was checked for reliability, measurability and validity to guarantee drawing of valid and representative conclusions.

### **3.4 Data Analysis**

The data was modelled in time series. The data was analysed using Statistical Package for Social Sciences (SPSS) and Microsoft Excel Spreadsheet and. The results of the model are presented using tables in order to display the effect of the independent variable (Exchange Rate) on the specific dependent variables (NSE All and 20 share index). Correlation and Multiple Regression analyses were employed in data collection. Regression analysis was employed to the nature of the relationship between exchange rate movements (shilling dollar parity) on NSE performance, as measured by the stock indices. This was to test the exchange rates variability impact on NSE performance. The correlation analysis was used to show whether and how strongly the movement in exchange rate and security market performance are related.

The study adopted the following regression model to analyse the data:

$$\Delta Y = \beta_0 + \beta_1 \Delta X_1 + \beta_2 \Delta X_2 + \beta_3 \Delta X_3 + \epsilon_t$$

Where:

$Y$  = represents dependent variables; NSE 20 share index and NSE All share index. The changes in these variables are used to measure the Nairobi Securities Exchange market performance over time and the total stock returns. Dubravka and Petra (2010) found that the market indices have the biggest statistical significance in explaining stock returns. The change in the dependent will be expressed as a percentage.

$X_1$  = represents the exchange rate given by Kenyan Shilling price of one US Dollar at time,  $t$ , obtained from the website of the Central Bank of Kenya. The movement in exchange rate will be expressed as a percentage to be able to achieve the objectives of the study.

$X_2$  = represents interest rate which is a control variable in this study. The central bank rate (CBR) that is published by the Central Bank of Kenya was utilized as the interest rate for the study.

$X_3$  = represents inflation rate which is a control variable in this study. This is given by the overall inflation rate reported for the study period. The overall inflation rate change was taken as the control variable.

$\beta_0$  = this is the constant term (regression constant)

$\beta_1$  = represents the stock index sensitivity to foreign exchange rate change in (regression coefficient)

$\beta_2$  &  $\beta_3$  = represents stock index sensitivity to the change in control variables

$X_2$  and  $X_3$  respectively i.e. interest rate and inflation rate coefficients.

$\epsilon_t$  = represents the error term with a constant variance and an expected value of zero.

### **3.4.1 Test of Significance**

The study adopted the use of the coefficient of determination ( $R^2$ ) and the coefficient of correlation ( $R$ ) to clearly understand the diverse relationships between the variables in the study. The Pearson Product Moment Correlation Coefficient was employed. The dependent variable percentage showed (performance of NSE) attributed to the independent variable (exchange rate movement) was showed by coefficient of determination. The coefficient of correlation showed the strength of the linear association between the study variables. To test the linearity significance of the relationship the variables, a T-test at 95% confidence level was used to predict the significance of exchange rate fluctuation in explaining the movements in the NSE performance.

## CHAPTER FOUR

### DATA ANALYSIS, RESULTS AND DISCUSSION

#### 4.1 Introduction

In the present chapter, both descriptive and inferential statistics are presented. Minimum, maximum, mean and standard deviation values are presented under descriptive statistics while correlation and multiple regressions are presented under inferential statistics.

#### 4.2 Descriptive Statistics

The study evaluated the study variables with respect to their descriptive statistics, that is, the performance change of the Nairobi Securities Exchange as indicated by both the percentage changes in NSE 20 share index and NSE All share index; the exchange rate movement given by the movement in Kenyan Shilling price of one US Dollar periodically; the change in central bank interest rate and the inflation rate changes. The study utilized monthly data observations over a five year period running from December 2010 to August 2016. Their Minimum, maximum, mean and standard deviation values were established as indicated in Table 4.1, with all values presented as percentages.

**Table 4.1: Descriptive Statistics**

	N	Min	Max	Mean	Std. Dev	Kurtosis	
						Stat	SE
NSE 20 Share Index (%)	68	-10.22	7.57	-0.3929	4.34719	-0.499	0.574
All Share Index (%)	68	-9.74	10.29	0.5834	4.66992	-0.205	0.574
Exchange rate (%)	68	-10.08	6.63	0.3590	2.19575	7.955	0.574
Inflation (%)	68	-78.57	185.09	3.5328	27.44810	29.570	0.574
Interest rates (%)	40	-21.21	57.14	2.2902	13.85183	8.816	0.733

Period of study: December 2010 to August 2016



A mean percentage change of -0.3929 was established in the NSE 20share index across the 68 months under study implying an average of -0.39% change in performance of the Nairobi Securities Exchange. This was at a standard deviation of 4.34719 meaning a 4.35% average difference across the months, with the lowest drop recorded at -10.22% and the highest at 7.57%. A similar trend was recorded in the all share index with a mean of 0.5834 implying a 0.58% average increase in Nairobi Securities Exchange market performance across the period under study. The minimum percentage decline was recorded at -9.74% and the highest increase at 10.29%. The standard deviation was 4.66992 meaning an average of 4.67% difference across the 68 months.

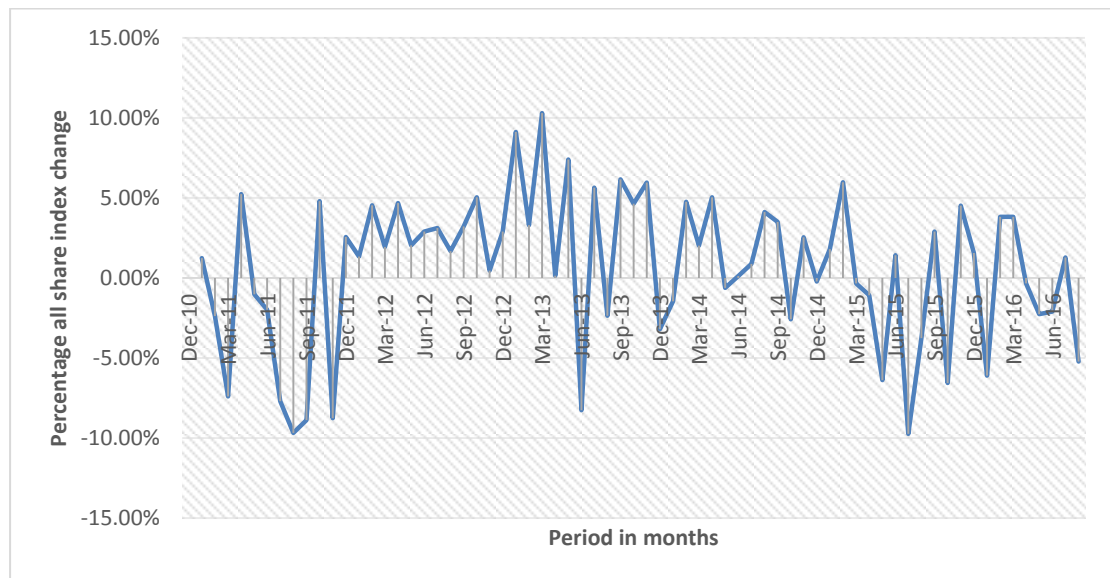
A mean 0.36% movement was recorded in exchange rate with the highest rise at 6.63% and the lowest decline by -10.08%. The average exchange rate movement across the months was a 2.19% increase. Inflation recorded a 3.53% change with the lowest decline by -78.57% and the highest shooting by 185.09%, with approximately 27.44% difference across the months. The central bank interest rates changed by a 2.29% mean, with the highest increase at 57.14% and the lowest decline at -21.21%, with a 13.85% deviation across the months.

For Kurtosis, George and Mallery (2010) opine the rule of thumb that values between -2 and +2 are deemed satisfactory as a show of normal distribution. They add that Kurtosis value ranging from 7.0-21.00 reveal moderate normality while values above 21.00 reveal extreme lack of normality. As observed in the descriptive statistics, whereas most of the variables were normally and moderately normally distributed, an abnormality was established in inflation at Kurtosis value of 29.570. This can be

attributed to an outlier in inflation with a 185.09% peak in November 2012, as is presented in figure 4.4 below.

#### 4.2.1 NSE All Share Index

The study sought to determine the Nairobi Securities Exchange Market performance over the period, December 2010 to August 2016, as indicated by the percentage change in All Share Index. Findings are as presented in figure 4.1.

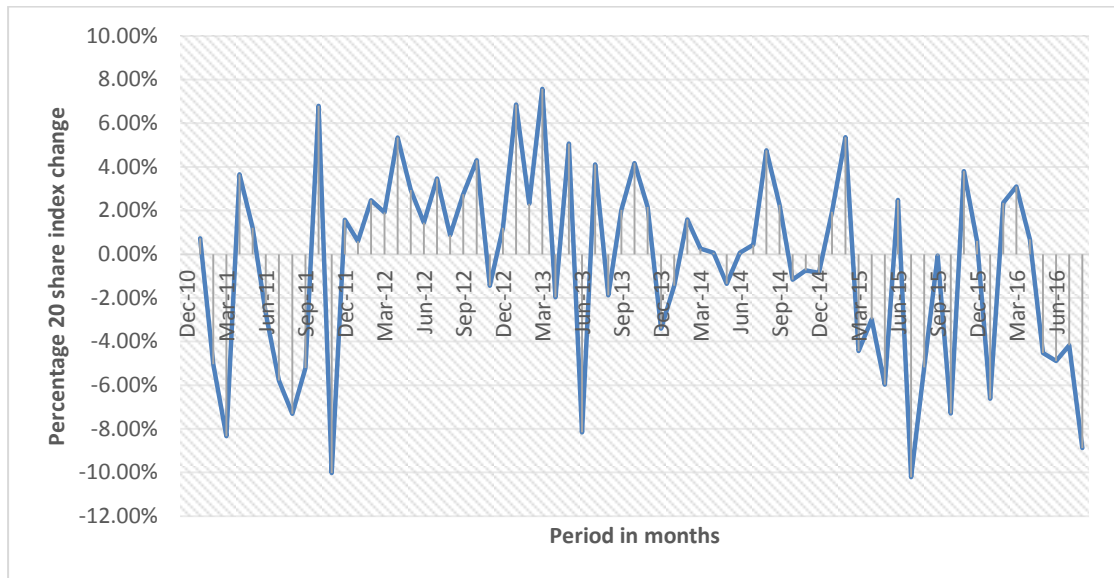


**Figure 4.1: NSE All Share Index**

As illustrated, a fairly normal distribution was recorded in the performance of the Nairobi Securities Exchange across for the period December 2010 to August 2016, as indicated by the percentage change in All Share Index. The sharpest decline was particularly noted in August 2011 at a -9.69% decline and the highest peak at 10.29% in March 2013. Notable declines were also recorded in June 2013 at -8.27% and in July 2015 at -9.74%. A declining trend has further on average been noted from December 2015 to August 2016 falling from 1.55% to -5.23% respectively.

#### 4.2.2 NSE 20 Share Index

The study also sought to examine NSE market performance over the period, December 2010 to August 2016, as indicated by the percentage change in the 20 Share Index. Findings are as presented in figure 4.2.

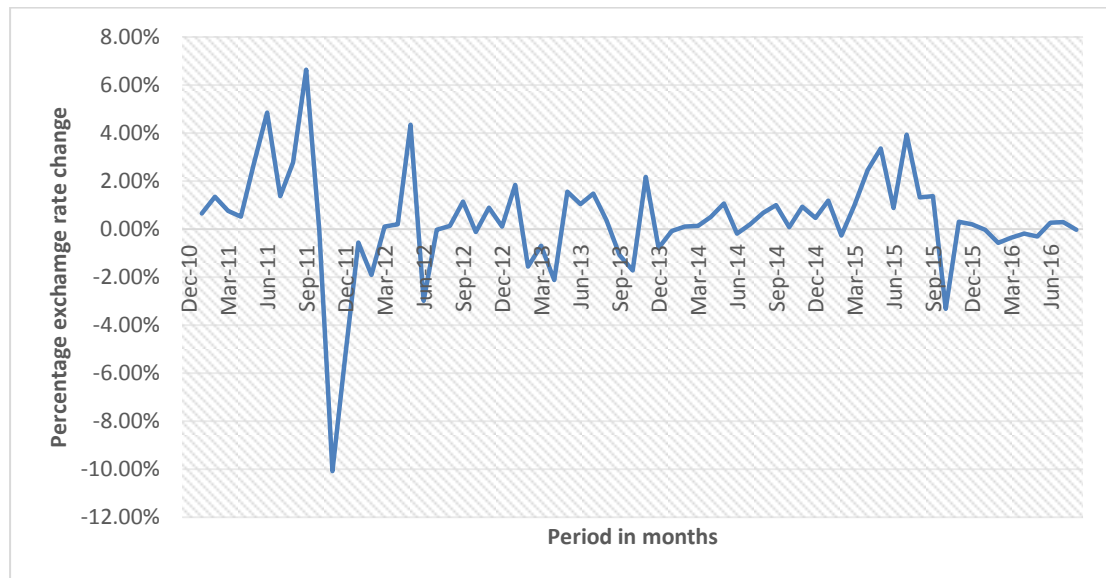


**Figure 4.2: NSE 20 Share Index**

A similar trend was observed in the NSE performance as indicated by the 20 share index as was by the all share index, across for the period December 2010 to August 2016. The sharpest decline was particularly noted in decline July 2015 at -10.22% and the highest peak at 7.57% in March 2013. Notable declines were also recorded in November 2011 at a -10.08%, June 2013 at -8.16%, March 2011 at -8.33% and in August 2016 at -8.88%. A declining trend has further on average been noted from February 2015 to August 2016 falling from 5.36% to -8.88% respectively.

### 4.2.3 Exchange Rate

The study then sought to establish the percentage exchange rate movement across the period, December 2010 to August 2016, as given by Kenyan Shilling price of one US Dollar. Findings are as presented in figure 4.3.

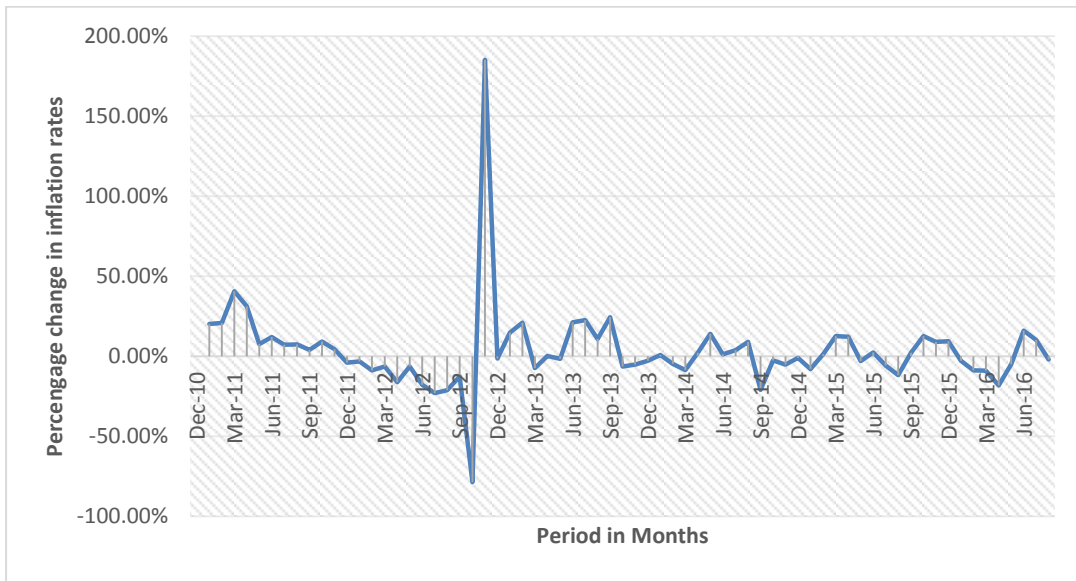


**Figure 4.3: Exchange Rate**

As illustrated, exchange rate movement, other recording sharp rises and a decline in the beginning of the period under study, the movement was on average on the declining trend across the 68 month period running from December 2010 to August 2016. The movement was highest in September 2011, at 6.63%, then May 2012 at 4.34% and in July 2015 at 3.94%. The sharpest decline was recorded in November 2011 at -10.08%, with the period December 2015 to August 2016 stabilizing 0.19% to -0.03% respectively.

### 4.2.4 Inflation Rate

The study further sought to establish the percentage change in inflation rates across the period, December 2010 to August 2016, the same being one of the control variables in the study. Findings are as presented in figure 4.4.

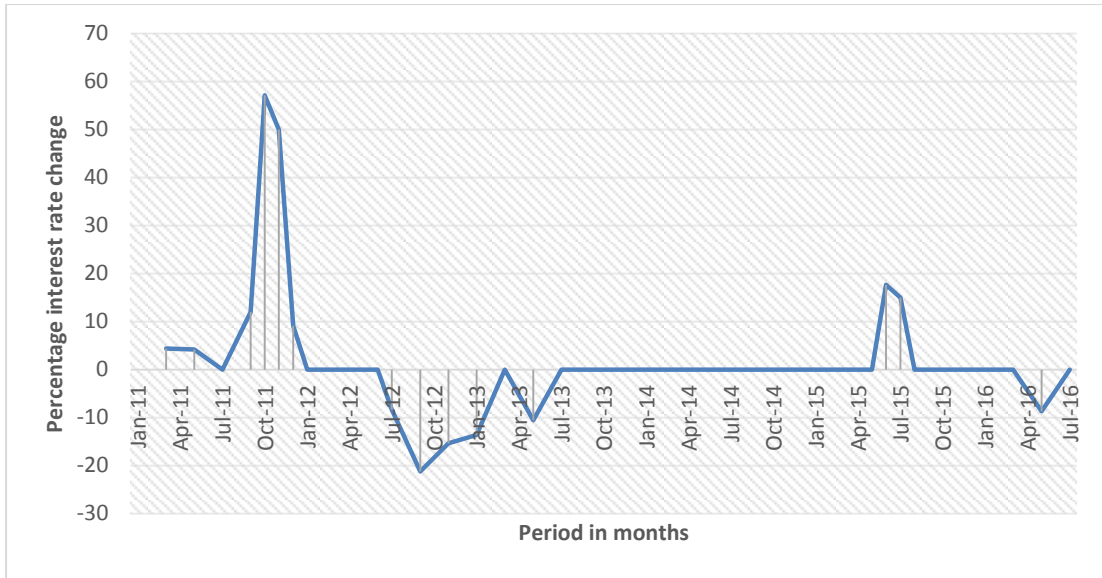


**Figure 4.4: Inflation Rate**

As illustrated, a stable decline can be observed in inflation rates across the December 2010 to August 2016 period at 20.18% to -2.03% respectively, with a sharp decline in October 2012 at -78.57% and an incline in November 2012 at a 185.09% peak.

**4.2.5 Interest Rate Change**

The study finally sought to establish the percentage change in Central Bank Interest Rates across the period, December 2010 to August 2016, the same also being the second control variable in the study. Findings are as presented in figure 4.5.



**Figure 4.5: Interest Rate Change**

As figure 4.5 illustrates, other than a sharp incline peaking at 57.14% in October 2011 and declining at 21.21 in September 2012, the change in the rate of interest set by the central bank have on average been at 0.00 for most of the period under study. The same is true for the period July 2013 to May 2015, to shoot at 17.65% in June 2015 and decline at -8.7% in March 2016. As at August 2016, the percentage change in interest rate was at 0.00%.

**4.3 Inferential statistics**

Under inferential statistics, both correlation and multiple regression analyses were performed. Whereas the former was used to assess the nature and direction of the association, among the study variables, the latter was used to assess the exchange rate fluctuation effect on the performance Nairobi Securities Exchange, 20the t - test statistics measured any statistically significant difference in mean between the two variables.

### 4.3.1 Pearson's Partial Correlation

In this section, the study assessed the nature and direction of the association, among the study variables, that is, if exchange rate movement will increase, decrease or not affect the performance of the Nairobi Securities Exchange. Pearson's Partial Correlation was particularly used to control association. According to Sarma and Misra (2006), Partial correlation measures the direction and strength of a linear association between two variables that are continuous in nature while controlling for other continuous variables. Table 4.2 shows the correlation coefficients for all the variables adopted in this study.

**Table 4.2: Correlations**

Control Variables			20 Share Index	All Share Index	Exchange rate
Inflation & Interest	20 Share Index	Correlation	1.000		
		Sig (2-tailed)			
	All Share Index	Correlation	0.927	1.000	
		Sig (2-tailed)	0.000		
	Exchange rate	Correlation	-0.059	-0.201	1.000
		Sig (2-tailed)	0.723	0.227	

Table 4.2 shows that at 0.01 confidence interval, there was a significant, strong and positive correlation between the NSE 20 Share Index and the NSE All Share Index ( $r = 0.927$ ; Sig. = 0.000). This can be attributed to the fact that both indices are metrics used to measure the NSE performance and are thus as expected to have a correlation value closest to 1. A weak and negative correlation was however observed between exchange rate and both the NSE 20 Share Index ( $r = -0.059$ ; Sig. = 0.723) and All Share Index ( $-0.201$ ; Sig. = 0.227).

### **4.3.2 Regression Analysis**

To determine the degree of impact of foreign exchange rate on the performance of the Nairobi Securities Exchange as indicated by NSE All Share and NSE 20 Share Indices while controlling for inflation and interest rates, the study used Hierarchical multiple regression. This was performed in two parts, the first one with the NSE All Share Index and the second one with the NSE 20 Share index. The regression analyses were performed with the assumption that: there is a normal distribution among variables; there is a linear association between the dependent and independent variables for estimation accuracy. Regression analyses produced both the coefficients of determination and Analysis Of Variance (ANOVA). ANOVA was done to indicate whether a significant mean difference exists between independent and dependent variables. ANOVA was conducted at 95% confidence level. Tables 4.3 and 4.4 below present the findings.



**Tables 4.3 Regression Analysis: NSE All Share Index**

**Model Summary<sup>c</sup>**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	0.332 <sup>a</sup>	0.110	0.062	4.52246	0.110	2.292	2	37	0.115
2	0.400 <sup>b</sup>	0.160	0.090	4.45583	0.049	2.115	1	36	0.155

a. Predictors: (Constant), Interest, Inflation

b. Predictors: (Constant), Interest, Inflation, Exchange

c. Dependent Variable: NASI

**ANOVA<sup>c</sup>**

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	93.771	2	46.886	2.292	0.115 <sup>a</sup>
	Residual	756.747	37	20.453		
	Total	850.518	39			
2	Regression	135.759	3	45.253	2.279	0.096 <sup>b</sup>
	Residual	714.759	36	19.854		
	Total	850.518	39			

a. Predictors: (Constant), Interest, Inflation

b. Predictors: (Constant), Interest, Inflation, Exchange

c. Dependent Variable: NASI

**Coefficients<sup>a</sup>**

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	0.919	0.733		1.253	0.218
	Inflation	-0.027	0.027	-0.160	-1.022	0.314
	Interest	-0.105	0.053	-0.310	-1.987	0.054
2	(Constant)	1.163	0.741		1.568	0.126
	Inflation	-0.026	0.026	-0.151	-0.983	0.332
	Interest	-0.134	0.056	-0.396	-2.405	0.021
	Exchange	-0.508	0.349	-0.239	-1.454	0.155

a. Dependent Variable: NASI

With an R-squared value of 0.110, in the block one variables which entails the variables being controlled for, the model shows that percentage changes in Interest

rates and Inflation collectively explain 11.0% of the variations in the percentage change of performance of the Nairobi Securities Exchange as indicated by the NSE All Share Index, while 89.0% is explained by other factors not included in the model. On the other hand, the R-squared of 0.160, in the second block of variables which entails the variables being controlled for and the predictor variable, percentage exchange rate movement shows that all the variables, that is percentage Interest rate change, percentage inflation rate change and percentage exchange rate movement collectively explain 16.0% of the variations in the percentage change of performance of the Nairobi Securities Exchange as indicated by the NSE All Share Index, while 84.0% is explained by other factors not included in the model.

The 0.49 change in R-squared value in the second block implies that controlling for percentage Interest rate change and percentage inflation rate change, percentage exchange rate movement has an influence on the percentage change of performance of the Nairobi Securities Exchange as indicated by the NSE All Share Index. The Sig. Value of 0.155 however implies that the influence thereof is not statistically significant.

In the ANOVA table, the Sig. value of 0.096b implies that the percentage change in Exchange rate has a joint relationship with movement in the percentage change in Interest rate, Inflation rate, albeit not statistically significant either at a confidence level of 0.01 or 0.05.

From the regression coefficients table, the regression equation established was thus:  

$$\Delta Y = \beta_0 (1.163) + -0.239 (\Delta \text{ exchange rate}) + -0.396 (\Delta \text{ interest rate}) + -0.151(\Delta \text{ inflation rate}) + 0.741 (\epsilon t): \Delta Y = 1.163 + -0.239 \Delta X_1 + -0.396 \Delta X_2 + -0.151 \Delta X_3 + \epsilon$$

Where:

$\Delta Y$  = NSE performance as measured by the change in NSE all share index  $\Delta X_1$  = Movement in exchange rate  $\Delta X_2$  = Change in interest rate  $\Delta X_3$  = Change in inflation rate.

It can therefore be deduced that a unit change in exchange rate movement would lead to a -0.239 unit change in the percentage change of performance of the Nairobi Securities Exchange as indicated by the All Share Index at a beta constant efficient of 1.163 with a 0.741 standard error, controlling for percentage change in interest rate and inflation rate. The association however lacks statistical significance at a Sig value of 0.155.

**Table 4.4: Regression Analysis: NSE 20 Share Index**

**Model Summary<sup>c</sup>**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	0.281 <sup>a</sup>	0.079	0.029	4.28300	0.079	1.589	2	37	0.218
2	0.297 <sup>b</sup>	0.088	0.012	4.32067	0.009	0.358	1	36	0.554

a. Predictors: (Constant), Interest, Inflation

b. Predictors: (Constant), Interest, Inflation, Exchange

c. Dependent Variable: NSE20

**ANOVA<sup>c</sup>**

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	58.292	2	29.146	1.589	0.218 <sup>a</sup>
	Residual	678.732	37	18.344		
	Total	737.024	39			
2	Regression	64.970	3	21.657	1.160	0.338 <sup>b</sup>
	Residual	672.054	36	18.668		
	Total	737.024	39			

a. Predictors: (Constant), Interest, Inflation

b. Predictors: (Constant), Interest, Inflation, Exchange

c. Dependent Variable: NSE20

### Coefficients<sup>a</sup>

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-0.121	0.694		-0.175	0.862
	Inflation	-0.032	0.025	-0.201	-1.265	0.214
	Interest	-0.069	0.050	-0.221	-1.394	0.172
2	(Constant)	-0.024	0.719		-0.034	0.973
	Inflation	-0.031	0.025	-0.197	-1.231	0.226
	Interest	-0.081	0.054	-0.258	-1.504	0.141
	Exchange	-0.203	0.339	-0.102	-0.598	0.554

a. Dependent Variable: NSE20

With an R-squared value of 0.079, in the block one variables which entails the variables being controlled for, the model shows that percentage changes in Interest rates and Inflation collectively explain 7.9% of the variations in the percentage change of performance of the Nairobi Securities Exchange as indicated by the NSE 20 Share Index, while 92.1% is explained by other factors not included in the model.

On the other hand, the R-squared of 0.880, in the second block of variables which entails the variables being controlled for and the predictor variable, percentage exchange rate movement shows that all the variables, that is percentage Interest rate change, percentage inflation rate change and percentage exchange rate movement collectively explain 8.8% of the variations in the percentage change of performance of the Nairobi Securities Exchange as indicated by the NSE All Share Index, while 91.2% is explained by other factors not included in the model.

The 0.009 change in R-squared value in the second block implies that controlling for percentage Interest rate change and percentage inflation rate change, percentage exchange rate movement has an influence on the percentage change of performance of

the Nairobi Securities Exchange as indicated by the NSE 20 Share Index. The Sig. Value of 0.554 however implies that the influence thereof is not statistically significant.

In the ANOVA table, the Sig. value of 0.338b implies that the percentage change in Exchange rate has a joint relationship with movement the percentage change in Interest rate, Inflation, albeit not statistically significant either at a confidence interval of 0.01 or 0.05.

From the regression coefficients table, the regression equation established was thus:  
$$\Delta Y = \beta_0 (-0.024) + -0.102 (\Delta \text{ exchange rate}) + -0.258 (\Delta \text{ interest rate}) + -0.197 (\Delta \text{ inflation rate}) + 0.719 (\epsilon_t)$$
$$\Delta Y = -0.024 - 0.102 \Delta X_1 - 0.258 \Delta X_2 - 0.197 \Delta X_3 + \epsilon$$

Where:  $\Delta Y$  = NSE performance as measured by the change in NSE 20 share index  
 $\Delta X_1$  = Movement in exchange rate  $\Delta X_2$  = Change in interest rate  $\Delta X_3$  = Change in inflation rate.

It can therefore be deduced that a unit change in exchange rate movement would lead to a -0.102 unit change in the percentage change of performance of the Nairobi Securities Exchange as indicated by the 20 Share Index at a beta constant efficient of -0.024 with a 0.719 standard error, controlling for percentage change in interest rate and inflation rate. The association however lacks statistical significance at a Sig value of 0.554.

#### **4.4 Discussions of Research Findings**

A fairly normal distribution was recorded in the performance of the Nairobi Securities Exchange across for the period December 2010 to August 2016, as indicated by the percentage change in All Share Index. A similar trend was observed in the

performance as indicated by the NSE 20 share index as was by the all share index, across for the period December 2010 to August 2016. A declining trend has further on average been noted on All Share Index from December 2015 to August 2016 falling from 1.55% to -5.23% respectively; and over the same period, in the 20 Share Index falling from 5.36% to -8.88% respectively.

As such, the performance of Nairobi Securities Exchange market can be described as both unpredictable and on the decline as the case observed from December 2015 to August 2016. If this goes unaddressed, losses by investors will likely be incurred as well as a downfall of a number of investment and brokerage firms. This will consequently contribute to loss of the confidence of investors in the Nairobi Securities exchange market which continues to attract international recognition as one of the best performing and dynamic securities markets in Africa.

Findings reveal that exchange rate movement, other recording sharp rises and a decline in the beginning of the period under study, the movement was on average on the declining trend with fluctuations, across the 68 month period running from December 2010 to August 2016. These fluctuations can be attributed to the floating system of exchange rate in which currency prices are determined by demand and supply of the forex market currency.

In view of the frequent demand and supply changes affected by numerous internal and external factors, present currency fluctuations can be attributed to this new exchange rate system. The same have proven to be a key concern for NSE investors, managers, shareholders and analysts as the same expose firms to foreign exchange risk. Further, NSE listed firms are becoming more open with global trading and consequently firms suffer more exposure to fluctuations in foreign exchange rate.

It was also found that other than a sharp incline peaking at 57.14% in October 2011 and declining at 21.21 in September 2012, the percentage change in interest rate set by the central bank have on average been at 0.00 for most of the period under study. This can be attributed to the realization that excessive fluctuations in interest rate pose considerable threats to a firm's capital base and earnings and increase operating expenses thereof. Interest rate changes may also impact underlying asset values, present future cash flow values and liabilities. This has major deleterious implications on the performance of listed firms, and therefore the economy owing to the former's secondary effects. In view of this, the Central Bank of Kenya has over the period under study minimized the fluctuations in interest rates.

A stable decline can be observed in inflation rates across the December 2010 to August 2016 period at 20.18% to -2.03% respectively, with a sharp decline in October 2012 at -78.57% and an incline in November 2012 at a 185.09% peak. The effects of inflation on the Nairobi Securities Exchange performance can be explained in two viewpoints: effect on the cost of production and aggregate demand. When the level of inflation is high the purchasing power of consumers with fixed income decreases due to the decline in the money value thus product demand shrinking. In the same way, cost of production is escalated by inflation which in return reduces profitability of listed companies.

Albeit not statistically significant, results from both the Pearson's partial correlation and regression analyses reveal weak and negative associations between exchange rates and the performance of the Nairobi Securities Exchange as measured both by the NSE 20 and All share indices, controlling for interest rates and inflation. The weak and negative relationship between movements in exchange rate and performance of

the Nairobi Securities Exchange may reflect how fluctuating and volatile exchange rate may have contributed to the declining trends observed in both the NSE All Share and 20 Share Indices. This may be attributed to the fact that many imports are paid by the NSE listed firms using the dollar and, with the shilling weakening against the dollar the firms are recording arbitrage losses.

The finding is in agreement with Nyaga (2014) who investigated the impact of operating exchange rate exposure of foreign currency on share prices in services and commercial segment of NSE listed firms and found a negative relationship between share prices and volatility of exchange rate. In addition, the study is in agreement with a study by Sekmen (2011) that researched on impact of volatility of exchange rate on US returns of stock for the 1980 to 2008 period utilizing the Autoregressive Moving Average (ARMA) models' squared residuals. The study discovered that foreign exchange rate variations adversely affected US returns of stock because the hedging tools' convenience could not limit the exchange rate instability's undesirable effect on trade volume.

The finding is however in conflict with findings by Lagat and Nyandema (2016) exchange rate has a positive coefficient on ROCE and ROE of commercial banks listed in the NSE. Similarly, Sifunjo and Mwasaru (2012) assessed the connection between foreign exchange rates and stock prices in Kenya. Data was composed of monthly NSE stock price index observations and the nominal Kshs/ US dollar exchange rates (November 1993 to May 1999). Findings revealed that both in first differences and level forms foreign exchange rates and stock prices are non-stationary, and an order one integration exists between the two variables.



In Nigeria, Olugbenga (2012) carried out a research on the existing association between security market behaviour and exchange rate volatility from the Nigeria standpoint. Results showed a positive and significant stock market performance in the short-run to exchange rate and a negative significant stock market performance in the long-run to exchange rate. This also disagrees with the present study findings. Similarly, in South Africa stock market was deemed has being determined such macroeconomic variables as interest rates, money supply, the United States interest rates and total mining production. These interest rates were found to exhibit a negative effect on the stock market.

## **CHAPTER FIVE**

### **SUMMARY, CONCLUSION AND RECOMMENDATIONS**

#### **5.1 Introduction**

This chapter provides a summary of key findings, conclusions, recommendations and suggestions for future studies.

#### **5.2 Summary of Findings**

Both descriptive and inferential statistics are performed. Minimum, maximum, mean and standard deviation values are presented under descriptive statistics while correlation and multiple regressions are presented under inferential statistics. A fairly normal distribution was recorded in the performance of the Nairobi Securities Exchange across for the period December 2010 to August 2016, as indicated by the percentage change in NSE All Share Index. The sharpest decline was particularly noted in August 2011 at a -9.69% decline and the highest peak at 10.29% in March 2013. Notable declines were also recorded in June 2013 at -8.27% and in July 2015 at -9.74%. A declining trend has further on average been noted from December 2015 to August 2016 falling from 1.55% to -5.23% respectively.

A comparable trend was also witnessed in the performance of the securities market as indicated by the percentage change in the NSE 20 share index as was with the All share index, across for the period December 2010 to August 2016. The sharpest decline was particularly noted in decline July 2015 at -10.22% and the highest peak at 7.57% in March 2013. Notable declines were also recorded in November 2011 at a -10.08%, June 2013 at -8.16%, March 2011 at -8.33% and in August 2016 at -8.88%. A

declining trend has further on average been noted from February 2015 to August 2016 falling from 5.36% to -8.88% respectively.

In exchange rate movement, other than recording sharp rises and a decline at the beginning of the period under study, the movement was on average on the declining trend across the 68 month period running from December 2010 to August 2016. The movement was highest in September 2011, at 6.63%, then May 2012 at 4.34% and in July 2015 at 3.94%. The sharpest decline was recorded in November 2011 at -10.08%, with the period December 2015 to August 2016 stabilizing from 0.19% to -0.03% respectively.

A stable decline was further observed in inflation rates across the December 2010 to August 2016 period at 20.18% to -2.03% respectively, with sharp declines in October 2012 at -78.57% and an incline in November 2012 at a 185.09% peak. Other than the sharp inclines peaking at 57.14% in October 2011 and declining at 21.21 in September 2012; the percentage change interest rate set by the central bank have on average been at 0.00 for most of the period under study.

Pearson's partial correlation revealed a weak and negative correlation between exchange rate and both the NSE 20 Share Index ( $r = -.059$ ; Sig. = .723) and NSE All Share Index ( $-.201$ ; Sig. = .227). Multiple regression analysis further revealed a 0.49 change in R-squared value implying that controlling for percentage Interest rate change and percentage inflation rate change, percentage exchange rate movement has an influence on the percentage change of performance of the Nairobi Securities 50 Exchange as indicated by the NSE All Share Index. The Sig. Value of .155 however implies that the influence thereof is not statistically significant. A 0.009 change in R-squared value was further observed implying that controlling for percentage Interest

rate change and percentage inflation rate change, percentage exchange rate movement has an influence on the percentage change of performance of the Nairobi Securities Exchange as indicated by the NSE 20 Share Index. The Sig. Value of .554 however revealed that the influence thereof is not statistically significant.

### **5.3 Conclusion**

The performance of Nairobi Securities Exchange market can be described as both unpredictable and on the decline as the case observed from December 2015 to August 2016. Foreign exchange movement was on average on the declining trend with fluctuations, across the 68 month period running from December 2010 to August 2016. These fluctuations can be attributed to the floating system of exchange rate in which currency prices are determined by demand and supply of the forex market currency. In view of the frequent demand and supply changes affected by numerous internal and external factors, present currency fluctuations can be attributed to this new exchange rate system.

Albeit not statistically significant, results from both the Pearson's partial correlation and regression analyses reveal weak and negative associations between exchange rates and NSE performance as indicated by both the NSE 20 and All share indices, controlling for interest rates and inflation. The weak and negative relationship between the movements in exchange rate and Nairobi Securities Exchange financial performance may reflect how fluctuating and volatile exchange rate may have contributed to the declining trends observed in both the NSE All Share and 20 Share Indices. This may be attributed to the fact that many imports are paid by the NSE listed firms using the dollar and, with the shilling weakening against the dollar the firms are recording arbitrage losses.

The applied significance of the foregoing study findings concerns the realization that whereas a number of methods to reduce risk exposure by NSE listed firms such as derivatives, hedging of the balance sheet, lagging and leading and amongst others these methods are to a significant extent too sophisticated and challenging to implement in such developing economies as Kenya having financial systems that are not adequately developed. However, with the extent of exposure established in the study, investors and corporate managers in the country ought to attempt to put into practice a mixture of such easy to use tools as swaps and forward contracts in the enhancement of price adjustments with a view to abate their exchange risk exposure to.

#### **5.4 Recommendations**

Based on the abovementioned findings, the study proposes that the issues related to foreign exchange trading should always be taken into account in efforts to improve listed firms' foreign exchange transactions and consider opportunities to boost firm capacities for foreign currency risk exposure management. It is of utmost importance that not only listed firms, but also all Kenyan firms in general with and without global business operations effectually control their risk with a view to lessen their exchange rate risk exposure. In a progressively globalizing economy, local firms, as well as their suppliers and clientele are not protected from the adverse consequences of currency movements, global competition and economic cycles.

Listed firms ought to explore the course of continuous short term trainings and education which ought to be adequately practical as opposed to theoretical. The same can involve the consultation of professional institutions comprised of bankers, finance specialists, consultants and accountants. Such short term trainings ought to preferably

be away from the site in order to avoid internal interruptions and also owing to the need to engage participants from different orientations and businesses for training and subsequent assessments. The short term trainings ought to not only encompass currency risk but preferably also be led by preliminary import-export trade contents as well as the real-world market challenges industries face.

It is also the study recommendations that the government should also put in place more measures to increase the country's exports as this will go a long way in improving the performance of listed firms in Kenya. The Central Bank of Kenya should set base lending rates that can help the listed banks profitable while at the same time not punitive to the borrowers. This will aid in growing the credit market in Kenya and eventually improve both listed firms' performance and develop the economy. The study also recommends that the overall rate of inflation should be contained via sound policy measures as higher rates of inflation can cripple the performance of listed firms.

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

A number of setbacks were inevitable in the course of the study, albeit minimal and with no actual effects to the quality thereof. The key limitation of the research was that the panel data used was for 68 months. A longer period of study would have painted a longer term picture of the effect of exchange rate fluctuation on the performance of listed firms. The R Squared values also revealed that the variables under consideration only explain less than 20% of the variations in NSE performance; other important factors were thus not captured.

Another constraint faced in the study was the number of variables investigated. The result from the dependent variables considered could only explain about 20% of the

dependent variable. Probably a study that considers all the factors that can influence the performance of the NSE need to be taken into account in future studies that may be carried in the area of securities market performance. This will provide adequate information to the investors who participate in the NSE market.

Further, the study relied on quantitative data during the period of study. The data was collected from secondary sources. The study did not consider the perception of investors on the inflation risk impact on NSE 20 share index performance. Further, the associations tested in the study's regression model have only been discussed as either weak or strong, but the study failed to account for the attributes behind the relative degrees of association. It is in this regard the researcher's recommendation that a causality study be conducted with a view to determine what cases the observed weaknesses and strengths in the relationships.

### **5.6 Suggestions for Future Studies**

The present study has focused on the effects of movements in exchange on NSE performance. Since the focus of the study was on both the NSE All and 20 share indices, a study on exchange rate movement effect on performance of bonds, real estate and other investment avenues may assist in further devising measures to improve firms' foreign exchange transactions and financial performance.

Further, the study suggests that the time factor the presented study used can be improved by expanding the same to cover a longer time period. A study can be conducted in the future focusing on the same topic, but differently use time series data covering a longer time period. This is so as to address the assumption that a longer time period is expected to provide better long standing findings reflecting the length of experience by NSE as opposed to the five year period used in the present study.

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## APPENDICES

### Appendix I: NSE Indices and Exchange Rate

Month	NSE 20 Share Index	NASI	Exchange Rate (KES/USD)	Change % (NASI)	Change % (NSE 20 Share Index)	Change % (Exchange Rate)
Aug-16	3,178.83	134.94	101.3589	-5.23%	-8.88%	-0.03%
Jul-16	3,488.67	142.39	101.3889	1.27%	-4.17%	0.28%
Jun-16	3,640.61	140.60	101.1022	-2.10%	-4.89%	0.27%
May-16	3,827.80	143.61	100.8306	-2.26%	-4.53%	-0.31%
Apr-16	4,009.26	146.93	101.1413	-0.35%	0.68%	-0.19%
Mar-16	3,982.09	147.44	101.3339	3.81%	3.10%	-0.36%
Feb-16	3,862.24	142.03	101.6971	3.82%	2.36%	-0.57%
Jan-16	3,773.17	136.81	102.2834	-6.10%	-6.62%	-0.03%
Dec-15	4,040.75	145.70	102.3114	1.55%	0.61%	0.19%
Nov-15	4,016.18	143.47	102.1143	4.51%	3.81%	0.31%
Oct-15	3,868.83	137.28	101.8000	-6.56%	-7.30%	-3.32%
Sep-15	4,173.52	146.92	105.2928	2.89%	-0.07%	1.37%
Aug-15	4,176.59	142.80	103.8699	-3.77%	-5.18%	1.32%
Jul-15	4,404.72	148.39	102.5212	-9.74%	-10.22%	3.94%
Jun-15	4,906.07	164.41	98.6394	1.41%	2.49%	0.88%
May-15	4,786.74	162.13	97.7810	-6.39%	-5.98%	3.36%
Apr-15	5,091.43	173.20	94.6000	-1.09%	-2.99%	2.45%
Mar-15	5,248.16	175.11	92.3350	-0.34%	-4.43%	1.00%
Feb-15	5,491.37	175.70	91.4231	5.97%	5.36%	-0.27%
Jan-15	5,212.11	165.80	91.6736	1.79%	1.95%	1.19%
Dec-14	5,112.65	162.89	90.5978	-0.23%	-0.85%	0.46%
Nov-14	5,156.33	163.27	90.1792	2.54%	-0.74%	0.93%
Oct-14	5,194.89	159.23	89.3522	-2.58%	-1.16%	0.08%
Sep-14	5,255.62	163.45	89.2794	3.49%	2.26%	1.00%
Aug-14	5,139.39	157.94	88.3944	4.12%	4.76%	0.67%
Jul-14	4,906.09	151.69	87.8042	0.88%	0.43%	0.20%
Jun-14	4,885.04	150.37	87.6269	0.11%	0.07%	-0.19%
May-14	4,881.56	150.20	87.7972	-0.62%	-1.36%	1.07%
Apr-14	4,948.97	151.13	86.8711	5.03%	0.06%	0.50%
Mar-14	4,945.78	143.89	86.4414	2.01%	0.25%	0.13%
Feb-14	4,933.41	141.05	86.3264	4.75%	1.59%	0.10%
Jan-14	4,856.15	134.66	86.2361	-1.46%	-1.44%	-0.09%
Dec-13	4,926.97	36.65	86.3097	-3.20%	-3.41%	-0.79%
Nov-13	5,100.88	141.17	86.9931	5.95%	2.16%	2.17%
Oct-13	4,992.88	133.24	85.1469	4.63%	4.17%	-1.73%

Sep-13	4,793.20	127.35	86.6458	6.16%	2.03%	-1.09%
Aug-13	4,697.75	119.96	87.5967	-2.36%	-1.88%	0.36%
Jul-13	4,787.56	122.86	87.2797	5.63%	4.12%	1.48%
Jun-13	4,598.16	116.31	86.0075	-8.27%	-8.16%	1.04%
May-13	5,006.96	126.80	85.1236	7.39%	5.07%	1.55%
Apr-13	4,765.23	118.07	83.8208	0.14%	-1.97%	-2.12%
Mar-13	4,860.83	117.91	85.6386	10.29%	7.57%	-0.69%
Feb-13	4,518.59	106.91	86.2361	3.29%	2.31%	-1.57%
Jan-13	4,416.60	103.50	87.6111	9.11%	6.86%	1.84%
Dec-12	4,133.02	94.86	86.0286	2.89%	1.21%	0.11%
Nov-12	4,083.52	92.20	85.9347	0.46%	-1.44%	0.89%
Oct-12	4,143.35	91.78	85.1775	5.04%	4.31%	-0.12%
Sep-12	3,972.03	87.38	85.2833	3.21%	2.75%	1.14%
Aug-12	3,865.76	84.66	84.3208	1.68%	0.87%	0.13%
Jul-12	3,832.42	83.26	84.2125	3.11%	3.47%	-0.02%
Jun-12	3,703.94	80.75	84.2333	2.89%	1.45%	-2.98%
May-12	3,650.85	78.48	86.8250	2.04%	2.94%	4.34%
Apr-12	3,546.66	76.91	83.2164	4.68%	5.34%	0.19%
Mar-12	3,366.89	73.47	83.0556	1.94%	1.91%	0.10%
Feb-12	3,303.75	72.07	82.9708	4.54%	2.47%	-1.91%
Jan-12	3,224.18	68.94	84.5875	1.34%	0.60%	-0.56%
Dec-11	3,205.02	68.03	85.0681	2.56%	1.57%	-5.19%
Nov-11	3,155.46	66.33	89.7208	-8.77%	-10.03%	-10.08%
Oct-11	3,507.34	72.71	99.7783	4.80%	6.80%	-0.05%
Sep-11	3,284.06	69.38	99.8319	-8.89%	-5.22%	6.63%
Aug-11	3,465.02	76.15	93.6222	-9.69%	-7.31%	2.77%
Jul-11	3,738.46	84.32	91.1000	-7.71%	-5.79%	1.38%
Jun-11	3,968.12	91.36	89.8639	-1.98%	-2.70%	4.85%
May-11	4,078.10	93.21	85.7044	-1.03%	1.21%	2.74%
Apr-11	4,029.23	94.18	83.4194	5.23%	3.66%	0.52%
Mar-11	3,887.07	89.50	82.9889	-7.41%	-8.33%	0.76%
Feb-11	4,240.18	96.66	82.3639	-2.38%	-5.03%	1.34%
Jan-11	4,464.92	99.02	81.2722	1.23%	0.73%	0.64%
Dec-10	4,432.60	97.82	80.7519			



## Appendix II: The Central Bank Rate

Date	CBR %	Change %
25/07/2016	10.50	0.00%
23/05/2016	10.50	-8.70%
21/03/2016	11.50	0.00%
20/01/2016	11.50	0.00%
17/11/2015	11.50	0.00%
22/09/2015	11.50	0.00%
05/08/2015	11.50	0.00%
07/07/2015	11.50	15.00%
09/06/2015	10.00	17.65%
06/05/2015	8.50	0.00%
26/02/2015	8.50	0.00%
14/01/2015	8.50	0.00%
04/11/2014	8.50	0.00%
03/09/2014	8.50	0.00%
08/07/2014	8.50	0.00%
30/04/2014	8.50	0.00%
04/03/2014	8.50	0.00%
14/01/2014	8.50	0.00%
05/11/2013	8.50	0.00%
03/09/2013	8.50	0.00%
09/07/2013	8.50	0.00%

Date	CBR %	Change %
07/05/2013	8.50	-10.53%
12/03/2013	9.50	0.00%
10/01/2013	9.50	-13.64%
07/11/2012	11.00	-15.38%
05/09/2012	13.00	-21.21%
05/07/2012	16.50	-8.33%
05/06/2012	18.00	0.00%
03/05/2012	18.00	0.00%
04/04/2012	18.00	0.00%
06/03/2012	18.00	0.00%
01/02/2012	18.00	0.00%
11/01/2012	18.00	0.00%
01/12/2011	18.00	9.09%
01/11/2011	16.50	50.00%
05/10/2011	11.00	57.14%
14/09/2011	7.00	12.00%
27/07/2011	6.25	0.00%
31/05/2011	6.25	4.17%
22/03/2011	6.00	4.35%
27/01/2011	5.75	

### Appendix III: The Overall Inflation Rate

Month	Overall Inflation Rate	Change %
Aug-16	6.26	-2.03%
Jul-16	6.39	10.17%
Jun-16	5.8	16.00%
May-16	5	-5.12%
Apr-16	5.27	-18.29%
Mar-16	6.45	-9.03%
Feb-16	7.09	-8.87%
Jan-16	7.78	-2.87%
Dec-15	8.01	9.43%
Nov-15	7.32	8.93%
Oct-15	6.72	12.56%
Sep-15	5.97	2.23%
Aug-15	5.84	-11.78%
Jul-15	6.62	-5.83%
Jun-15	7.03	2.33%
May-15	6.87	-2.97%
Apr-15	7.08	12.20%
Mar-15	6.31	12.48%
Feb-15	5.61	1.45%
Jan-15	5.53	-8.14%
Dec-14	6.02	-1.15%
Nov-14	6.09	-5.29%
Oct-14	6.43	-2.58%
Sep-14	6.6	-21.05%
Aug-14	8.36	9.00%
Jul-14	7.67	3.79%
Jun-14	7.39	1.23%
May-14	7.3	13.88%
Apr-14	6.41	2.23%
Mar-14	6.27	-8.60%
Feb-14	6.86	-4.85%
Jan-14	7.21	0.84%
Dec-13	7.15	-2.85%
Nov-13	7.36	-5.15%
Oct-13	7.76	-6.39%

Month	Overall Inflation Rate	Change %
Sep-13	8.29	24.29%
Aug-13	6.67	10.80%
Jul-13	6.02	22.61%
Jun-13	4.91	21.23%
May-13	4.05	-1.70%
Apr-13	4.12	0.24%
Mar-13	4.11	-7.43%
Feb-13	4.44	20.98%
Jan-13	3.67	14.69%
Dec-12	3.2	-1.54%
Nov-12	3.25	185.09%
Oct-12	1.14	-78.57%
Sep-12	5.32	-12.64%
Aug-12	6.09	-21.32%
Jul-12	7.74	-22.99%
Jun-12	10.05	-17.76%
May-12	12.22	-6.43%
Apr-12	13.06	-16.34%
Mar-12	15.61	-6.47%
Feb-12	16.69	-8.85%
Jan-12	18.31	-3.28%
Dec-11	18.93	-4.01%
Nov-11	19.72	4.28%
Oct-11	18.91	9.18%
Sep-11	17.32	3.90%
Aug-11	16.67	7.34%
Jul-11	15.53	7.18%
Jun-11	14.49	11.89%
May-11	12.95	7.47%
Apr-11	12.05	31.12%
Mar-11	9.19	40.52%
Feb-11	6.54	20.66%
Jan-11	5.42	20.18%
Dec-10	4.51	