

**THE VOLATILITY EFFECTS OF FOREIGN EXCHANGE ON  
FINANCIAL PERFORMANCE OF THE BOND MARKETS IN  
KENYA**

**BY SAMUEL AWICH OTIENO**

**D63/81576/2015**

**A RESEARCH PROPOSAL SUBMITTED IN PARTIAL FULFILLMENT OF  
THE REQUIREMENTS FOR THE AWARD OF A MASTER OF SCIENCE IN  
FINANCE DEGREE, SCHOOL OF BUSINESS, UNIVERSITY OF NAIROBI.**

**2018**

## DECLARATION

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

Signature: .....

Date: .....

STUDENT:

SAMUEL AWICH OTIENO

REGISTRATION NUMBER:

D63/81576/2015

This project has been submitted for examination with my approval as university supervisor.

Signed: \_\_\_\_\_ Date \_\_\_\_\_

DR. WINNIE NYAMUTE

Senior Lecturer,

Department of Finance and accounting,

School of Business, University of Nairobi

## **ACKNOWLEDGEMENT**

I thank the LORD, God Almighty for the love, grace, life and blessings in guiding, sustaining and providing for me throughout the course and in undertaking this project. Special thanks to my supervisor Dr. Winnie Nyamute for her invaluable help and guidance while undertaking this project.

With much gratitude I thank The Man of God, Prophet Dr. David Edward Owuor for the prayers and spiritual support that have been immeasurable throughout the Msc program.

## **DEDICATION**

This project is dedicated to my lovely wife Susan Naliaka Awich and our precious daughter Baby Sancia Pelia. I also dedicate to my parents Nichanor Otieno Odero and Serphine Otieno for such a wonderful care and upbringing that have enabled me to get this far. I dedicate the project to my siblings Willy, Chris, Dan, Peninah and Anne.

## TABLE OF CONTENTS

<b>DECLARATION .....</b>	<b>ii</b>
<b>ACKNOWLEDGEMENT .....</b>	<b>iii</b>
<b>DEDICATION .....</b>	<b>iv</b>
<b>LIST OF FIGURES.....</b>	<b>viii</b>
<b>LIST OF TABLES.....</b>	<b>ix</b>
<b>LIST OF ABBREVIATIONS .....</b>	<b>x</b>
<b>ABSTRACT .....</b>	<b>xi</b>
<b>CHAPTER ONE.....</b>	<b>1</b>
<b>INTRODUCTION .....</b>	<b>1</b>
1.1 Background of the Study.....	1
1.1.1 Foreign Exchange Rate Volatility .....	2
1.1.2 Financial Performance of Bond Markets.....	3
1.1.3 Exchange Rate Volatility Effect on Financial Performance of Bond Markets.....	5
1.1.4 Bond Market in Kenya.....	7
1.2 Research Problem.....	9
1.3 Objective of the Study.....	12
1.4 Value of Study.....	12
<b>CHAPTER TWO .....</b>	<b>13</b>
<b>LITERATURE REVIEW .....</b>	<b>13</b>
2.1 Introduction.....	13
2.2 Theoretical Review .....	13
2.2.1 Purchasing Power Parity Theory .....	13

2.2.2 Liquidity Premium Theory .....	14
2.2.3 Efficient Market Hypothesis.....	15
2.3 Determinants of Financial Performance Bond Markets .....	16
2.3.1 Foreign Exchange rate .....	16
2.3.2 Interest Rates .....	17
2.3.3 Inflation.....	18
2.4 Empirical Review .....	19
2.4.1 International Empirical Review.....	20
2.4.2 Local Empirical Review .....	22
2.5 Conceptual Framework.....	23
2.6 Summary of Literature Review .....	25
<b>CHAPTER THREE.....</b>	<b>27</b>
<b>RESEARCH METHODOLOGY .....</b>	<b>27</b>
3.1 Introduction.....	27
3.2 Research Design .....	27
3.3 Population.....	27
3.4 Data Collection .....	28
3.5 Diagnostic Tests.....	28
3.6 Data Analysis.....	28
3.6.1 Analytical Model .....	29
<b>CHAPTER FOUR .....</b>	<b>30</b>
<b>DATA ANALYSIS, RESULTS AND DISCUSSIONS .....</b>	<b>30</b>
4.1 Introduction.....	30
4.2 Variables of the Study .....	30
4.2.1 Foreign Exchange Volatility.....	30

4.2.2 Bond Indices .....	30
4.2.3 Inflation.....	31
4.2.4 Money Supply.....	31
4.3 Descriptive Statistics .....	31
4.4 Normality test .....	32
4.5 Test for linearity .....	32
4.6 Test for Multicollinearity.....	33
4.7 Correlation Analysis .....	34
4.8 Regression Model .....	36
4.9 Analysis of Variance.....	37
4.10 Beta coefficients .....	37
4.11 Discussion and Interpretation of Findings .....	38
<b>CHAPTER FIVE .....</b>	<b>39</b>
<b>SUMMARY, CONCLUSION AND RECCOMENDATIONS .....</b>	<b>39</b>
5.1 Introduction.....	39
5.2 Summary of Findings .....	39
5.3 Policy Recommendations .....	40
5.4 Limitation of the Study.....	40
5.5 Suggestions for Further Studies.....	41
<b>REFERENCES .....</b>	<b>42</b>

## LIST OF FIGURES

Figure 2.1 Conceptual Model.....	22
Figure 4.1 Linearity Plot .....	30



## LIST OF TABLES

Table 4.1 Descriptive Statistics.....	28
Table 4.2 Test of Normality.....	29
Table 4.3 Collinearity Statistics.....	31
Table 4.4 Correlation Analysis.....	32
Table 4.5 Model Summary.....	33
Table 4.6 ANOVA.....	34
Table 4.7 Beta Coefficient.....	34

## **LIST OF ABBREVIATIONS**

<b>CMA</b>	Capital Market Authority
<b>CBK</b>	Central Bank of Kenya
<b>EMH</b>	Efficient Market Hypothesis
<b>FTSE</b>	Financial Times Stock Exchange
<b>FX</b>	Exchange rate
<b>GARCH</b>	Generalized Autoregressive Conditional Heteroskedasticity
<b>KNBS</b>	Kenya National Bureau of Statistics
<b>NSE</b>	Nairobi Securities Exchange
<b>SPSS</b>	Statistical Package for Social Sciences
<b>USD</b>	United States Dollar
<b>U.K.</b>	United Kingdom
<b>US</b>	United States

## ABSTRACT

The recent macroeconomic environment has been characterized by depreciation of the Kenya Shilling to one of the lowest levels, trading at 106 per US dollar in 2015. The NSE share index declined recording a return of 3.8% in 2014. Bonds, however have outperformed other asset classes at the N.S.E. of the recent past. In 2015, treasury bonds yielded an upward of 8.5%. The yields of both Treasury and corporate bonds have been attributed to the high interest rates recorded in the last half of 2015. The strong performance of the bond markets was attributed to high interest rates which indicates uncertainties in the markets, depreciation of the local currency and decline in returns from the stock markets with many listed companies reporting profit warning. The objective of this study is to evaluate whether the exchange rate parameter is a determinant of investments in bond markets in Kenya. Kluza (2002) finds chaotic results in analysis of the relationship between the two variables with some showing a negative relationship while others a positive relationship. Chinn and Meridith (2004) found varying results using different bond maturities. Longei (2017) who examined the relationship between USD/KES exchange rate and the NSE bond index found a negative relationship between the variables which conflicts with studies by Froot (1990) who found a positive relationship between the variables. Secondary data was collected from Bloomberg on the FTSE-NSE Kenya Government bond index for the period 2007-2017. Data on foreign exchange volatility was obtained from Central Bank of Kenya (CBK) website and statistical abstract for the period. Inflation data was obtained from the Consumer Price Indices published by Kenya National Bureau of Statistics (KNBS) for the period under study. From the results, the correlation coefficients between bond indices and the independent variables are all negative. The correlation coefficient between bond indices and FX volatility is -0.224. This implies a negative association where a unit change in FX volatility results in 22.4% change in the value of bond indices.

# **CHAPTER ONE**

## **INTRODUCTION**

### **1.1 Background of the Study**

The intertemporal interactions in foreign exchange volatility and financial performance of bond markets is a growing area of interest since both variables participate extensively towards determining the extent of economic development of a country. The increased freedom of trading between countries results in exposure to currency volatility (Adler, 1984), that determines investors' appetite and confidence in constructing the bond portfolio based on the financial performance (Longei & Ali, 2017). The financial performance of bond markets is directly influenced by foreign investments and currency exchange risks that determine the real value of portfolio. Foreign exchange fluctuations vary the premium demanded by investors on the returns from the bond markets to reflect the real value of income (Serge & Camilo, 2007).

This study is anchored on the theories Purchasing Power Parity, Liquidity Premium Theory and Efficient Market Hypothesis. The Purchasing Power Parity theory postulated by Cassel (1918) relates the differential exchange rates among countries with the ability and willingness to purchase a "basket of goods". This theory is essential in explaining price adjustments in assets in a country to correspond to currency exchange fluctuations. The Efficient Market Hypothesis posited by Fama (1981) describes the prices of bonds reflecting all the available information in the market and that it is difficult to obtain arbitrage opportunities to earn extra income. The Liquidity Premium Theory established

by Hicks (1946) holds that investors choose easily saleable short-term bonds to illiquid long-term bonds.

The onset of global economic crisis influenced capital flows from stocks to bonds as diversified the portfolio to minimize risks. Earnings in bonds is considered less risky compared to stock markets and portfolio managers increase investment in bonds to spread the exposure. In Kenya, CMA Quarterly Bulletin, (2017) reported a massive decline in foreign investment in shares due to uncertainties in the macroeconomic climate. The exchange rate fluctuation has been attributed to have spillover effects on bond markets both within country and among markets as studied by Mustafa (2012).

### **1.1.1 Foreign Exchange Rate Volatility**

Exchange rate is the value of a country's currency, prices in respect to another country's currency. The period before 1970s, currency exchange regime was fixed and controlled by the Bretton Woods Agreement. Under this agreement, currency exchange rate regimes were fixed until its collapse. The establishment of floating exchange rates meant that the prices of currencies were not controlled by any intervention except the economic activities of supply and demand. These fluctuations expose investors to currency exchange risks. Adler (1984) posits that currency rate risk is the level of reaction to movements in a country's real currency value of assets and liabilities to unexpected movements in exchange rate. Volatility of exchange rates implies the level of dispersion of a currency conversion rate with respect to another country's currency over time. Polyzoidou (2014) argued that spillover effects are consequences of an economic activity to other entities that are not participants, explaining the relationship between the

variables. Thus, this study critically evaluates the financial performance of the bond markets relative to the volatility in currency exchange rate.

Taggart and McDermott (2000) assert that volatility of currency exchange rates leads to uncertainties in both micro and macroeconomic environment where the expected future income, expenses and asset real and market value cannot be projected with a high degree of probability. This is further explained by Taiwo and Adesola (2013) who posit that the currency exchange volatility result in a rise or a decline in the net financial position of firms and a country's net international investment position. Earnings of companies engaged in international trade are influenced by currency exchange rate movements.

The floating exchange rate between Kenya's currency to other foreign currencies is affected by demand and supply pressures. The Central Bank of Kenya sets the par value which commercial banks, forex bureaus and other market participants reference to while setting the exchange rates (Musyoki, 2017).

### **1.1.2 Financial Performance of Bond Markets**

A bond is a fixed income security where issuers receives cash from the bond holders who earn periodic interest in form of coupon payments and principal repayment (Balduzzi, 2001). Bonds are commonly issued by treasury, corporate and municipalities in some jurisdictions. In the primary markets, bonds are normally issued at a par value. In the secondary market, bond value is influenced by market forces just like any good or service in free market economy. Thus, bond prices in the secondary markets fluctuate depending on the prevailing market conditions. Mukherjee and Atsuyuki (1996) posited that fixed income securities like bonds are comparatively preferable choice of investment to other

securities like shares due to the stable flow of income, low risk of losses and tax incentives for government issued bonds.

Kluza and Sławiński (2002) assert that the study of bond returns is essential in providing investors with vital information for construction of portfolio. Returns on bonds indicate a country's economic development and determines the level of confidence investors place in a country's debt market. Huttman, (1998) in examining the primary variables that affect values of bonds came up with the mean short-term interest rates, credit worth of the borrower and the foreign exchange volatility as main factors influencing returns on the bond markets. Market prices of bonds fluctuate based on market interest rates, inflation and foreign exchange rate fluctuations. Investors profile their portfolio on whether to hold or sell bonds by comparing coupon rate payments to prevailing market rates. Market interest rates have an indirect link to bond market performance. This is because newly issued bonds would bear higher coupons comparatively. The demand for the existing bond would decline and thus exert pressure on the downward pricing of the bond. Conversely, a negative change in interest rates effects a decline in bond prices as the coupon payment of the existing bond would be higher than that of a newly issued bond. The demand would therefore rise which results in an increase in price of the bond. Mustafa (2012) posits that foreign investors are keen on currency fluctuations when purchasing bonds. A devaluation of the bond issuing country's currency would result in erosion of the real value earned from the coupon payments in the foreign currency terms. Similarly, currency appreciation results in increased real value in the foreign currency terms of the coupon payments.

Financial performance of the bond markets in Kenya indicates whether investors gain or lose through investments in bonds. The returns from the bond markets is measured using the bond market indices. The Nairobi Securities Exchange has partnered with FTSE to provide periodic Kenya Shilling Bond Market Index. The indices are calculated based bid and ask prices obtained from the NSE. (Longei and Abdallah, 2017)

### **1.1.3 Exchange Rate Volatility Effect on Financial Performance of Bond Markets**

The liberalization of markets has offered investors fertile opportunity to diversify their investments internationally. This comes at the backdrop against which countries trade in different currencies. Fluctuations in exchange rates affects both assets and liabilities Adler and Dumas (1984). Volatility in foreign exchange thus becomes a subject that attracts the investors' concern. With the end of the fixed currency exchange rate, foreign exchange volatility has become an area of interest for many industries' players like investors, analysts, lenders and managers. A country's economic growth can be determined by indicators such as the local and international demand for products from that country. Equally, a country's credit rating by internationally recognized rating agencies affects the demand for bonds. An increase in demand for local bonds by international investors leads to an increase in demand for the local currency and thus its appreciation.

There is increasing literature on effects of foreign exchange volatility on bond markets. A number of studies have produced varied results. Some reasons for the diversity include the calculation method such as the sampling style as the case noted by Kluza (2002). Empirical studies have found varied results in explaining the relationship between



foreign exchange movements and both short and long maturity bonds. Chinn and Meredith (2004, 2005) postulated a direct relationship between foreign exchange volatility and long maturity bonds and a negative relationship with short maturity bonds.

The floating exchange regime has brought about risks as the exchange rate volatility results in uncertainty in earnings. Li, Sarkar, and Wang (2003) argued that when volatility is interpreted as uncertainty, it becomes a key input to many investment decisions. Foreign exchange rate adjustments affect the demand and supply of bonds. Currency appreciation reflects a corresponding decline in inflation as argued by Solnik (1998). Inflation has a direct impact on a country's bond value. A rise in inflation represents the expected rise in interest rates. Increasing inflation denies the investors the real income earned in selling the bond at market value and the coupon payments. Demand for bonds, therefore, declines when inflation rises while supply for bonds rises as investors divest so that they may seek investments with relatively lower inflationary pressure. This leads to a decline in returns from the bond markets and therefore, inflation has a negative impact on returns of bonds. (Longei, 2017).

Depreciation in currency indicates a rise in inflation. The depreciation is viewed as erosion in income earned converted into international currency terms especially with investors with international horizon. This presents the research problem. Some empirical studies like Kluza (2002) and Longei and Ali (2017) have shown that exchange rate volatility has an indirect relationship with bonds. Others like Chinn and Meredith (2004, 2005) find mixed results with positive relationship for long maturity and negative relationship for long maturity.

Interest rate has an indirect relationship with foreign exchange rates Furman (1998). Depreciation in currency indicates a rise in interest rates

#### **1.1.4 Bond Market in Kenya**

The Nairobi Securities Exchange (NSE) provides a platform for trade in securities to brokers, dealers and investment banks. Corporates and the Kenyan government raise debts by issuing bonds in this exchange. The first treasury bond was issued in 1980, while corporate bond launched its first listing in 1996 (Ngugi & Agoti, 2009). Trade in treasury bonds has been digitized where partnership with mobile service provider, Safaricom, has allowed the public access to the bond M-Akiba, through their mobile phones (Business Daily, 2018). According to the regulator, Capital Markets Authority (CMA Quarterly Bulletin, 2017), the bond markets is preferred to equity markets during uncertainties in both global markets and local affairs like general elections.

Investments in the bond market has attracted both the local and international investors. Investors with international horizon are particularly cognizant of currency movements and would love to look at how it impacts on the performance of their investments. The Kenyan Government has been borrowing to finance various infrastructure projects and meet financial obligations and goals in the budget. The government The FTSE NSE Kenya Government Index captures the market performance of the government issued bonds at NSE.

Most of the listed companies that have issued bonds at the exchange have significant value of their trade in multi-currency. This is because a significant value of their sales or expenses is in imports or exports. This implies that depreciation or appreciation impact directly on their fundamental ability to repay their debt. This is very important for

analysts and investors to track changes and look at the impact in making decisions on bond uptake. The Kenya Shilling was weakest in September 2015 at 106.5 per US Dollar and achieved a record strengthening of KES 36.23/ Us Dollar in January 2013. Trading daily in US dollar affects the pricing of other assets including bonds (Trading Economics, 2018)

## **1.2 Research Problem**

Empirical studies on the relationship between the macroeconomic variable exchange rate volatility and financial performance of bond markets is an area of interest for researchers determining link between the two variables. Foreign exchange volatility as a function of forces of demand and supply creates a risky business environment as returns for investors with global outlook is adjusted to reflect the real economic value based on the existing rates. Critically analyzing the returns on bond markets is a vital tool for measuring economic performance of a country. This helps investors correctly match their risk profile with the portfolio of securities held for a period. Market players would be quick to assess the possibilities of arbitrage occurring from dynamic bidirectional interactions between currency exchange volatility and returns in the bond markets to maximize their returns.

The recent macroeconomic environment has been characterized by depreciation of the Kenya Shilling to one of the lowest levels, trading at 106 per US dollar in 2015. The NSE share index declined recording a return of 3.8% in 2014. Bonds, however, have outperformed other asset classes at the N.S.E. of the recent past. In 2015, treasury bonds yielded an upward of 8.5%. The yields of both Treasury and corporate bonds have been attributed to the high interest rates recorded in the last half of 2015. The strong performance of the bond markets was attributed to high interest rates which indicates uncertainties in the markets, depreciation of the local currency and decline in returns from the stock markets with many listed companies reporting profit warning (Business Daily, 2016).

Kluza (2002) finds chaotic results in analysis of the relationship between the two variables with some showing a negative relationship while others a positive relationship. Chinn and Meredith (2004) found varying results using different bond maturities. While they found a positive link using long-maturity data their findings presented a negative relationship using short-maturity bond data. Longei (2017) who examined the relationship between USD/KES exchange rate and the NSE bond index found a negative relationship between the variables which conflicts with studies by Froot (1990) who found a positive relationship between the variables. Some empirical studies have found linear relationships while others found log-linear relationships. The overall conclusions of these studies are that bond markets are affected by changes in exchange rates. A fundamental question to investors, analysts, fund managers, regulators among other players in bond markets is the level of impact of the exchange rate volatility whether it's a positive or negative and the necessary actions in response to the variation to cushion the interests of the players.

When a currency depreciates it affects both exporting and importing entities. Exporting companies will be able to increase their sales because of the weakening of the currency leading to a rise in the price of the stock as argued by Nieh (2006). Previous empirical studies have looked at exchange rate as macro-economic variables affecting the performance of the bond markets at the NSE for example studies by Mbugua (2003) and Monia (2016). While the outcomes revealed that there is a significant effect of the macroeconomic variable like inflation, interest rates and currency exchange movements on the bond markets little research exists to address particularly the effect of exchange rate. Thus, the research question would ask the question what is the effect of the volatility

in exchange rate on the financial performance bond markets in Kenya? The research would be interested in knowing the effects whether positive or negative and the magnitude of the exchange rate movements on the financial performance of the bond markets

### **1.3 Objective of the Study**

To determine the effect of volatility in exchange rate parameter on the financial performance of bond market in Kenya.

### **1.4 Value of Study**

This research will contribute to academic literature especially in addressing the gaps in study of bond performance. Existing empirical on currency exchange rates research has focused on studying the first moments of foreign exchange impact on stock markets in Kenya. There is limited study on second moment effects and particularly literature on currency volatility effects on financial performance of bonds in Kenya is a new area.

The study assists investors and other players in investments like brokers and investment banks in deriving conclusions whether they can rely on the exchange rate parameter in objectively determining investments in bond markets in Kenya. According to Li, Sarkar, and Wang (2003) when volatility is interpreted as uncertainty, it becomes a key input to many investment decisions. Whenever there are volatilities in the currency, this study would enable investors know whether to increase uptake in bonds, or to sell the existing bonds.

Finally, the regulators like CBK and NSE will be able to set a benchmark of trading variance on foreign exchange volatility to protect investors from massive losses in a bear run market. The CBK can intervene to stabilize the currency and preserve the value investors have earned therefore maintaining investor confidence.

## **CHAPTER TWO**

### **LITERATURE REVIEW**

#### **2.1 Introduction**

This section discusses existing research on the relationship between foreign exchange and bonds. The chapter provides the theoretical framework that provides the building blocks for this relationship. The empirical literature review enumerates past scholarly studies that enumerate foreign exchange movements interaction with market securities and more specifically the bonds. The context is then set on the determinants of the bond value and the models used to describe the relationship between the variables foreign exchange movements and bond performance are defined. The last section evaluates variables influencing bond prices and their relationship to foreign exchange movements.

#### **2.2 Theoretical Review**

There are theories that outline the relationship between movement of exchange rates and bonds relative to each other. The theories suggest an inverse relationship the macro-economic variable currency exchange volatility has on bond market performance.

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

Purchasing Power Parity Theory developed by Cassel (1918) is a theory that relates the exchange rate between countries with the prices of selected basket of goods per unit. The prices are different among countries, resulting in exchange rate adjustment accordingly. The Purchasing Power Parity (PPP) theory postulates that in a free market economy, a proportionate adjustment in purchasing power parity for two currencies is estimated by the price ratio of traded goods would tend to be approximated by a change in the



equilibrium rate of exchange between these two currencies (Shapiro and Rutenberg, 1996).

A country's inflation has an inverse relationship with demand for currency. The Goods Market Approach argues that currency devaluation influences values of market securities resulting in domestically produced goods being cheaper compared to imported products Solnik (1987). That means, when the inflation rises, the demand for the currency declines and as inflation falls the demand for the country's currency rises. The decline in demand for the currency results in currency devaluation and higher demand for a currency results in its appreciation (Madura, 2000). The exchange rate differentials are explained by spillovers in inflation (Cecchetti, 2011). This can be explained further by examining the effect of a country's inflation on imports and exports. High inflation results in demand for more imports and a decline in exports as prices soar.

When price adjustments happen in one economy and not another, exchange rate fluctuations occur to respond to the adjustments. This concept is relevant in applying this theory in relating the foreign exchange rate adjustments with the price movements of bonds which affects their financial performance. The exchange rate volatility reflects inflationary pressure in a country which affects the real value of assets including bonds. The return from the investment in bonds is therefore adjusted based on the currency fluctuations to reflect the real value of income earned.

### **2.2.2 Liquidity Premium Theory**

The Liquidity Premium Theory developed by Hicks (1946) holds that investors prefer easily saleable and short-term bonds to illiquid long-term bonds. Investors therefore demand a higher compensation to reflect the risks in holding the bonds for a longer time.

Investors holding bonds for a longer period are subjected to variations in income resulting from market volatility, default risks, market bear run, interest rate movements and opportunity costs of investments in alternatives. Holding the portfolio for a longer period results in possibility in fluctuations in the interest rates which may not match the required return by investors. The theory holds that bonds of varying maturities but with same interest rates move together since the longer period bonds charge interest rates while referring to the short-period bonds. This is because the return for the long term is partly risk free and partly has a premium for the longer-term fluctuations.

The longer the time to maturity the higher the risks in fluctuations in returns. As the term of bond progresses, market factors such as inflation, increase in interest rates and currency devaluation are likely to reduce the returns on bonds. The liquidity premium is the extra earning demanded by investors to hold a bond to its maturity (Friewald, Rainer and Subrahmanyam, 2012).

### **2.2.3 Efficient Market Hypothesis**

The Efficient Market Hypothesis (EMH) postulated by Fama (1965) holds that the prices of financial assets reflect the available information about the asset in an efficient market. The price of bonds in an exchange market, therefore, reflects all the fundamentals of the bond market and an investor would be unable to take advantage of any arbitrage opportunity to maximize their returns. A portfolio manager who wishes to increase the returns would thus invest in high-risk assets rather than purchasing assets to sell in future at a premium.

The magnitude of efficiency is classified as Strong, Semi-Strong and Weak efficiency. The strong form of efficiency holds that the prices of securities reflect all the information

held in public and private. Investors in this case are unable to generate excess returns using insider information. Semi-strong form refers to the case where prices of bonds reflect information that is available to the public only. The publicly available information but not historical prices and includes information content in the financial reports and public pronouncements by the company like profit warning, dividend payments, mergers, acquisitions and takeovers. In the weak-form, the prices of financial assets represent the historical data regarding the specific asset price.

Mobarek and Fiorante (2014) found the BRICS (Brazil, Russia, India, China and South Africa) countries to be approaching a weak form of efficiency in the equity markets. Their study was further developed by Guduza, (2017) who both the equity and bond markets of the Johannesburg Stock Exchange with respect to EMH. The results presented by Guduza (2017) evidenced the efficiency of the Johannesburg Stock Exchange by testing using sample stock and bond returns. These empirical studies support the return of bonds being influenced by information sources including data on foreign exchange rate fluctuations.

## **2.3 Determinants of Financial Performance Bond Markets**

Bonds are primarily issued by governments, corporates or municipalities. Bonds trade in a secondary market known as over the counter (OTC). In secondary markets, there are certain factors that lead to the variation of the bond's price.

### **2.3.1 Foreign Exchange rate**

The fluctuations in foreign exchange rate results in adjustments in the real pricing of assets for both the local and foreign investor. When local currency appreciates, the income from the investments in bonds increases as the earnings real value is higher when

converted into another currency. The investors therefore demand a higher price for the extra earnings expected and this explains the concurrent increase in bond prices when currency appreciates. Bond prices have an indirect link to bond prices, implying that as bond prices rise, bond yields fall. Foreign exchange volatility therefore is expected to negatively affect bond returns (Lace, Macerinskiene & Balciunas, 2015).

Kal, Arslaner and Arslaner (2015), argued that deviations from the fundamentally predetermined rate of return for exchange rates results in variance from earnings in both stocks and bond markets. This concept is supported by Lidiema and Macharia (2017) who posit that the interaction between the exchange rate movements bond markets results in fluctuations in bond prices and yields. They argued that the bidirectional interactions between the two variables is an indication of economic performance in a country which investors benchmark to analyze the returns of their portfolios and measure the risk in earnings. The studies suggest a negative relationship between exchange rate volatility and financial performance of bonds.

### **2.3.2 Interest Rates**

Interest rates is a fundamental macroeconomic variable used to determine the flow of capital in the financial markets. Barnor (2014) asserts that fluctuations in interest rates determines investment decisions as investors restructure their profile of financial assets and liabilities to minimize risks in costs and returns. Interest rates fluctuations have a direct influence on bond's quantity demanded and supplied. A rise in interest rates would result in investors preferring newly issued bonds compared to existing ones, thus attract a higher demand. The rise in the interest rate indicate that newly issued bonds bear higher yield compared to outstanding ones. The decline in demand of the existing bonds results

in a drop-in price. If the interest rates drop, the demand for existing bonds rise as investors prefer them relative to newly issued bonds since they offer higher yield compared to existing ones. This arises from the notion that a rational investor prefers a higher yield (Lidiema & Macharia, 2017)

Francová1 (2017) considered the 91-day treasury bill rate as a risk-free interest rate as returns from such an investment are unlikely to be significantly impacted by other macroeconomic factors. Any rate charged above the treasury bill rate reflects the risk premium charged to reflect the variations in earnings of the asset classes. The T-bill rate charged reflects the expected economic performance of aggregate portfolio of macroeconomic variables in a country. The interest rate fluctuations every three months directly affect the investors' perceptions on returns on bonds as studied by Longei and Abdallah (2017) who found that the relationship between interest rates and bond markets development to be significantly negatively correlated.

### **2.3.3 Inflation**

Inflation is the increase in prices of goods and services in a country resulting in erosion of the real value of a currency (Baltar, 2014). Inflation has a bidirectional relationship with foreign currency volatility. Depreciation of a currency increases the demand for exports in an economy resulting in inflation. Conversely, appreciation of a currency results in increase in demand for exports resulting in decline in the inflationary pressure. The inflationary pressure affects the real return from financial markets. Inflation reduces the real earnings from bonds and thus it is expected that the two variables will have a negative relationship.

Andersson, Krylova and Vahamaa (2008) argued that increase in inflation slows down economic activities resulting in reduced earnings from investments. The decline in business activities lowers the performance of various asset classes. Ngabirano (2016) posits that inflation has a negative influence in the development of the corporate bond markets.

#### **2.3.4 Money Supply**

Money supply refers to the quantity of currency that is in circulation in an economy. The availability of money determines investors' appetite to purchase financial assets. Money supply is controlled by the central bank monetary policy which attempts to influence the interest rate markets in order to achieve an optimum quantity of money available in an economy. The central bank pays high interest rates on treasury bills and bonds in order to encourage reduction of supply of money in an economy to achieve the preferred rates. Increase supply of money encourages increased demand for bonds in the market and concurrent rise in interest rates from the central bank monetary policy to curb inflation. This negatively influences the financial performance of the bond markets. Chung and Ariff (2016) in evaluating the effect of money supply in four major capital markets, Japan, Canada, U.S and U.K., found that it negatively influences the performance of stock prices.

#### **2.4 Empirical Review**

This section reviews previous actual research carried out, the results and relevance of information obtained to the current study undertaken for both local and international studies.

### **2.4.1 International Empirical Review**

Flood and Taylor (1997) examined the relationship between three-year exchange rate changes and medium-term government bonds for a sample of 21 countries. Using annualized data obtained from International Monetary Fund (IMF) over the period 1973–92 to construct a regression model with the exchange rate adjustments as independent variable and medium-term bonds as dependent variable. The results are evidence of positive relationship between exchange rate parameter and long-maturity bond data which correspond to studies by Chinn and Meredith (2005) who found positive relationships between the macro-economic parameters using long-maturity data and indirect relationship for short-maturity data.

Kluza and Sławiński (2002) examined the variables influencing treasury bond performance in Poland from the perspective of an investor. Their study evaluates the impact of the variables: interest rates, budget deficit and foreign exchange rate on performance of bond markets in Poland for the period 1998-2003 using autoregressive model. The results were varied with some showing an inverse link between exchange rates and bonds for monthly data while some results were found to be positively related for the daily data. The inconclusive results necessitate further studies to examine particularly influence of exchange rate volatility on financial performance of bond markets.

Ehrmann, Fratzscher, and Rigobon (2011) assessed the interdependence between share performance, bond values and currency volatilities in the United States and European Union using second moments. The study employed structural vector autoregression model to evaluate the relationships among the variables for the 16-year period 1989-

2004. The results presented empirical evidence of spillover effects among asset classes with strongest transmissions being within same markets and found the relationship between exchange rate volatility and bond yields to be indirect. This study primarily focused on volatility spillover among asset classes and not influence of exchange rate volatility particularly for the Kenyan market that the current study is reviewing.

Mustafa (2012) investigated spillover effects among stocks, exchange rates and bonds. They study covered countries across different geographies categorized as either developed or emerging economies. The study provided both within-country and between countries return volatilities and the effect of these volatilities on both same and different asset classes. As opposed to numerous past studies, this study uses second moments to examine the relationship between the asset variables. The volatilities are examined using a multivariate GARCH methodology over the 11-year period between 2000 to 2011. They presented empirical evidence of the influence foreign exchange rate movements have on bond performance. This study is based on a global outlook of spillover effects between asset classes with and among countries which does not exclusively critically analyze the volatility effect on financial performance of bonds that this study

Gadanecz, Miyajima and Shu (2014) evaluated the response of local currency sovereign yields to volatility in exchange rates over the five-year period 2010-2014 for 20 emerging markets. The primary regression model constructed with dependent variables as the movement in bond yields and exploratory variables as credit risk, depreciation of the nominal exchange rates and exchange rate volatility. The study found the exchange rate to negatively influence bond yields, a relationship that the current study evaluates but with respect to the financial performance of the bond markets in Kenya.



### **2.4.2 Local Empirical Review**

Mbugua (2003) conducted a research on the macroeconomic variables affecting the development of corporate bond markets in Kenya. They employed linear regression over the 7- year period 1997-2003 to evaluate the relationship between the independent variables exchange rate, interest rate and bank credit; and the dependent variable corporate bond development. The study found exchange rate changes and corporate bond development to be indirectly linked. This study was limited to corporate bond development and not financial performance of bond markets that the current study focuses on.

Ogilo (2014) evaluated the factors that influence the development of bond markets in Kenya. A linear model was used to examine the influence economic size, exports, banking system size, foreign exchange rate, interest rates and Gross Domestic Product (GDP) on bond market development for the five-year period 2008-2012. The variables economic size, exports and banking system size were found to have no correlation with the development of the bond markets. Foreign exchange movement was found to have the largest correlation coefficient with a positive relationship to the development of the bond markets. This study was limited to the development of the bond markets and not financial performance of bonds which the current study evaluates.

Gantara (2016) evaluated the factors influencing the performance of infrastructure bonds in Kenya. Using a linear model over the 6-year period for the company Kenya Electricity Generating Company (Kengen) infrastructure bonds, they found exchange rates, inflation and interest rates to have inverse relationship with performance of the

infrastructure bond. This study was limited to infrastructure bonds and not the performance of the entire bond portfolio that the current study is evaluating

Ngabirano (2016) examined the determinants of corporate bond performance in Kenya. The study was on the population of all corporate bonds and medium-term notes that were listed at the NSE for the period 2010-2015. Short run time series linear model was employed to assess the effect of the macroeconomic variables: interest rates, stock market index, exchange rate, inflation and borrowing on bonds. The study found a negative relationship between exchange rate and bond performance. Their study focused on the variables affecting corporate bond performance and not the overall bond market performance.

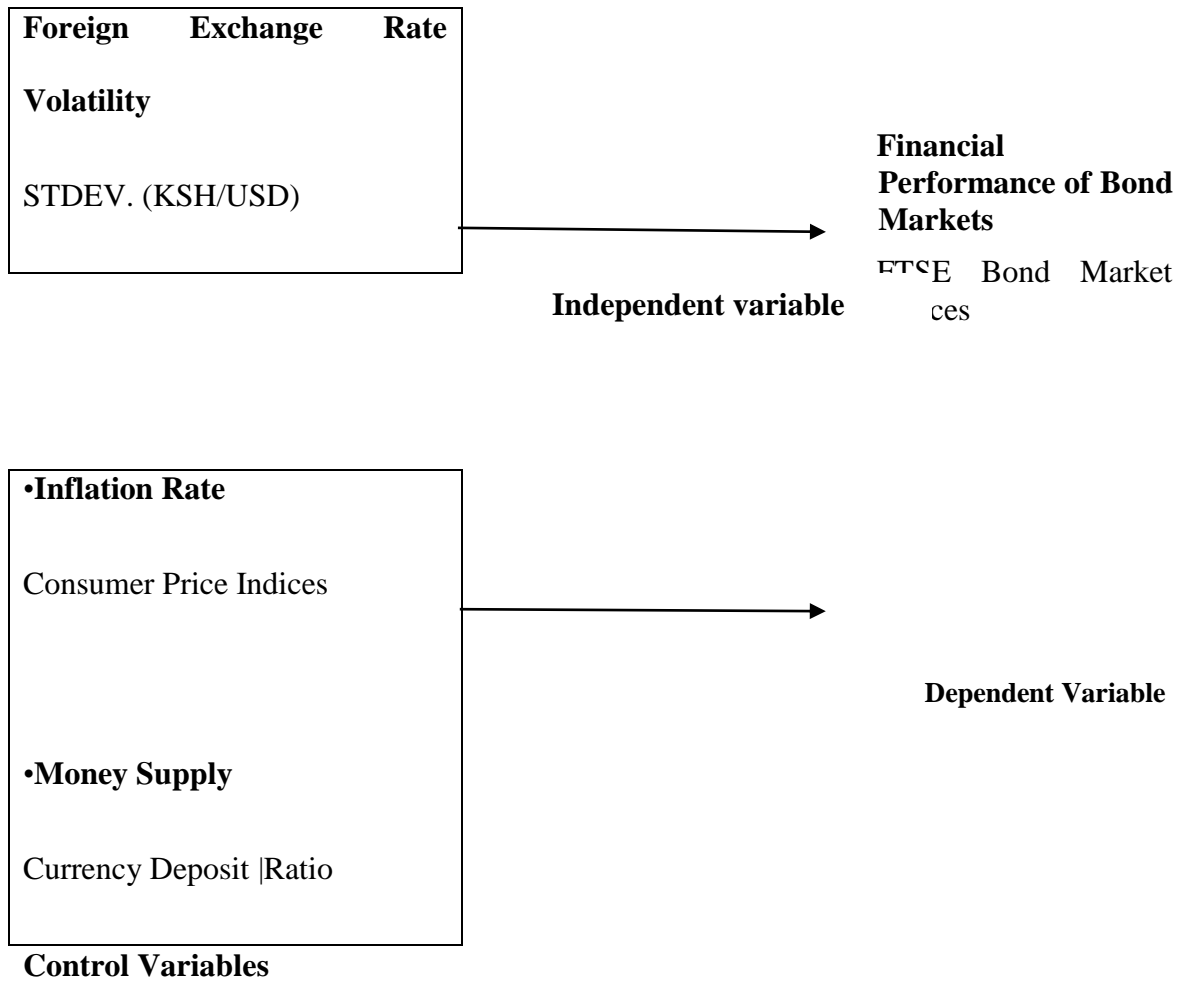
Longei and Abdallah (2017) examined the variables that affect bond performance at the Nairobi Security Exchange. Their study centered on how the macroeconomic variables: inflation, foreign exchange rate and interest rates affect the bond market index bond index at the Nairobi Securities Exchange. They used a linear model to construct annualized data for the period 2006 – 2016 with bond market index as the dependent variable and inflation, interest and exchange rate as dependent variables. They concluded that foreign exchange rate, interest rate and inflation have inverse relationships with bond market index. The study by Longei and Abdallah (2017) was based on annualized data and first moments of foreign exchange rate whereas this study focuses on the second moments of the exchange rate parameter and the quarterly values of the data.

## **2.5 Conceptual Framework**

Conceptual framework is a diagram that states the relationship between independent, dependent and control variables. The primary justification for development of a

conceptual model is to allow the reader to speedily understand how the independent variables explain the dependent variables (McGaghie, Bordage & Shea, 2001)

The conceptual framework for the research is made up of the variables interest rate, inflation and foreign exchange rate as independent variables and bond market performance as dependent variable.



**Figure 2.1 Conceptual model**

**Source (Researcher 2018)**

## **2.6 Summary of Literature Review**

Theories have been postulated to support the evaluation of the relationship between exchange rate volatility and financial performance of bonds. The three theories Purchasing Power Parity, Liquidity Premium Theory and Efficient Market Hypothesis support the influence currency exchange volatility has on returns of bond markets.

Various empirical research on the relationship between the variables under study have produced varied results with respect to long and short maturity bonds. While (Flood & Taylor, 1997; Chinn & Meredith, 2005) found positive relationship between currency exchange rate movements and bonds other studies by (Longei & Abdallah,2017; Ogilo, 2014) found a negative relationship between the variables. The empirical research focused on bond market development with little research on influence on currency exchange volatility on returns on bond markets.

## **CHAPTER THREE**

### **RESEARCH METHODOLOGY**

#### **3.1 Introduction**

The chapter explores the phases that are followed in carrying out this research. It defines the methodology used in the study. It has subsections on overall research design, a clarification of the target population and the sampling procedure and a justification for the techniques for collecting the relevant data, presentation and analysis.

#### **3.2 Research Design**

This study employs descriptive research in explaining the relationship between foreign exchange rate fluctuations and performance of bond markets. Descriptive research outlines the parameters in a specific occurrence in accordance to the events observed, and an evaluation of the relationship between two or more variables as posited by William (2007). The objective of study is to examine the relationship between foreign exchange volatility and bonds. This research will use regression analysis to examine the extent to which foreign exchange volatility explains the prices of bonds.

#### **3.3 Population**

A population a or set of individuals having similar attributes that are of interest to a researcher Ngechu (2004). The population in this study consists of the 50 bonds issued at the N.S.E.

### **3.4 Data Collection**

Secondary data will be collected from Bloomberg on the FTSE-NSE Kenya Government bond index for the period 2007-2017. Data on foreign exchange volatility will be obtained from Central Bank of Kenya (CBK) website and statistical abstract for the period. Inflation data is obtained from the Consumer Price Indices published by Kenya National Bureau of Statistics (KNBS) for the period under study.

### **3.5 Diagnostic Tests**

The independent and dependent variable X and Y respectively are related by the linear equation  $Y = \beta_i X + c$  where c is a constant. A scatterplot is constructed to graph the independent variables against the dependent variables and tested using the F-statistic in ANOVA. A t-test is conducted to evaluate the level of significance in which the independent variable explains the dependent variable. The t-tests evaluates the level of significance in which the two variables are normally distributed. The Pearson correlation coefficient is employed to measure level of association between the two variables. The correlation coefficient ranges from -1 to 1, where the absolute values close to 1 indicate a strong correlation while values less than 0 indicate negative association. 0 value indicates no association between the variables.

### **3.6 Data Analysis**

Appropriate analytical tools will be used to analyze data in addressing the research questions in this study. This study involves an assessment of the relationship between exchange rate volatility on bond markets in Kenya. Data will be keyed into SPSS to generate frequency tables, charts, correlations and regressions to help in the analysis.

### 3.6.1 Analytical Model

Multiple regression model is applied to study the extent to which independent variables explain the dependent variable. Regressing the variables estimates the co-efficient of the linear model where one or more independent variables explain the dependent variable. Cooper and Schindler (2003).

The regression model is

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

Where:

(Y) - Bond market financial performance which is measured by the quarterly averages of FTSE-NSE Kenya Bond Government Index.

$\beta_0$  – is the constant term

$\beta_1, \beta_2, \beta_3$  are the correlation coefficients

- $X_1$  – is the volatility in the currency exchange rate calculated by the quarterly standard deviations of the KES-USD rate.

- $X_2$  – is the inflation rate calculated by the quarterly averages of Consumer Price Indices (CPI) for the period under study

- $X_3$ - is the money supply rate calculated by the ratio extended broad money supply to demand deposits in bank

-  $\varepsilon$  –is the error term



## **CHAPTER FOUR**

### **DATA ANALYSIS, RESULTS AND DISCUSSIONS**

#### **4.1 Introduction**

This chapter discusses the findings from the analysis conducted to determine the effect of foreign exchange volatility on financial performance of the bond markets in Kenya. Monthly data was collected from the secondary sources for the period January 2013 to August 2018. The study employed both descriptive and inferential statistics to explain data attributes, regressing the variables and interpreting the findings which are analyzed using Statistical Package for Social Sciences (SPSS) version 21.

#### **4.2 Variables of the Study**

##### **4.2.1 Foreign Exchange Volatility**

The study computed the exchange rate volatility by obtaining the monthly standard deviations of the prominent currency exchange rate, the US Dollar to Kenya Shilling. The monthly standard deviations were computed from the Central Bank of Kenya daily mean rates for the period under study.

##### **4.2.2 Bond Indices**

The study computed monthly means from the daily FTSE NSE Kenya 25 Indices that provide the indices for the top performing 25 bonds were obtained from Bloomberg for the study period.

### 4.2.3 Inflation

Inflation data was obtained from Kenya National Bureau of Statistics.

### 4.2.4 Money Supply

The study computed money supply by obtaining the ratio of extended broad money supply to demand deposits in bank. Both values for the period under study were obtained from the Central Bank of Kenya monthly economic indicators.

## 4.3 Descriptive Statistics

The research employed a descriptive approach in analysis of the variables. This is presented in Table 4.1

**Table 4.1 Descriptive Statistics**

Descriptive Statistics						
	N	Minimum	Maximum	Sum	Mean	Std. Deviation
Index	68	95.2425	189.7051	9081.4546	133.550803	25.9338551
FX Volatility	68	.0413	1.9687	20.0555	.294934	.2998848
Inflation	68	3.6700	11.7000	435.9900	6.411618	1.6906288
Money Supply	68	2.6313	3.4583	208.0057	3.058907	.2708010
Valid N (listwise)	68					

#### Source: Research findings

The mean of the bond indices is 133.55 and the second moment dispersion of 25.9339.

The volatility of the US Dollar to Kenya Shilling exchange rate has a mean of 0.294934 and standard deviation of 0.2998848. Inflation rates average at 6.411618 with standard deviation of 1.6906288 and money supply has a mean of 3.058907 and standard deviation of 0.2708010.

#### 4.4 Normality test

The variables under study were assessed for normality by obtaining the mean, standard deviation, skewness and kurtosis. For a normal distribution, it is expected that the third and fourth moments, skewness and kurtosis respectively lie within the z-values -1.96 to 1.96 (Ghasemi & Zahediasl, 2012)

**Table 4.2 Test of Normality**

		Statistics			
		Bond Indices	FX Volatility	Inflation	Money Supply rate
N	Valid	68	68	68	68
	Missing	0	0	0	0
Mean		133.550803	.294934	6.411618	3.058907
Skewness		.494	3.301	.753	-.470
Std. Error of Skewness		.291	.291	.291	.291
Kurtosis		-.672	14.725	1.311	-1.441
Std. Error of Kurtosis		.574	.574	.574	.574

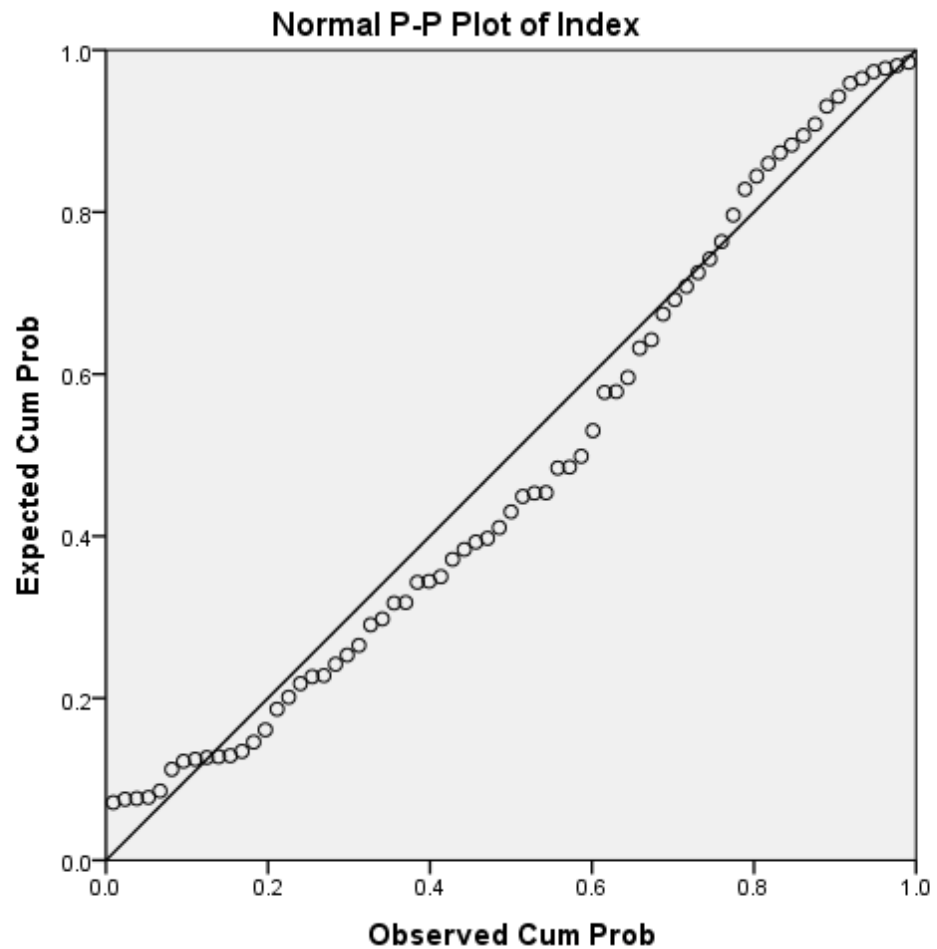
**Source: Research findings**

Bond indices data has a skewness of 0.494 and kurtosis of -0.672 implying that the bond indices are normally distributed. The FX volatility has a skewness of 3.301 and a kurtosis of 14.725. This is an indication of large tail of outliers and therefore, the FX volatility data is not normally distributed. The money supply rate has a skewness of -0.470 and kurtosis of -1.441 and thus is normally distributed. Inflation is skewed at 0.753 and kurtosis of 1.311 and is thus normally distributed.

#### 4.5 Test for linearity

The linearity test is performed by construction of the scatter plot which yielded figure 4.1

**Figure 4.1 Linear Plot**



**Source: Research findings**

The scatter plot indicates that the data is linear with the line of best fit passing close to the data points. This is an indication of that the explanatory variables are linked to the financial performance of bond markets in a linear relationship.

#### **4.6 Test for Multicollinearity**

The multicollinearity tests determine the level of associations between the independent variables under this study. The results of the multicollinearity tests are presented in the table 4.3

**Table 4.3 Collinearity Statistics**

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

Model	Collinearity Statistics	
	Tolerance	VIF
(Constant)		
1 FX Volatility	.928	1.077
Inflation	.991	1.009
Money Supply rate	.936	1.068

a. Dependent Variable: Index

From the results, FX volatility has a tolerance of 0.928 and Variance Interest Factor (VIF) of 1.077. Inflation has tolerance of 0.991 and VIF of 1.009. Money Supply rate has tolerance of 0.936 and VIF of 1.068. The VIF for all independent variables fall below 10, and therefore there exists no multicollinearity between the independent variables.

#### **4.7 Correlation Analysis**

This research evaluated a correlation test to explain the degree of association among the variables under study; bond indices, exchange rate volatility, inflation and money supply. The outcome is attached in the table 4.4.

**Table 4.4 Correlation Test**

		<b>Correlations</b>			
		FX	Index	Inflation	Currency deposit ratio
FX Volatility	Pearson Correlation	1	-.224*	-.091	.253*
	Sig. (1-tailed)		.032	.227	.019
	Sum of Squares and Cross-products	6.051	-121.098	-3.112	1.377
	Covariance	.088	-1.781	-.045	.021
	N	70	69	70	68
Bond Index	Pearson Correlation	-.224*	1	-.075	-.741**
	Sig. (1-tailed)	.032		.269	.000
	Sum of Squares and Cross-products	-121.098	48444.980	-229.835	-348.676
	Covariance	-1.781	712.426	-3.380	-5.204
	N	69	69	69	68
Inflation	Pearson Correlation	-.091	-.075	1	-.030
	Sig. (1-tailed)	.227	.269		.404
	Sum of Squares and Cross-products	-3.112	-229.835	192.749	-.926
	Covariance	-.045	-3.380	2.793	-.014
	N	70	69	70	68
Money Supply	Pearson Correlation	.253*	-.741**	-.030	1
	Sig. (1-tailed)	.019	.000	.404	
	Sum of Squares and Cross-products	1.377	-348.676	-.926	4.913
	Covariance	.021	-5.204	-.014	.073
	N	68	68	68	68

Source: Research results

From the findings in table 4.4, the Bond Indices have a correlation with FX Volatility, Inflation and Money Supply of -0.224, -0.075 and -0.741 respectively. All the independent variables FX Volatility, Inflation and Money Supply have a negative relationship with the independent variable Bond Indices.

## 4.8 Regression Model

The regression model is constructed to determine the association between the bond indices and the independent variables FX Volatility, Inflation and Money Supply. The results are presented in table 4.5

**Table 4.5 Regression Model**

Model Summary									
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	.747 <sup>a</sup>	.558	.537	17.6421344	.558	26.926	3	64	.000

a. Predictors: (Constant), Money Supply, Inflation, FX

Source: Research

From the findings, the dependent variable is explained by the independent variables by the statistic  $R = 0.747$ . The square of R which is the coefficient of determination  $R^2=0.558$ . This is the proportion of variance in bond indices that is explained by the dependent variables FX Volatility, Inflation and Money Supply. This implies that 55.8% of changes in bond indices is explained by the independent variables and therefore, there exists other variables not studied under the research that explain the remaining 44.2% of changes in bond indices.

#### 4.9 Analysis of Variance

	Sum of Squares	df	Mean Square	F	Sig.
Regression	25142.170	3	8380.723	26.926	.000
Equation 1 Residual	19919.674	64	311.245		
Total	45061.844	67			

From the ANOVA table, the F-Statistic of 26.926 implies the strong influence of the regressors in explaining the dependent variable. The p-value of significance is 0.00, which is less than 0.05 which indicates that the regression model is significant in explaining the relationship between FX Volatility and bond indices. The chance of there being no relationship between the two variables from the analysis is therefore 0.00.

#### 4.10 Beta coefficients

	Unstandardized Coefficients		Beta	t	Sig.
	B	Std. Error			
(Constant)	358.438	26.233		13.664	.673
Equation 1 FX Volatility	-3.272	7.460	-.038	-.439	.003
Inflation	-1.381	1.281	-.090	-1.078	.002
Money Supply	-70.309	8.227	-.734	-8.546	.437

The linear model  $Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \varepsilon$  is fit using the values obtained to obtain the equation:

$$Y = 358.438 + -3.272X_1 + -1.381X_2 + -70.309X_3 + \varepsilon$$

The independent variables FX Volatility, Inflation and Money Supply have a significant influence on the dependent variable, bond indices at 5% confidence interval. Maintaining all values at 0, the expected bond index is 358.438. All the independent variables have a



negative relationship with bond indices. Exchange rate volatility has a beta coefficient of -3.272 thus has a negative influence on the bond indices.

#### **4.11 Discussion and Interpretation of Findings**

The research objective was to evaluate the level of relationship between exchange rate volatility and financial performance of the bond markets. The study employed secondary data to analyze the dependability of bond performance on FX volatility.

The study found a significant linkage between all the independent variables and the bond indices based on the F-statistic test on ANOVA and the model summarized table. The variables FX Volatility, Inflation and Money Supply explain 55.8% of the changes in the bond indices.

From the results, the correlation coefficients between bond indices and the independent variables are all negative. The correlation coefficient between bond indices and FX volatility is -0.224. This implies a negative association where a unit change in FX volatility results in 22.4% change in the value of bond indices. This is a significant negative relationship between exchange rate volatility and financial performance of the bond markets. This study supports the results by Longei and Abdallah (2017) who found a negative relationship between the exchange rate movements and bond indices.

The control variables, money supply and inflation have a negative influence on the bond indices. The coefficient of determination for inflation data is -0.253, implying that the fluctuations in inflation has the strongest influence in changes in bond indices.

## CHAPTER FIVE

### SUMMARY, CONCLUSION AND RECCOMENDATIONS

#### 5.1 Introduction

The chapter outlines the important outcomes of this study, enumerates the major findings and conclusions and provide an interpretation and recommendations of the study. This section discusses the limitations and recommendations for further research.

#### 5.2 Summary of Findings

The primary goal of the study was to evaluate the effects of the currency exchange volatility on the financial performance of the bond markets in Kenya. The mean of the volatility in exchange rates was found to be 0.29 implying that for the period under study, 2013-2018, while there exist significant fluctuations in the exchange rates, the mean rates are found to be stable. The standard deviation of the volatility in exchange rates is is 0.3 implying that the dispersions from the mean are not extreme outliers.

The currency exchange volatility has been found to negatively influence the financial performance of bond markets in Kenya. The coefficient of determination for exchange rate volatility relationship with bond indices is found to be -22.4%. This implies that unit of currency exchange rate volatility results in 22.4% negative change in financial performance of bond markets. The inflation rate has the highest negative influence on the financial performance of the bond markets at 0.269. The effect of money supply is less significant with a coefficient of determination of 7.5%. The F-statistic of 26 implies an overall strong explanatory power that the independent variables have on the bond

performance. The level of significance of 0.00 indicates that the linkage is accepted at both 1% and 5% confidence intervals.

### **5.3 Policy Recommendations**

The study found a significant negative influence the currency exchange volatility has on the financial performance of the bond markets. It therefore recommends that the CBK stabilizes the exchange rates to protect the investors from excessive losses emanating from the volatility.

The study determined a significant negative influence inflation has on the financial performance of bond markets and an insignificant influence money supply has. It is therefore recommended that the CBK promotes policies to control inflation to reduce adverse effects on financial performance of bond markets and encourage more foreign investors. Since money supply effect on financial performance on bond markets is insignificant, no further policy changes are recommended to stabilize money supply.

### **5.4 Limitation of the Study**

The major challenge of the study is the use of secondary data to assess the connection between the variables under study. There are potential errors in collection and computations of the secondary data which may be transmitted into the study.

The FTSE bond indices data has been computed from the year 2012. This made it practically impossible to study over a 10-year period or compare the financial performance of the bond markets for the last five years with previous years. The earliest data available on bond indices was computed weekly and not daily which would have provided more data for evaluation.

The period under study also included 2017 where Kenya had two elections which led to highest inflation rates of above 11% experienced. The financial markets were similarly affected during the intense political season, particularly after September 1 nullification of the election results which eroded the confidence investors had in the market. These outliers are potential problems in a linear model.

The resources available only enabled evaluation of three independent variables on the influence of the financial performance of the bond markets. The variables studied attributed to 58% of explanation of changes in the financial performance of the bond markets. There exist more macro-economic factors that explain the variation in the bond indices.

### **5.5 Suggestions for Further Studies**

The study focused on the influence of the currency exchange volatility on the financial performance of the bond markets in Kenya. The study recommends further studies of evaluation of more macro-economic variables effects on financial performance of the bond markets. The additional variables explain the 42% that this study was unable to relate to financial performance of the bond markets.

The study suggests use of other models like GARCH which are less affected by the presence of large outliers and are good predictors of volatility. The GARCH model would work especially with the collection of large amounts of the data in a time series.

## REFERENCES

- Adler, M., and Dumas, B. (1984). Exposure to currency risk: Definition and measurement, *Financial Management* 12 (2), 41-50.
- Baltar, C.T., (2014). Inflation and Economic Growth in an Open Developing Country: the case of Brazil, *Cambridge Journal of Economics*
- Barnor, C. (2014). *The Effect of Macroeconomic Variables on Stock Market Returns in Ghana*, Unpublished Dissertation. Walden University
- Cecchetti, S. G. (2011). Money, Banking, and Financial Markets (2nd Edition, p. 456). *McGraw-Hill Education*
- Chen, L., Lesmond D. and Wei J., (2007), Corporate Yield Spreads and Bond Liquidity, *Journal of Finance* 62, 119–149
- Chinn, M. D. and Meredith, G. (2004), Monetary Policy and Long Horizon Uncovered Interest Parity. *IMF Staff Papers*. 51(3), 409-430.
- Cassel, G. (1918). Abnormal Deviations in International Exchanges, *Economic Journal*, 28, 413-415
- Diana, B., (2013). The Free Risk Rate of Return and Factors that affect its Assessment, *IOSR Journal of Business and Management (IOSR-JBM)* e-ISSN: 2278-487X, p-ISSN: 2319-7668. Volume 9, Issue 4 (Mar. - Apr. 2013), PP 88-92
- Ehrmann M., Fratzscher, M. and Rigobon R., (2011). Stocks, Bonds, Money Markets and Exchange Rates: Measuring International Financial Transmission. *Journal of Applied Econometrics* 26, 6, 948-974

- Fama E., and French K. R., (1992). Common Risk Factors in the Returns on Stocks and Bonds, *Journal of Financial Economics* 33 (1993) 3-56. North-Holland
- Flood, R. P. and Taylor M. P., (1997). Exchange Rate Economics: What's Wrong with the Conventional Macro Approach in The Microstructure of Foreign Exchange Markets Chicago, *University of Chicago Press and National Bureau of Economic Research*
- Freund, W.C. (1970). *Investment Fundamentals*, Washington.
- Francovál, B. (2017). Valuation of Government Bonds: The Exchange Rate is an Important Aspect, *Acta Universitatis Agriculturae et Silviculturae Mendelianae Brunensis*, 65(6): 1911–1916.
- Friewald, N., Rainer, J., and Subrahmanyam M. G., (2012). Illiquidity or Credit Deterioration: A Study of Liquidity in the US Corporate Bond Market During Financial Crises. *Journal of Financial Economics*, 105, 18–36.
- Froot, K. A., and Thaler, R. H., (1990). Anomalies: Foreign Exchange. *Journal of Economic Perspectives*. 4(3) pp. 179-192.
- Furman, J. and Stiglitz J. E. (1998). Economic Crises: Evidence and Insights from East Asia. *Brooking Papers on Economic Activity, No. 2, Brooking Institution, Washington D.C.*
- Gadanecz, B., Miyajima K. and Shu C., (2014). Exchange Rate Risk and Local Currency Sovereign Bond Yields in Emerging Markets, *Bank for International Settlements* 2014, ISSN 1682-7678.

- Gantara, S. (2016). Factors Affecting the Performance of Infrastructure Bonds in Kenya: A Case of KENGEN Infrastructure Bond, *MBA Research Project United States International University Africa*
- Hall, G. J., and Sargent, T. J., (2011). Interest Rate Risk and other Determinants of Post-WWII US Government Debt/GDP Dynamics. *American Economic Journal: Macroeconomics*, 3(3), 192-214.
- Longei, H. and Abdallah A., (2017). Determinants of Bond Market Index at the Nairobi Securities Exchange in Kenya, *The Strategic Journal of Business and Change Management*
- Hicks J.R. (1946). Value and Capital, *Oxford University Press, London 2<sup>nd</sup> edition*.
- Huttman, M. D., (1998). Managed currencies: a powerful alternative investment strategy in *Alternative Investment Strategies, Euromoney Books*, (ed. S. Jaffer)
- Johannes, M., (2004). The Statistical and Economic Role of Jumps in Continuous Time Interest Rate Models, *Journal of Finance*, 59, 227-60
- Kal, S. H., Arslaner, F. and Arslaner N., (2015). The Dynamic Relationship Between Stock, Bond and Foreign Exchange Markets, *Economic Systems*, Volume 39, Issue 4, December 2015, Pages 592-607
- Kariuki, J. (2018). M-Akiba investors get second interest payment, *Business Daily* retrieved from <https://www.businessdailyafrica.com/markets/marketnews/M-Akiba-bond-investors-get-second-interest-payment/3815534-4380306-gn9k74/index.html> on 02/09/2018

- Kluza, S. and Sławiński, A. (2004). Factors affecting t-bond prices: from investor's perspective. *22nd NBP Conference on Monetary policy in the environment of structural changes*.
- Krishnamurthy, A., and Vissing-Jorgensen, A. (2011). The Effects of Quantitative Easing on Interest Rates: channels and implications for policy (No. w17555). *National Bureau of Economic Research*
- Krugman K. (1993), Exchange Rates, the Concise Encyclopedia of Economics (Henderson D.R., ed.). Originally published as The Fortune Encyclopedia of Economics, *Warner Books. Library of Economics and Liberty*.
- Lace, N., Macerinskiene, I., & Balciunas, A. (2015). Determining the EUR/USD Exchange Rate with US and German Government Bond Yields in the Post-Crisis Period. *Intellectual Economics*, 9(2), 150-155
- Lidiema, C. and Macharia, I., (2017). Stocks, Bonds and Foreign Exchange Inter-linkages: A Market Micro-Structure Perspective in Kenya, *Journal of Finance and Economics*, 2017, 5(6), 290-299
- Longstaff, F., Sanjay M., and Neis E., (2005). Corporate yield spreads: Default Risk or Liquidity? New Evidence from the Credit Default Swap Market, *Journal of Finance* 59, 2213–2253.
- Madura, J. (2010). International Financial Management 10th Edition, *South-Western College Publishing*
- Malkiel, B.G. (1962). Expectations, bond price and the term structure of interest rates. *Quarterly Journal of Economics*: 198-205.



- Malkiel, B.G (1965). The term structure of interest rate. Princeton, N.J: *Princeton University Press*
- Mbugua, M. A. (2003). Factors Influencing Development of the Corporate Bond Market in Kenya. *University of Nairobi, Kenya.*: Unpublished MBA project
- McGaghie, W.C, Bordage, G; Shea, J. A, (2001), Problem Statement, Conceptual Framework, and Research Question, *Journal of Association of Medical Colleges*
- Mobarek, A. and Fiorante A. (2014), The Prospects of BRIC Countries: Testing Weak-form Market Efficiency, *Research in International Business and Finance*, 30, 217-232.
- Mukherjee, T.K., Asiyuki, T. (1996). Macroeconomic Factors in Japanese Equity Markets, *Japanese Capital Market*, New York.
- Mustafa, M. M., (2012), The Volatility Spillover Among a Country's Foreign Exchange, Bond and Stock Markets: A Multivariate GARCH analysis, *Middle East Technical University unpublished MSc Project*
- Musyoki J. M., (2017), Effect of Exchange Rate Volatility on Stock Market Returns in the Nairobi Securities Exchange, *MBA Project University of Nairobi*
- Ngabirano, M.K (2016). Determinants of Corporate Bond Performance in Kenya. *Unpublished MBA Project United States International University Africa.*
- Ngechu, M. (2004). Understanding the research process and methods. An Introduction to Research Methods. *Acts Press, Nairobi*
- Ngigi, G. (2016). Bonds, Real Estate Return Highest Gains in Tough 2015, *Business Daily*, retrieved from <https://www.businessdailyafrica.com/markets/Bonds-real->

[estate-return-highest-gains-in-2015/539552-3020394-ddp6ir/index.html](http://estate-return-highest-gains-in-2015/539552-3020394-ddp6ir/index.html) on  
05/11/2018.

- Ngugi, R W. and Agoti, J. (2009). Microstructure Elements of the Bonds Market in Kenya NSE HANDBOOK 2013, *Nairobi Stock Exchange Handouts on Bonds' Trading & Settlement.Rules and Investor Education Prospectuses.*
- Nieh, C. C. (2006). Dynamic relationship between stock prices and exchange rates for G-7 countries. *The Quarterly Review of Economics and Finance* 477-490.
- Nunn, K. P. Jr., Hill, J. and Schneeweis T., (1986). Corporate Bond Price Data Sources and Return/Risk Measurement, *Journal of Financial and Quantitative Analysis* 21, 197-208
- Ogilo, F. (2014), The Effect of Selected Macro-Economic Variables on Bond Market Development in Kenya, *DBA Africa Management Review* August 2014, Vol 4 No 2. Pp 54-62
- Sargent, T. J. and Wallace N. (1981). Some Unpleasant Monetarist Arithmetic. *Federal Reserve Bank of Minneapolis Quarterly Review*, No.5, Fall, pp1-17
- Serge, J. and Camilo, E. T. (2007). Financial Stability Implications of Local Currency Bond Markets: An Overview of the Risks, *Bank of International Settlements Papers* No. 36, 2007,
- Shapiro, A.C. (1984). A practical Method of Assessing Foreign Exchange Risk, *Midland Corporate Finance Journal* (pp. 6–17).
- Solnik, B., (1987). Using Financial Prices to Test Exchange Rate Models: A Note. *Journal of Finance* 42, 141-149.

Taiwo, O. and Adesola, O. A., (2013). Exchange rate volatility and bank performance in Nigeria. *Asian Economic and Financial Review*, 2013, 3(2).

The CMA Quarterly Capital Markets Statistical Bulletin – Q1.2017

Warga Arthur D, 1991, Corporate bond price discrepancies in the dealer and exchange markets, *Journal of Fixed Income* 1, 7-16

Webster, M. (1985). Webster`s ninth new collegiate dictionary. Meriam - Webster Inc.

Williams, C. (2007). Research Methods, *Journal of Business & Economic Research* March 2007 Volume 5, Number 3

Wuhan, S.L. and Khurshid A., (2015) The Effect of Interest Rate on Investment; Empirical Evidence of Jiangsu Province, China. *Journal of International Studies*, Vol. 8, No 1, 2015, pp. 81-90. DOI: 10.14254/2071-8330.2015/8-1/7