Factors Affecting the Performance of Infrastructure Bonds in Kenya: A Case of Kengen Infrastructure Bond

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UNITED STATES INTERNATIONAL UNIVERSITY-AFRICA

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FACTORS AFFECTING THE PERFORMANCE OF INFRASTRUCTURE BONDS IN KENYA: A CASE OF KENGEN INFRASTRUCTURE BOND

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STUDENT'S DECLARATION

I, the undersigned, declare that this is my original work and has not been submitted to any other college, institution or university other than the United States International University in Nairobi for academic credit.

Shaila Ganatra (ID: 624350)

This Report has been presented for examination with my approval as the appointed supervisor.

Dr. Amos Njoguna

Dean, Chandaria School of Business
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The main objective of the study was to determine the factors that affect the performance of the Kengen Bond between 2010 and 2015. The investigation was guided by following objectives; to determine the effect of interest rates on the performance of the Kengen bond, to establish the effect of forex volatility rates on the performance the Kengen bond and to examine the effect of inflation rates on the performance of the Kengen bond.

This study employed a correlational and causal research designs. The regression model was run to establish the relationship between the selected variables. Correlation analysis was carried to ascertain the strength of linear association between the dependent and independent variables.

The study revealed that there was a negative insignificant relationship between interest rates and performance of the Kengen bond. This implies that the performance of Kengen’s bond is negatively influenced by the level of interest rates in the Kenyan market.

The study further revealed that was a negative insignificant relationship between exchange rates and the performance of the Kengen bond. This therefore means that the performance of Kengen’s bond is negatively influenced by the level of exchange rates in the forex market in Kenya.

Finally the study revealed that there was a positive relationship between inflation rates and performance of Kengen Bond. This implies that the performance of Kengen’s bond is positively influenced by the level of inflation rates in the Kenyan market.

The study recommends the need for policy makers to ensure that they put in place policy measures that will ensure stability of interest rates in the country. This will create a stable market performance thus increase infrastructure bond market. Additionally the study recommends that CBK provide a mechanism to evaluate exchange rate volatility. This will help to curb the impact that exchange rate volatility currently has on the economy.

Finally the study recommends that given specific context of developing countries like Kenya, significant shocks from the exchange rate will influence inflation rates therefore the monetary policy needs to curb exchange rate volatility which important in the fight against inflation.
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# TABLE OF CONTENTS

STUDENT'S DECLARATION ................................................................. ii

COPYRIGHT .......................................................................................... iii

ABSTRACT ............................................................................................ iv

ACKNOWLEDGEMENT ........................................................................... v

TABLE OF CONTENTS ........................................................................... vi

LIST OF TABLES .................................................................................. ix

LIST OF FIGURES ................................................................................ x

CHAPTER ONE ....................................................................................... 1

1.0 INTRODUCTION ................................................................................ 1

1.1 Background of the Study ................................................................. 1

1.2 Problem Statement .......................................................................... 5

1.3 General Objective ............................................................................ 6

1.4 Specific Objectives .......................................................................... 6

1.5 Significance of the Study ................................................................. 6

1.6 Scope of the Study .......................................................................... 7

1.7 Definition of Terms ......................................................................... 7

1.8 Chapter Summary ............................................................................ 8

CHAPTER TWO ....................................................................................... 10

2.0 LITERATURE REVIEW .................................................................... 10

2.1 Introduction .................................................................................... 10

2.2 Effect of Interest Rates on Bond Performance ................................ 10

2.3 Effect of Exchange Rates on Bond Performance ............................ 14

2.4 Effect of Inflation on Bond Performance ......................................... 17

2.5 Chapter Summary ............................................................................ 20
CHAPTER THREE .......................................................................................... 21
3.0 RESEARCH METHODOLOGY ................................................................. 21
  3.1 Introduction ......................................................................................... 21
  3.2 Research Design ................................................................................ 21
  3.3 Population and Sampling Design ....................................................... 21
  3.4 Data Collection Methods .................................................................... 22
  3.5 Research Procedures .......................................................................... 23
  3.6 Data Analysis Techniques .................................................................... 23
  3.7 Chapter Summary ............................................................................... 24

CHAPTER FOUR .......................................................................................... 25
4.0 RESULTS AND FINDINGS ...................................................................... 25
  4.1 Introduction ......................................................................................... 25
  4.2 General Information ........................................................................... 25
  4.3 Effect of Interest on KengenBond Performance .................................... 29
  4.4 Effect of Forex Volatility on KengenBond Performance ....................... 30
  4.5 Effect of Inflation Rates on KengenBond Performance ......................... 32
  4.6 Effects of Interest Rates, Forex Volatility and Inflation Rates on KengenBond Performance .............................................................. 33
  4.7 Chapter Summary ............................................................................... 35

CHAPTER FIVE .......................................................................................... 36
5.0 DISCUSSION, CONCLUSION AND RECOMMENDATIONS .................. 36
  5.1 Introduction ......................................................................................... 36
  5.2 Summary ............................................................................................ 36
  5.3 Discussion ........................................................................................... 36
  5.4 Conclusions ....................................................................................... 42
  5.5 Recommendations ............................................................................. 42
LIST OF TABLES

Table 4.1: Performance of the Kengen Bond.................................................................26
Table 4.2: Descriptive Statistics for Exchange Rate Movements...............................27
Table 4.3: Descriptive Statistics for Interest Rate Movements......................................28
Table 4.4: Descriptive Statistics for Inflation Rate Movements...................................28
Table 4.5: Correlation for Interest Rates and Bond Performance.................................29
Table 4.6: Model Summary for Interest Rates and Bond Performance.........................29
Table 4.7: ANOVA for Interest Rates and Bond Performance.......................................30
Table 4.8: Coefficients for Interest Rates and Bond Performance..................................30
Table 4.9: Correlation on Forex Volatility and Bond Performance.............................30
Table 4.10: Model Summary for Exchange Rates and Bond Performance....................31
Table 4.11: ANOVA for Exchange Rates and Bond Performance.................................31
Table 4.12: Coefficients for Forex Volatility and Bond Performance............................31
Table 4.13: Correlation on Inflation Rates on Bond Performance.................................32
Table 4.14: Model Summary for Inflation Rates and Bond Performance.......................32
Table 4.15: ANOVA for Inflation Rates and Bond Performance....................................32
Table 4.16: Regression Analysis for Inflation Rates and Bond Performance..................33
Table 4.17: Correlation Analysis of Interest Rates, Forex Volatility and Inflation Rates on
Bond Performance...........................................................................................................33
Table 4.18: Multiple Regression of Interest Rates, Forex Volatility and Inflation Rates on
Bond Performance...........................................................................................................34
Table 4.19: ANOVA of Interest Rates, Forex Volatility and Inflation Rates on Bond
Performance....................................................................................................................34
Table 4.20: Regression Results of Interest Rates, Forex Volatility and Inflation Rates on
Bond Performance...........................................................................................................35
LIST OF FIGURES

Figure 4.1: Performance of the Kengen Bond ................................................................. 25
Figure 4.2: Trends in the exchange rates ........................................................................ 26
Figure 4.3: Trends in Interest Rates ................................................................................ 27
Figure 4.4: Trends in Inflation Rates .............................................................................. 28
CHAPTER ONE

1.0 INTRODUCTION

1.1 Background of the Study

The benefits of issuing securities by various entities brings about public benefit at different levels, this include both macroeconomic as well as at the corporate level (Pearl, 2014). Debt security markets is likely to result in stresses as a result of the diversification of credit risks across the economy; which in the end is likely to supply long-term funds for long-term investment needs while also keeping in place measures to offer long-term investment products for long-term savings as well as lower funding costs through capturing a liquidity premium, this can also mean an endowment of financial products with flexibility that allows an organization to meet the specific needs of investors as well as the needs of borrowers and reallocate capital more efficiently (International Monetary Fund (IMF), 2012). These are all features that should emerge as an economy develops and grows (International Monetary Fund (IMF), 2012).

Bond market is considered to be a substitute market when it comes to the mobilization of resources for both the government as well as the private sector especially with regards to financing long term projects such as housing and infrastructure development, in addition to financing government deficit (Pearl, 2014). The development of bonds market plays a very essential role when it comes to the promotion of partnership in the development process between the government and the private sector. Successful development of bonds market requires a number of conditions such as a developed money market, favorable macroeconomic policies, market participation, appropriate trading system and a sound legal and regulatory framework (Pearl, 2014). Bonds provide the borrower with external funds to finance long-term investments, or, in the case of government bonds, to finance current expenditure (Calomiris, 1995). Certificates of deposit (CDs) or commercial paper are considered to be money market instruments and not bonds. Bonds must be repaid at fixed intervals over a period of time (Calomiris, 1995).

Infrastructure is considered to be basically what the basic physical and organizational structures that are essential when it comes to the operation of a society or enterprise, or the services and facilities necessary for an economy to function and refers to the technical structures that support a society, such as roads, cables, wires, pipes, bridges, canals, reservoirs, sewers, power grids and telecommunications (Sullivan and Sheffrin, 2003).
Stohler (2004) for instance put into perspective the infrastructure as the substructure or the rather the skeleton assets of an economy that are considered to be key when it comes to the production of goods as well as services. Later approaches have gone further to split the infrastructure into social as well as economic subgroups. Economic infrastructure provides key services to business as well as industry and goes a long way to enhance productivity as well as innovation. Social infrastructure, on the other hand, is considered to be a medium for supplying basic services to households (healthcare, education and judicial facilities) (ING Real Estate, 2012).

Infrastructure is considered to be very vital in the facilitation of production of goods and services in the economy while considering how its impacts on time usage such as travelling time and quality of life (Sullivan and Sheffrin, 2003). According to Varma (2001), investments in infrastructure either produce services directly for household consumption or provide the critical inputs used by enterprises in the production process (transport, port facilities, electricity, and information and communications technology). Kuroda (2012) and Bhattacharyay (2008) identified a number of major roles for infrastructure in socio-economic development and regional integration. First, basic infrastructure promotes economic exchange among various sectors of an economy, both locally and internationally. It goes a long way to offer greater access when it comes to the important inputs for economic growth, such as resources, technology, and knowledge. In addition, infrastructure goes a long way to improve socio-economic and environmental conditions through the provision of basic needs and utilities that include; roads, water, sanitation, hospitals, clinics, schools, environment-friendly power, as well as telephone lines all of which are part of the United Nation's Millennium Development.

In the presence of information asymmetries in the capital markets, firms prefer internal to external finance but at some point as the firms grow, self-funding is inefficient to finance their investment projects and so they turn to external finance markets for equity and debt / banks (Calomiris, 1995). Corporations are able to raise capital either by selling an ownership interest or through borrowing money from creditors. In the language of businesses, an ownership interest that includes stock is called equity, as well as money borrowed from creditors and is therefore considered to be a debt. In their early years organizations need to raise equity capital privately, often from professional investors such as venture capitalist who specialize in high risk high return investments in fast growing firms. After a corporation goes public by selling its stock through an initial public
offering (IPO) it has option to raise cash by selling more stock later either through a primary market or a secondary market (Megginson, 2014).

In developed economies bond markets are mainly made up of Government, Municipal, Asset-backed, financing as well corporate bond markets (Platz, 2014). In fact most of Africa’s debt is in foreign currency and is therefore considered as not tradable, and very few countries in Africa have a viable bond market. Particularly, for most African countries the bond market is insignificant or non-existent, even though Africa has some of the most heavily indebted countries in the world (Yeboah, 2014). Sub-Saharan African countries in developing local bond markets include the different debt structures and level of market infrastructure. Access to the international bond markets by infrastructure projects in emerging economies is a relatively new phenomenon, borne of the economic reforms, market liberalization, and financial innovations in the early 1990s.

However, failure to provide adequate or affordable infrastructure facilities and services for low income users has often been associated with negative social impacts of inappropriate provision (Masika and Baden, 1997). In the United States, concerns are being expressed about the capacity of the country’s aging network of highways, roads and bridges to support future economic expansion. In contrast, in sub-Saharan Africa, the recent work of the Africa Commission, the New Partnership for Africa’s Development (NEPAD), the Africa Infrastructure Country Diagnostic (AICD) and the Forum on Debt and Development (FONDAD) have brought into stark relief the extent to which lack of access to basic infrastructure services is constraining the current welfare and future growth potential of countries in the region (Ombok, 2009).

In Africa countries like: South Africa, Ghana, Botswana and, Nigeria, have used capital markets to finance infrastructure projects. However, infrastructure investments need to remain enormous in the least developed countries (LDCs) in all regions. During the period 1990 – 2001, the private sector invested a total of US $750 billion in developing and transition economies. Sub-Saharan Africa’s share of this investment was a paltry US $ 23 billion, a mere 3%. There were Only 200+ bond issues worldwide in 2001 by infrastructure entities: Nearly 50% of them in telecom, Only 20% of them in LDCs (mostly in Asia and Eastern Europe), of which about 33% by public companies, therefore, only about 30 private issues in LDCs, of which about 15 by telecom companies (Schwartz, Hahn and Bannon, 2004). Black Rock for instance holds 9.6 billion Euros in
global infrastructure loans and bonds (Tuner, 2016). There is a growing need for large-scale infrastructure projects around the world. The OECD and the World Economic Forum (in a report prepared in collaboration with PwC) estimates that around 3.5 - 4% of global GDP, or around USD 53tn from 2010 to 2030 needs to be invested in electricity distribution, transportation, telecommunications, and water infrastructure annually. For Sub Saharan Africa, the World Bank estimates infrastructure funding requirements at USD93BN per annum for the next 10 years, of which at least 50% must be financed from non-government sources.

The bonds market in Kenya trades in both the treasury and corporate bonds. While treasury bonds were introduced as early as mid-1980s, corporate bonds came to the market in 1996 during the reform period. Despite the early initiation of treasury bonds in the market, the market remained almost stagnant, with the government using treasury bills to finance domestic debt. It was not until 2001 when the government took a deliberate effort to develop the market that activities of the treasury bonds market increased (Mbewa, Ngugi and Kithinji, 2007).

In 2001, the Government of Kenya initiated reforms to restructure domestic debt market to ensure sustainable source of long term financing by both public and private sector. In addition, the move was meant to reduce exposure to risks associated with short term borrowing. The proportion of short-term to long-term debt in the total domestic debt stock stood at 70:30 then. A number of reforms were introduced, which included; lowering the cash ratio for commercial banks to release liquidity thereby reducing short term interest rates, streamlined domestic Borrowing Cash Plan in favor of bonds, and liberalized the pension sector (Mbewa, et al, 2007).

Kenya issued its first infrastructure bond of 18.5 billion shillings in February 2009 and was used to build roads, develop a geothermal energy project, and boost water and irrigation systems (Mugwe, 2011). The infrastructure bond was issued at 12.5% coupon rate over 12 years; redeemed in three stages in 2015, 2017 and 2021. Its second infrastructure bond, a 12-year security with a 12 percent coupon valued at 18.5 billion shillings ($249.16 million), on Nov. 12 and planned to use the proceeds in fiscal year 2010 (Ombok, 2009).

The Kenya Electricity Generating Company (Kengen) is a government parastatal mandated with the generation of energy in Kenya. The company was formed in 1954 with
the main aim of developing geothermal and other energy forms such as hydro energy as well as wind and thermal energy. Kengen is a public company listed on the Nairobi Securities Exchange with the Government of Kenya owning 70% shareholding and the public 30%. It is the main generator of electric power in the country with an installed capacity of 1,016 Megawatts made up of hydropower, geothermal, thermal and wind. Kengen controls about 75% of the electric energy sales market in Kenya. This study sought to establish factors affecting the performance of Kengen bond. In this study; bond performance was measured using the bond yield, which in this case will be the interest from the bonds over the par value or the market price whichever will be favorable.

1.2 Problem Statement

Bond issuance decisions in securities markets have two influential drivers: firm-specific factors such as firm growth, profitability, leverage; and market-specific drivers such as market size and liquidity (Mbewa, et al., 2007). These variables indicate the economic justification for issuing the security and the credit-worthiness of the issuer. Market factors also influence the firm's decision to issue bonds by improving the environment in which the firm issues debt. Larger markets with greater liquidity are more likely to encourage firms to issue bonds (Mizen and Tsoukas, 2010). These have direct effects on the probability of bond issuance since they affect costs of entering and exiting the market for firms and investors, and they reduce uncertainty and thresholds for entry. Larger and more liquid bond markets reduce uncertainty for investors by revealing more accurately the firm's financial condition in market prices and reduce the thresholds for entry by allowing the development of local underwriting and rating agencies to facilitate lower cost bond issuance for the issuer (Mizen, et al., 2010).

There exists a gap in research given that previous research studies have been focused on the corporate bond market and not infrastructure bonds market which is virtually non-existent. Ochenge (2014) analyzed the major microstructure elements namely; liquidity, volatility and efficiency of the Kenyan government bond market. He further investigated the determinants of liquidity using a comparatively close proxy of liquidity. Mwangi (2013) studied the effect of benchmark bonds program on liquidity of the Kenyan government bond market. He concluded that the implementation of this program has been effective in fostering liquidity. He further noted that issue size and trade frequency vitally influenced government bond market in Kenya. A study by Waweru (2014) sought to
examine the effect of macroeconomic variables on the liquidity of infrastructure bonds. The findings suggested that interest rates and exchange rates have a positive relationship with liquidity of infrastructure bonds.

Moreover, the Kenyan economy getting more and more open with international trading constantly increasing and as a result firms are more exposed to foreign exchange rate fluctuations (Mudida and Ngene, 2010). These fluctuations bring increased uncertainty to traders; thus the presented risk may influence the bond performance. This study intends to fill this gap by determining the factors affecting the performance of Kengen Bond. Kengen was singled out because it’s amongst the first infrastructure bond to be issued to fund the energy sector.

1.3 General Objective
The objective of this study was to establish factors affecting the performance of Kengen Bond.

1.4 Specific Objectives
1.4.1 To determine the effect of interest rates on the performance of Kengen bond.

1.4.2 To establish the effect of foreign exchange volatility rates on the performance of Kengen bond.

1.4.3 To examine the effect of inflation rates on the performance of Kengen bond.

1.5 Significance of the Study
1.5.1 Management of Kengen
This study on determinants of performance in infrastructure debt will be useful to bond issuers who are keen on reducing costs of borrowing. An understanding of bond performance will assist in formulation of new issuances and will also influence the decisions of issuers on the optimal capital structure.

1.5.2 Policy Makers
The Capital Markets Authority (CMA), as a policy maker and regulator would gain insight on infrastructure bond markets liquidity from this study since they have a role in ensuring a sound and efficient securities market is in place.
1.5.3 Investors
This analysis will be of use to both individuals and institutional investors as well the
general public. This study will be useful in guiding investors in making sound debt
investment decisions with regard to liquidity in infrastructure debt markets.
The study will enhance capital allocation by directing savings towards assets offering
higher returns, provide an alternative source of financing and will enhance risk
management through the distribution of risk amongst various investors.

1.5.4 Researchers and Academicians
This study is a valuable addition to the few existing studies on the bonds market
particularly in developing markets. It will serve as a guide to researchers and
academicians who may wish to replicate the study in the other frontier markets due to
shared market similarities.

1.6 Scope of the Study
The study is limited to Kengen infrastructure bond. In order to achieve the objective, the
research will rely on bond turnover for the period between June 2010 and June 2015 since
infrastructure debt issuance is a fairly new phenomenon in the Kenyan capital markets.

1.7 Definition of Terms
1.7.1 Bond
Pearl defines bond like a loan the issuer is the borrower debtor, the holder is the lender
creditor and the coupon is the interest (Pearl, 2014)

1.7.2 Infrastructure Bond
A long-term contract under which a borrower agrees to make payments of interest and
principal, on specific dates, to the holders of the bond (Brigham & Ehrhardt, 2013).

1.7.3 Bond issuer
The party who issues a bond also called an obligor and receives the loan from the
bondholder (Sprengers, 2006).

1.7.4 Liquidity
The ability to trade large size quickly, at low cost, when you want to trade (Harris, 2003).
1.7.5 Primary Market
A market where securities are offered for subscription, for the purpose of raising capital or funds (Shaikh, 2010).

1.7.6 Secondary Market
Refers to a market where securities are traded after being initially offered to the public in the primary market, and/or listed on the stock exchange (Shaikh, 2010).

1.7.7 Fixed Income Securities Market Segment
Market segment for which fixed income securities of issuers that satisfy the eligibility requirements prescribed under Regulation 7 (1) (c) of the Capital Markets (Securities) (Public Offers, Listing and Disclosure)Regulations 2002 and set out in the 2ndSchedule under Part V of these rules, are listed (NSE Listing Manual, 2015).

1.7.8 Interest Rate
Interest rate is the percentage charged, or paid for the use of money (Kimberly & Amadeo, 2012).

1.7.9 Forex Rates
Forex rates are the price of one currency in terms of another currency whilst volatility is an unobservable or latent variable, deterministic or stochastic (Bauwnes and Sucarrat, 2005).

1.7.10 Inflation Rate
Inflation rate refers to the rate of changes in the average level of prices (Burda, 2003).

1.7.11 Bond Performance
Bond performance can therefore be described to be how good or bad a bond reacts to market pressure (Kimberly, et al, 2012).

1.8 Chapter Summary
This chapter presents the background on the objective of study which explores internal bond characteristics and macroeconomic variables as determinants of performance of infrastructure bonds listed at the Nairobi Securities Exchange. It also defined the terms liquidity, infrastructure bonds and secondary markets which are at the very core of the
study. The specific objectives to be addressed are also outlined together with the significance and scope of the study. Chapter two reviews the literature existing on infrastructure debt securities. Chapter three presents the research methodology adopted in this study while chapter four presents the results and findings. Finally the fifth chapter reviews the summary of findings, discussion, conclusion as well as recommendations.
CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Introduction

In this chapter, we review the studies covered by other scholars regarding performance of infrastructure bonds as well as theoretical review on the concepts that have informed the study of infrastructure bond features. This chapter has three sections based on the specific objectives of the study: the effect of interest rates on the performance of Kengen Bond, the effect of forex volatility rates on the performance of Kengen Bond and finally the effect of inflation rates on the performance of Kengen Bond.

2.2 Effect of Interest Rates on Bond Performance

2.2.1 Bond Performance

Thomas (2005) argues that financial instruments that include bonds will always have three key attributes that define them, which are: liquidity, risk and yield. According to Thomas all these three attributes are very well related to each other in a systematic way. Bond performance can therefore be described to be how good or bad a bond reacts to market pressure. This therefore means that if there is no liquidity then it becomes very difficult to convert a bond into cash. Additionally bond performance is very important to the market just the same way oxygen is to humans, that is exactly how bond liquidity is to the market, only noticeable by its absence (Das, Ericsson & Kalimipalli, 2003).

2.2.2 Interest Rates

Chordiaet al (2001) stated that interest rates affect the performance of infrastructure bonds in a number of ways. This is indeed seen to be very important to the investors who wish to invest on the bond market. According to the inventory paradigm, bond liquidity is very much dependent on inventory turnover rates as well as the risks emanating from inventory. Additionally, it can as well be argued that the existence of frictions that come in the form of margin requirements as well as short-selling constraints provide an implication of how well interest rates influence performance of bonds. One classic example is when there is a reduction in the interest rates this causes a drop in the cost of margin trading and therefore also brings about a reduction in the cost of financing
inventory. In the long run there is a likelihood of stimulated trading activity which is likely to increase stock market liquidity.

2.2.3 Theory of Effect of Interest Rates on Bond Performance

There are various models which have been developed to look at how interest rates affect performance of bonds in the market. These theories can be classified as follows: transactions, consumer as well as asset demand theories of money. According to the transaction theory of money demand framework the inventory theoretical approach (Baumol, 1952 and Tobin, 1956) and the precautionary demand for money (Cuthberston and Taylor, 1990) models were introduced. These models emanated from the medium of exchange of money. In this view it was deduced that the asset function of money resulted to asset or portfolio approach in which there was more emphasis placed on risk and expected returns of assets. As such the model provides an examination of the cost and benefits of holding money(Tobin, 1958). Alternatively, the consumer demand theory approval (Friedman, 1956) made sufficient consideration to the demand for money which is described as being a direct expression of the traditional theory of demand for any durable good (Feige, 1967).

2.2.4 Effect of Interest Rates on Bond Performance

There have been a number of studies that have been conducted to examine the influence of interest rates on the performance of bonds. Waweru (2014) carried out a study with a view of examining how macroeconomic variables affect performance of infrastructure bonds listed at the NSE. In this study, it was revealed that some macroeconomic variables such as interest rates have a positive effect on performance of infrastructure bonds.

The study by Davis (1999) revealed interest rates movements in the economy are of overriding importance in the purchase of fixed-income securities. This means that in the event that there is an increase in the interest rates, as a result of monetary policy tightening is likely to bring about a financial crisis, this in the end can result in liquidity collapses especially so in the security markets. Additionally in the event that there exists uncertainty in the market, chances are very high that this could lead to shifts in confidence of the investors which in the end would largely affect markets and institutions and thus bring into play the potential for a liquidity crisis.
Smales (2012) carried out a study in the Australian market to examine how interest rates affect performance of bonds. In his study, it was established that interest rates affect the performance of bonds. He further established that right after a scheduled macroeconomic announcement, the sensitivity to order flow went up in the Australian interest rate futures market. This was attributed to an increase in the level of information asymmetry.

Adelegan and Radzewicz (2009) in their study on the effect of interest rates on bond performance, they established that high level of interest rates tend to have a depressing impact on issuance and bond market development. This is mainly because very few firms are likely to service debts in the event that interest rates are high. However in the event that that interest rates are variable investors are likely to have a little appetite for long-term fixed rate notes. The main reasoning of this is due to the risk for purchasing power of long-term fixed rate assets is likely to face erosion. In addition, the fluctuations in a world interest rates play’s a very special role when it comes to the level of spreads. This is largely attributable to lowering of the cost of funding imminent for international bond investors while at the same time affecting the cost of financing when it comes to the emerging market sovereigns (Andritzky et al, 2007).

According to Singh (1993) a rise in the level of interest rate results into a drop in the level investment, consequently a low rate of interest is likely to increase investment activity. This clearly suggests that investment rise is likely to use more debt. On the other hand however in the event that short run interest becomes inelastic chances are very high that they are likely not to influence level of investment. This therefore means that there exists a relationship between investment and use of debt and level of interest rates. This is because interest rates are a representation of the cost of borrowing capital for a given period of time.

Infrastructure bonds have continued to experience rapid development in the developed countries given that the macroeconomic environments continue to be more stable and predictable. Meanwhile, in countries where the macroeconomic environment has been relatively volatile, the corporate bond market has had to rely heavily on government support in one form or another (Fabella and Madhur, 2003).
Muhammad and Banafe (2002) carried out a study to examine how the developments of debt markets in emerging economies have fared on in Saudi Arabia. According to their findings it was noted that secondary bond market was very important and as such, there was sufficient evidence to show that the huge volumes of outstanding government bonds spread along certain key maturities stream. This was therefore very important in enhancing bond market performance.

A study by Reinhart and Sack, (2000), argued that it is important to tighten fiscal policies; however permanent tightening in fiscal policy is likely to lower real interest rates. In this regard therefore it follows that although the quantity of private sector debt is likely to rise when there is a fall in government debt, such adjustments might be less than one for one, abstracting from other effects such as economic growth and increasing financial sophistication. Lower interest rates in the long run will also reduce total demand for debt securities, so the size of the net effect on issuance of private sector debt depends on the elasticities of supply of and demand for these securities with respect to the interest rate.

Garcia (1989) further suggested that the monthly stance of the Federal Reserve Bank can affect liquidity through the alteration of the terms of margin borrowing and through the alleviation of the borrowing constrains of dealers. Additionally, the author found that monetary expansions are associated with increased liquidity during crisis periods. This was in line with Fujimoto (2004) who also discovered that monetary variables are significant.

The domestic interest is a representation of what can be termed as the opportunity cost of holding money; in this regard therefore the public is more likely to prefer holding more financial assets such as treasury bills, bonds among others. In this regard therefore during times of high interest rate, bank interest rate spreads are provided by net interest margin. In this regard therefore such a spread is very well measured as the difference between the average interest rate earned on loans and the average interest rate paid. It follows therefore that in the event that the interest margin is low; chances are very high that the social costs of financial intermediation will without doubt be on the lower side (Maudos and Guevara, 2004). In addition it goes without saying that the money demand function when it comes to the financially developed industrial countries is beyond controversy. This however is notwithstanding what can be regarded to be the role of interest rate
especially so with regard to the low income economies deserves and this therefore deserves some serious attention.

2.3 Effect of Exchange Rates on Bond Performance

2.3.1 Exchange Rates
The foreign exchange market plays a very important role when it comes to the trade and investment aspects in an economy. This means therefore that a stable exchange rate, is likely to have positive effects on household incomes and consumption; firms’ investment, import and employment decisions; government’s fiscal, debt and monetary policies; and trade balance (Adebiyi, 2006). Additionally the stability of the forex market goes a long way to influence capital flight speculation as well as market speculation in the foreign exchange market.

It has been established that foreign exchange developments affect all aspects of an open economy including its financial markets. Charles (2006) for instance established that floating exchange rate appreciation reduces the competitiveness of export markets; and has a negative effect on the domestic stock market of export dominated economies. However, it has positive effect on the stock market by lowering input costs, for an import dominated country. In effect countries such as Kenya which is import oriented can experience price instability in the face of exchange rate volatility because its economy is heavily dependent on imports of raw materials, capital goods and consumer goods, hence, the need to manage the foreign exchange market.

2.2.2 Theories for Exchange Rate and Bond Performance
The Arbitrage Pricing Theory (APT) model was developed by Ross (1976) who put forward an argument that markets are competitive and that individuals homogeneously believe that the return of all assets in the economy are driven by a linear structure of risk factors. The APT model was a clear representation in terms of answers to queries about those critics of the popular Capital Asset Pricing Model which set forward a linear relation between the excess assets’ return and a single risk factor. According to the model there is an assumption that indeed all assets can be held by an individual investor. Although some people may be made to think that this is a particular case of APT, the theoretical construction of CAPM requires normality of returns or quadratic utility
function, what isn’t always easy to justify. On the other hand however this model can as well be proved that any mean-variance portfolio satisfies exactly the CAPM equation. So, when it comes to conducting tests on the mean-variance efficiency of the market portfolio then the CAPM becomes equivalent to testing.

Risk factors (in the APT) emanate from changes in some fundamental economic and financial variables such as interest rates, inflation, real business activity, exchange rate among other variables. Rashid and Karachi (2007) also argue that according to the Arbitrage theory, a rise in real interest rate is likely to reduce the present value of a firm’s future cash flows and therefore result in a fall in prices. At the same time a higher interest rate is likely to stimulate the capital inflow, and eventually lead to a fall in exchange rate. It means therefore that the real interest rate disturbance can be a factor of a positive relationship between the average level of bond prices and exchange rates.

2.3.3 Empirical Review on the Exchange Rates and Bond Performance

Njihia (2005) in his study on how macroeconomic variables affect the infrastructure bond market was able to establish that exchange rate variables negatively affect the development of the bond market. He therefore further argued that there is need for sound policies to deal with performance of infrastructure bond performance. He further vouches for greater exchange rate flexibility in order to promote the development of domestic bond market. In this regard therefore pegged exchange rates are likely to motivate foreign investors to underestimate the risk of lending to banks and corporations. This in the end is likely to result into foreign competition and thus go a long way in slowing down the development of domestic intermediation (Adelegan et al, 2009).

Exchange rate fluctuation is very much considered to be a very important factor when it comes to one investing in a foreign security market. This means that secondary security market liquidity is likely to go up as a result of an appreciation in the foreign currency. This on the other hand means that fluctuations in exchange rate increase the risk of investment when foreign investors transfer their investment back to their mother countries. In South Africa for example it has been established that exchange rate fluctuation plays a very important role when it comes to secondary bond market liquidity. This is because of the mere fact that foreign investors play an active role in bond trading (Mukherjee and Atsuyuki, 1995).
Mbugua (2003) conducted a study that sought to look at the relationship between exchange rates and bond performance in Kenya. He adopted the use of a short run time series linear econometric model so as to be able to effectively estimate effects and contribution of exchange rates on domestic bond market development. Findings from his study revealed that exchange rate, interest rate and bank credit variables had a negative effect on the development of the corporate bond market.

Yuan (2002) further carried out a study to examine the effect of exchange rates on bond performance. He was able to demonstrate that government can indeed influence bond performance through the issuance of securities so as to absorb the cost of acquiring systematic information and therefore internalize all information externalities. This means that once the sovereign issuances, both primary and secondary corporate bond markets become more liquid and information-efficient. In this regard therefore it can be argued that the government plays a very important role when it comes to the facilitation of development of financial markets. In Kenya for instance the Central Bank has adopted market-friendly issuance strategies and has gone further to carry out critical reforms which that have gone ahead to produce reliable yield curve. This has indeed become a very essential pricing benchmark for corporate entities to issue corporate bonds (Kiama, 2013).

Looking at it from the perspective of macroeconomics the absence of bond markets has constrained financing of fiscal deficits. In the same regard bond markets have gone a long way in the provision of useful market signals that are key for macro-economic policy. According to Kahn (2005), bond markets play a very essential role when it comes to the provision of interest rates across the maturity spectrum and a more efficient pricing of risk. This means that in the wake of such happenings, the provision of an alternative source of financing is likely to cause a reduction in the concentration of intermediation in banks.

Goyenko, (2009) also carried out a study that sought to examine the nature of the relationship between exchange rates and bond performance. He however noted that the nature of this relationship for some time now is yet to be explored. In his study however it was established that there was a negative relationship between exchange rates and bond performance.
Balli (2009) on his part sought to examine the relationship between exchange rates and bond performance. He established that exchange rates affect euro bond markets in various levels, creating differences in bond yields even when controlling different market specific factors. His study employed the use of yield changes as a result of bond performance. Balli (2009) also established that partially different and a less comprehensive set of macroeconomic news are likely to affect bond performance.

In some other studies, much concentration has been put on financial asset pricing and volatility. One such study is from Engle and Li (1998) who carried out an investigation on the degree of persistence heterogeneity related to schedule macroeconomic announcement dates and dates with no announcements in the treasury futures market.

2.4 Effect of Inflation on Bond Performance

2.4.1 Inflation

Inflation can be defined as a persistent increase in general price levels in an economy over the time. It can lead to uncertainty about the future profitability of investment projects, especially when high inflation is also associated with increased price variability. This leads to more conservative investment strategies than would otherwise be the case, ultimately leading to lower levels of investment and economic growth (Gokal and Hanif, 2014).

Nasser and He (2003) conducted a study to examine how inflation rates have affected the world’s capital markets. In their study it was established that inflationary pressures play a key role when it comes to pushing up bond yields. They therefore go ahead to argue that the fear of inflation has made many bond managers to shorten the duration of their portfolio. This therefore leaves them with an option of looking for relative safety in the short to intermediate term sectors which in turn may also affect liquidity.

Rutledge (1995) on his part argues that growth in the world economy in the past resulted largely into so much competition for capital, this therefore allows for investors to have multiple alternatives when it comes to fixed income instruments. This on the contrary becomes visible when inflation shows to soar and as such the nominal risk-free rate rises as a result of raising interest rates.
Inflation plays a very important role when it comes to capital structure as well as the firm’s value. The reason being, high rates of inflation make investors sell bonds in exchange for stocks. This in the end results in a drop in the firms’ debt-equity ratio (Dammon, 1988). According to a study by Dokko (1989) investors change in inflation creates wealth redistribution between creditors (bondholders) and debtors (shareholders).

2.4.2 Theories of Inflation and Bond Performance

Corcoran (1977), Zwick (1977) noted that inflation leads to more debt since it lowers the real cost of debt, the demand for corporate bonds increases during inflationary periods. On the other hand, bond returns become higher relative to stocks return as inflation decreases and the aggregate demand for corporate bonds thus increases. An analysis by Gajurel (2005) reveals that for the firms listed at Nepalese stock exchanges inflation is negatively related to leverage ratio. In an essay on the relationship between inflation and capital structures, Noguera (2001) finds a positive relationship between leverage and inflation.

According to Kang and Pflueger (2013) it can be stated that both theoretically and empirically the uncertainty about the long-run price level and the relationship of inflation with the business cycle are as a result of the external economic factors such as inflation rates on the performance of bonds. They further put forward the argument that uncertainty surrounding the long-run price level and the changing relationship of inflation with the business cycle are as a result of inflation rates. This can be well explained by the recent soar in the rates of inflation that have resulted into high levels of corporate bond spreads. It means therefore that firms can go ahead and issue inflation-indexed corporate debt, floating-rate debt, callable debt, or shorter term debt as a reaction to the risk of inflation. It is however notably that these adjustments are likely to come at a cost, such as rollover risk (He and Xiong (2012).

According to a study conducted by Bubnova (2000) seeking to examine the role of governance on private investment in infrastructure bonds, it was established that indeed there exists a substantial degree of variation in the impact of inflation on the spread for bond issuers. This means that private sector infrastructure projects are the most likely to
be systemically more vulnerable to inflationary risks as compared to public sector projects, especially in the case of developing countries.

### 2.4.3 Empirical Review of Inflation and Bond Performance

Empirical evidence has shown that inflation affects the performance of bonds. For example, Riona et al (2010) in a study on the long run relationship between inflation and bond prices using empirical evidence from South Africa revealed that there is enough support of the view that in the long run real stock prices will mostly affect bond performance. This indeed affirms.

Kullapom and Lalita (2010) conducted a study to establish the existing relationship between inflation and bond performance in Thailand. The study made use of the vector auto regression (VAR) so as to effectively examine the type of relationship. In addition, the study made use of interviews so as to be able to obtain additional information from the various stakeholders. It was revealed therefore that bond performance is irrelevant to inflation.

Shehu (2011) on his part conducted a study on whether inflation has an impact on bond returns and volatility. The study that was based on evidence from Nigeria and Ghana used Generalized Autoregressive Conditional Heteroskedacity (GARCH) model to assess the impact of inflation on bond market returns and volatility using monthly time series data. Results for Nigeria show weak support for the hypothesis which states that bad news exert more adverse effect on stock market volatility than good news of the same magnitude; while a strong opposite case holds for Ghana. Furthermore, inflation rate and its three month average were found to have significant effect on bond market in the two countries; therefore, would certainly reduce bond market returns and boost investor confidence.

Nyambok (2010) in her study on the relationship between inflation rates and liquidity of bonds quoted at the Nairobi Securities Exchange observed that the overall inflation rates influence the bond liquidity at varying degree depending on segment. Regression models were developed using monthly inflation rates as independent variable and both segment wise and market wise trading volume as dependent variable. The study was for 3 years
from January 2007 to December 2009. Their study however found a positive relationship between overall inflation rates and bond liquidity at the NSE which is an indication that as inflation rates go up, the overall market liquidity in terms of trading volumes also go up and vice versa. The study made focus on liquidity and not the overall price.

Kiptoo (2010) conducted a study on an empirical investigation on the relationship between selected macroeconomic variables and bond prices based on evidence from the Nairobi Securities Exchange. The study used NSE 20 Share index to represent all listed companies and covered the period between 1978-2008. Data was analysed using unit root test, multi-collinearity and regression. The study agrees with that of Kaimba (2010) in that there is a significant relationship between the bond prices and both exchange rate and inflation. She however found insignificant relationship on interest rates, money supply and gross domestic product.

Siele (2009) in the Study on the relationship between bond market and some selected macroeconomic variables in Kenya used NSE 20 share index to represent Kenya Stock Market and real GDP growth rate, inflation, interest and treasury bill rates as macroeconomic variables. Quarterly time series data for the period 1999-2008 was analysed using summary statistics, correlation and regression analysis to ascertain the relationships. Findings of the study revealed that macro-economic variables explain about 70% of the variation of the bond market share index. The regression coefficients show that the bond market share index is positively related to inflation rate, Treasury bill rate and gross domestic product while it is negatively related to interest rate. This study results share similar views with those of Kaimba (2010) and Kiptoo (2010).

2.5 Chapter Summary

This chapter has clearly reviewed the relevant literature in relation to the research objectives that have been covered in this study. This chapter has therefore outlined the various scholarly opinions which will be used later on in our study, in comparison to our findings. Chapter three outlines the methodology used in carrying out the Research, clearly giving the designs and data collection and analysis techniques to be used to bring out the results expected.
CHAPTER THREE

3.0 RESEARCH METHODOLOGY

3.1 Introduction

Chapter three is mainly concerned with the methodology which the researcher chose to adopt in order to achieve the research objectives. The various components of this chapter are; the research design which was followed by the research population as well as the sampling methods that were adopted by the researcher to select the sample size. The chapter also presents the procedures that the study followed in order to collect relevant information for the study as well as the data collection methods, not forgetting the data analysis techniques.

3.2 Research Design

Research design is basically a plan of action which is taken by the researcher in the process of collecting and analyzing data (Babbie, 2010). This study employed a causal research design for the empirical analysis to assist the researcher in determining which factors affect the performance of the Kengen bond. Mugenda (2003) explained that causal explore relationships between variables and this was consistent with this study which sought to establish the extent to which respective determinant contributed (Cause) to bond market development.

3.3 Population and Sampling Design

3.3.1 Population

Mugenda and Mugenda (2003) define research population to be a group of elements from which a researcher can chose to work with and who have certain types of characteristics. It is from this group of subjects that the researcher chooses on who to work with.

The target population for this study was based upon Kengen as listed in the Nairobi Securities Exchange. The study covered the years between 2010 -2015. These years were selected because it was within this period that the Kengen infrastructure bond was traded at the NSE.
3.3.2 Sampling Design

3.3.2.1 Sampling Frame

The sampling frame consists of a list of the elements from which the probability sample is derived (Babbie 2010). This study did not make use of any sampling frame because only secondary data was used.

3.3.2.2 Sampling Techniques

Cooper and Schinder (2003) define sampling as a selection of a few items (a sample) from a bigger group (population) to become the basis for estimating or predicting the prevalence of an unknown piece of information, situation or outcome regarding the bigger group. This study did not adopt any sampling technique given that the data used in the study was purely secondary data.

3.3.2.3 Sample Size

Thietart, et al (2001) defines a sample size as the set of elements from which data is collected. The sample size is what makes it easy for the researcher to effectively allocate his or her resources to the process of collecting and analyzing data. This is because it is a function of the population parameters. The study did not make use of any sample size.

3.4 Data Collection Methods

Data collection is the technique in which a researcher gathers information to be used for a study. Information can either be primary or secondary and both have specific ways of collection. In line with the scope of the study, data was collected from various sources. The researcher collected secondary data using data collection sheets. The monthly turnover of the bonds was sourced from the Nairobi Securities Exchange daily bond price list. The Monthly inflation rates was obtained from the Kenya National Bureau of Statistics while the monthly average interbank rate and the monthly average exchange rates of US dollar against the Kenya Shilling was extracted from the Central Bank of Kenya database. The monthly average stock index data was obtained from the Nairobi Securities Exchange daily Equity price list. The government borrowing scorecard statistics was sourced from the Central Bank’s monthly economic review database.
3.5 Research Procedures

This refers to the procedure used to conduct the research project. It describes the sequential steps that must be undertaken by a researcher in carrying out a research project to answer a specific phenomenon or question (Fraenkel & Wallen, 2003). This study used secondary information, therefore no piloting of data collection instrument was required. External factors such as interest rates, inflation rates as well as foreign exchange rates were tabulated into data sheets before they were analyzed.

3.6 Data Analysis Techniques

Analyzing information involves examining it in ways that reveal the relationships, patterns, trends, etc. that can be found within it. That may mean subjecting it to statistical operations that can tell you not only what kinds of relationships seem to exist among variables, but also to what level you can trust the answers you’re getting (Milstein & Wetterhall, 2013).

Data was tabulated into manageable summaries to allow for ease of analysis. Depending on the nature of the data to be analyzed and the objectives of the study, statistical analysis in the form of tables, graphs and inferential statistics which include correlation and regression analysis techniques was applied.

The macroeconomic factors are the independent variables while bond performance was the dependent variable. Spearman’s correlation analysis was adopted for this particular study. Descriptive statistics such as mean and standard deviation were used. The correlation between the variables under study was computed and a regression analysis was done to facilitate the comparison of two factors at a time. The analysis began with the computation of the correlation coefficients between the macro determinants and bond performance.

The following multiple regression model was used.

\[ Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + e \]

Where \( Y \) = Performance

- \( X_1 \) = the weighted average of US Dollar, exchange rate to Kenya shilling
- \( X_2 \) = Interest Rates (Average annual interest rate)
- \( X_3 \) = Inflation (Average annual inflation)
\[ e = \text{Random error term} \]
\[ \beta_0 = \text{Regression constant} \]

3.7 Chapter Summary

This chapter described the research methodology that will be used in the study. The research design, population and sampling design, data collection methods, research procedures and data analysis methods of the study have been discussed. The secondary data used was from the NSE daily bond price listing and supplemented by the pricing supplements. Data analysis was through SPSS. The next chapter presents the results and findings of the study.
CHAPTER FOUR

4.0 RESULTS AND FINDINGS

4.1 Introduction

This chapter involved analysis of data collected and discussion of the results obtained. The objective of the study was to determine the factors affecting the performance of the Kengen bond. The chapter also presents descriptive analysis of the findings with regards to the both the independent and dependent variables. The study utilized secondary data collected from different sources. The main line of investigation in this research was interest rates, inflation rates and forex volatility rates for the period between 2010 and 2015.

4.2 General Information

4.2.1 Performance of the Kengen Bond

As seen in the figure 4.1, the performance of Kengen bond has been fluctuating since it was floated into the market. The lowest performance was however witnessed in the year 2010, 2011 and part of 2013.

![Performance of the Kengen Bond](image)

**Figure 4.1: Performance of the Kengen Bond**

Table 4.1 presents the descriptive statistics for the performance of Kengen bond. As presented in table 4.1, the mean performance was 3.5143, the standard deviation was 4.62490 and the skewness statistic was 2.194 with a standard error of 0.306.
Table 4.1: Performance of the Kengen Bond

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Skewness</th>
<th>Std. Error</th>
</tr>
</thead>
<tbody>
<tr>
<td>Performance</td>
<td>61</td>
<td>3.5143</td>
<td>4.62490</td>
<td>2.194</td>
<td>.306</td>
</tr>
<tr>
<td>Valid N (listwise)</td>
<td>61</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

4.2.2 Trends in the Exchange Rates

Figure 4.2 presents the monthly performance of monthly average of US Dollar to Kenya Shilling movements between 2010 and 2015. As seen in the figure 4.2 the exchange rates have been on an increasing trend since 2011 to date.

![Figure 4.2: Trends in the Exchange Rates](image)

Table 4.2 presents the descriptive statistics for the exchange rate trends. As presented in table 4.2, the mean exchange rate was 86.827213, the standard deviation was 4.4454944 and the skewness statistic was 0.999 with a standard error of 0.306.
Table 4.2: Descriptive Statistics for Exchange Rate Movements

<table>
<thead>
<tr>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Skewness</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Statistic</td>
<td>Statistic</td>
<td>Statistic</td>
</tr>
<tr>
<td>Exchange Rates</td>
<td>61</td>
<td>86.827213</td>
<td>4.4454944</td>
</tr>
<tr>
<td></td>
<td>.306</td>
<td>.306</td>
<td></td>
</tr>
</tbody>
</table>

4.2.3 Trends in Interest Rates

Figure 4.3 presents the annual interest rates movement figures. As presented in the figure 4.3, the interest rates were high between 2010 and 2011; however there have been stable since 2012 to 2015.

![Figure 4.3: Trends in Interest Rates](image)

Table 4.3 presents the descriptive statistics for the interest rate trends. As presented in table 4.3, the mean exchange rate was 8.815902, the standard deviation was 5.7566134 and the skewness statistic was 1.187 with a standard error of 0.306.
Table 4.3: Descriptive Statistics for Interest Rate Movements

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Skewness</th>
<th>Std. Error</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Statistic</td>
<td>Statistic</td>
<td>Statistic</td>
<td>Statistic</td>
<td>Std. Error</td>
</tr>
<tr>
<td>Interest Rates</td>
<td>61</td>
<td>8.15902</td>
<td>5.7566134</td>
<td>1.187</td>
<td>.306</td>
</tr>
<tr>
<td>Valid N (listwise)</td>
<td>61</td>
<td>8.815902</td>
<td>5.7566134</td>
<td>1.187</td>
<td>.306</td>
</tr>
</tbody>
</table>

4.2.4 Trends in Inflation Rates

Figure 4.4 shows that the annual inflation was very high in 2011 and 2012. In 2013 and 2014 there had been a drop in the levels of inflation with a steady rise in 2015.

![Inflation Rates Chart](chart.png)

Figure 4.4: Trends in Inflation Rates

Table 4.4 presents the descriptive statistics for the inflation rate trends. As presented in table 4.4, the mean exchange rate was 8.166, the standard deviation was 4.6800 and the skewness statistic was 1.168 with a standard error of 0.306.

Table 4.4: Descriptive Statistics for Inflation Rate Movements

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Skewness</th>
<th>Std. Error</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Statistic</td>
<td>Statistic</td>
<td>Statistic</td>
<td>Statistic</td>
<td>Std. Error</td>
</tr>
<tr>
<td>Inflation Rates</td>
<td>61</td>
<td>8.166</td>
<td>4.6800</td>
<td>1.168</td>
<td>.306</td>
</tr>
<tr>
<td>Valid N (listwise)</td>
<td>61</td>
<td>8.166</td>
<td>4.6800</td>
<td>1.168</td>
<td>.306</td>
</tr>
</tbody>
</table>
4.3 Effect of Interest on Kengen Bond Performance

4.3.1 Results of Correlation Analysis

The first objective of the study was to determine the effect of interest rates on the performance of Kengen bond. Table 4.5 presents a summary of findings with regards to the correlation analysis on the relationship between interest rates and bond performance. As seen in the table, there was a negative correlation between interest rates and performance with a correlation coefficient of -0.071.

Table 4.5: Correlation for Interest Rates and Bond Performance

<table>
<thead>
<tr>
<th></th>
<th>Interest Rates</th>
<th>Performance</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Correlations</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interest Rates</td>
<td>Pearson Correlation</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Sig. (2-tailed)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>61</td>
</tr>
<tr>
<td>Performance</td>
<td>Pearson Correlation</td>
<td>-0.071</td>
</tr>
<tr>
<td></td>
<td>Sig. (2-tailed)</td>
<td>0.586</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>61</td>
</tr>
</tbody>
</table>

4.3.2 Results of Regression Analysis

As seen in table 4.6 the R square value was 0.005 indicating that the interest rates contributes 0.5 percent to the infrastructure bond performance.

Table 4.6 Model Summary for Interest Rates and Bond Performance

<table>
<thead>
<tr>
<th>Model</th>
<th>R</th>
<th>R Square</th>
<th>Adjusted R Square</th>
<th>Std. Error of the Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>.071*</td>
<td>.005</td>
<td>-.012</td>
<td>4.65243</td>
</tr>
</tbody>
</table>

a. Predictors: (Constant), Interest Rates

The ANOVA summary in table 4.7 is a clear indication that the model was not significant, with a p value of 0.586 which was more than 0.05.
Table 4.7: ANOVA for Interest Rates and Bond Performance

<table>
<thead>
<tr>
<th>Model</th>
<th>Sum of Squares</th>
<th>Df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regression</td>
<td>6.485</td>
<td>1</td>
<td>6.485</td>
<td>.300</td>
<td>.586</td>
</tr>
<tr>
<td>Residual</td>
<td>1276.898</td>
<td>59</td>
<td>21.642</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>1283.382</td>
<td>60</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a. Dependent Variable: Performance
b. Predictors: (Constant), Interest Rates

The coefficient values in table 4.8 show that there was a negative insignificant relationship between interest and infrastructure bond performance with a beta value of -0.057 and p value of 0.586 which was more than 0.05.

Table 4.8: Coefficients for Interest Rates and Bond Performance

<table>
<thead>
<tr>
<th>Model</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
<th>Correlations</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>Std. Error</td>
<td>Beta</td>
</tr>
<tr>
<td>1 (Constant)</td>
<td>4.018</td>
<td>1.096</td>
<td></td>
</tr>
<tr>
<td>Interest Rates</td>
<td>-.057</td>
<td>.104</td>
<td>-.071</td>
</tr>
</tbody>
</table>

a. Dependent Variable: Performance%

4.4 Effect of Forex Volatility on Kengen Bond Performance

4.4.1 Results of Correlation Analysis

The second objective of the study was to determine the effect of forex volatility on the performance of Kengen bond. As seen in the table 4.9 there was a negative correlation between exchange rates and bond performance with a correlation coefficient of -0.046.

Table 4.9: Correlation on Forex Volatility and Bond Performance

<table>
<thead>
<tr>
<th>Performance</th>
<th>Exchange Rates</th>
<th>Performance</th>
<th>Exchange Rates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson Correlation</td>
<td>1</td>
<td>-.046</td>
<td></td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>.727</td>
<td></td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>61</td>
<td>61</td>
<td></td>
</tr>
<tr>
<td>Pearson Correlation</td>
<td>-.046</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Exchange Rates</td>
<td>Sig. (2-tailed)</td>
<td>.727</td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>61</td>
<td>61</td>
<td></td>
</tr>
</tbody>
</table>
4.3.2 Results of Regression Analysis

As seen in table 4.10 the model summary reveals that the R square value was 0.002 indicating that the exchange rates contributes 0.2 percent to the infrastructure bond performance.

Table 4.10: Model Summary for Exchange Rates and Bond Performance

<table>
<thead>
<tr>
<th>Model</th>
<th>R</th>
<th>R Square</th>
<th>Adjusted R Square</th>
<th>Std. Error of the Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>.046a</td>
<td>.002</td>
<td>-.015</td>
<td>4.65939</td>
</tr>
</tbody>
</table>

a. Predictors: (Constant), Exchange Rates (Average monthly rates)

The ANOVA summary in table 4.11 is a clear indication that the model was not significant, with a p value of 0.727 which was more than 0.05.

Table 4.11: ANOVA for Exchange Rates and Bond Performance

<table>
<thead>
<tr>
<th>Model</th>
<th>Sum of Squares</th>
<th>Df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Regression</td>
<td>2.670</td>
<td>1</td>
<td>2.670</td>
<td>.123</td>
</tr>
<tr>
<td></td>
<td>Residual</td>
<td>1280.884</td>
<td>59</td>
<td>21.710</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>1283.554</td>
<td>60</td>
<td>21.710</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a. Dependent Variable: Performance%

b. Predictors: (Constant), Exchange Rates (Average monthly rates)

The coefficient values in table 4.12 show that there was a negative insignificant relationship between exchange rates and infrastructure bond performance with a beta value of -0.047 and p value of 0.727 which was more than 0.05.

Table 4.12: Coefficients for Forex Volatility and Bond Performance

<table>
<thead>
<tr>
<th>Model</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
<th>Correlations</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>Std. Error</td>
<td>Beta</td>
</tr>
<tr>
<td>1</td>
<td>(Constant)</td>
<td>7.635</td>
<td>11.764</td>
</tr>
<tr>
<td></td>
<td>Exchange Rates</td>
<td>-.047</td>
<td>.135</td>
</tr>
<tr>
<td></td>
<td>(Average monthly rates)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a. Dependent Variable: Performance %
4.5 Effect of Inflation Rates on Kengen Bond Performance

4.5.1 Results of Correlation Analysis

The third objective of the study was to determine the effect of inflation rates on the performance of Kengen bond. As seen in the table 4.13 there was a positive correlation between inflation rates and bond performance with a correlation coefficient of 0.125.

Table 4.13: Correlation on Inflation Rates on Bond Performance

<table>
<thead>
<tr>
<th>Performance</th>
<th>Inflation Rates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson Correlation</td>
<td>1</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>.339</td>
</tr>
<tr>
<td>N</td>
<td>61</td>
</tr>
<tr>
<td>Pearson Correlation</td>
<td>.125</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>.339</td>
</tr>
<tr>
<td>N</td>
<td>61</td>
</tr>
</tbody>
</table>

4.5.2 Results of Regression

As seen in table 4.14 the model summary reveals that the R square value was 0.016 indicating that the inflation rates 1.6 percent of infrastructure bond performance.

Table 4.14: Model Summary for Inflation Rates and Bond Performance

<table>
<thead>
<tr>
<th>Model Summary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
</tr>
<tr>
<td>1</td>
</tr>
</tbody>
</table>

a. Predictors: (Constant), Inflation

The ANOVA summary in table 4.15 is a clear indication that the model was not significant, with a p value of 0.339 which was more than 0.05.

Table 4.15: ANOVA for Inflation Rates and Bond Performance

<table>
<thead>
<tr>
<th>ANOVA²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
</tr>
<tr>
<td>1</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

a. Dependent Variable: Performance %
b. Predictors: (Constant), Inflation
The coefficient values in table 4.16 show that there was a positive relationship between inflation rates and infrastructure bond performance with a beta value of 0.123 and p value of 0.339 which was more than 0.05.

Table 4.16: Regression Analysis for Inflation Rates and Bond Performance

<table>
<thead>
<tr>
<th>Model</th>
<th>Coefficients</th>
<th>Standardized Coefficients</th>
<th>Correlations</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Unstandardized</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>Std. Error</td>
<td>Beta</td>
</tr>
<tr>
<td>1</td>
<td>(Constant)</td>
<td>2.509</td>
<td>1.199</td>
</tr>
<tr>
<td></td>
<td>Inflation</td>
<td>.123</td>
<td>.128</td>
</tr>
</tbody>
</table>

a. Dependent Variable: Performance %

4.6 Effects of Interest Rates, Forex Volatility and Inflation Rates on Kengen Bond Performance

4.6.1 Results of Correlation Analysis

Table 4.17 presents correlation analysis of the variables in the study. As presented in table 4.17 it can be seen clearly that the inflation rates are the highest contributors to infrastructure bond performance.

Table 4.17: Correlation Analysis of Interest Rates, Forex Volatility and Inflation Rates on Bond Performance

<table>
<thead>
<tr>
<th>Correlations</th>
<th>Liquidity (Bond Turnover) %</th>
<th>Exchange Rates (Average monthly rates)</th>
<th>Interest Rates</th>
<th>Inflation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Liquidity</td>
<td>Pearson Correlation</td>
<td>-0.046</td>
<td>-0.071</td>
<td>0.125</td>
</tr>
<tr>
<td>Bond Turnover %</td>
<td>Sig. (2-tailed)</td>
<td>1</td>
<td>.727</td>
<td>.586</td>
</tr>
<tr>
<td>N</td>
<td>61</td>
<td>61</td>
<td>61</td>
<td>61</td>
</tr>
<tr>
<td>Exchange</td>
<td>Pearson Correlation</td>
<td>-0.332**</td>
<td>1</td>
<td>0.386**</td>
</tr>
<tr>
<td>Rates</td>
<td>Sig. (2-tailed)</td>
<td>0.727</td>
<td>0.009</td>
<td>0.002</td>
</tr>
<tr>
<td>N</td>
<td>61</td>
<td>61</td>
<td>61</td>
<td>61</td>
</tr>
<tr>
<td>Interest</td>
<td>Pearson Correlation</td>
<td>-0.071</td>
<td>0.332**</td>
<td>1</td>
</tr>
<tr>
<td>Rates</td>
<td>Sig. (2-tailed)</td>
<td>-0.586</td>
<td>0.009</td>
<td>0.000</td>
</tr>
<tr>
<td>N</td>
<td>61</td>
<td>61</td>
<td>61</td>
<td>61</td>
</tr>
<tr>
<td>Inflation</td>
<td>Pearson Correlation</td>
<td>0.125</td>
<td>0.386**</td>
<td>0.696**</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td></td>
<td>0.339</td>
<td>0.002</td>
<td>0.000</td>
</tr>
<tr>
<td>N</td>
<td>61</td>
<td>61</td>
<td>61</td>
<td>61</td>
</tr>
</tbody>
</table>

** Correlation is significant at the 0.01 level (2-tailed).
4.6.2 Results of Multiple Regression Analysis

A multiple regression was further conducted to examine the relationship between performance of Kengen bond and interest rates, forex volatility as well as inflation rates as seen in table 4.18 and the model summary reveals that the R square value was 0.070 indicating that interest rates, inflation rates as well as forex volatility and inflation rates of 7 percent to the bond performance.

Table 4.18: Multiple Regression of Interest Rates, Forex Volatility and Inflation Rates on Bond Performance

<table>
<thead>
<tr>
<th>Model</th>
<th>R</th>
<th>R Square</th>
<th>Adjusted R Square</th>
<th>Std. Error of the Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>.265a</td>
<td>.070</td>
<td>.021</td>
<td>4.57530</td>
</tr>
</tbody>
</table>

a. Predictors: (Constant), Inflation, Exchange Rates (Average monthly rates), Interest Rates

The ANOVA summary in table 4.19 is a clear indication that the model was not significant, with a p value of 0.241 which was more than 0.05.

Table 4.19: ANOVA of Interest Rates, Forex Volatility and Inflation Rates on Bond Performance

<table>
<thead>
<tr>
<th>ANOVAa</th>
<th>Model</th>
<th>Sum of Squares</th>
<th>Df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Regression</td>
<td>90.353</td>
<td>3</td>
<td>30.118</td>
<td>1.439</td>
<td>.241b</td>
</tr>
<tr>
<td></td>
<td>Residual</td>
<td>1193.201</td>
<td>57</td>
<td>20.933</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>1283.554</td>
<td>60</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a. Dependent Variable: Performance %
b. Predictors: (Constant), Inflation, Exchange Rates (Average monthly rates), Interest Rates

The coefficient values in table 4.20 reflect that both Exchange rates & Interest rates had a negative insignificant relationship with bond performance whilst inflation rates which had a beta coefficient that was positive.
Table 4.20: Regression Results of Interest Rates, Forex Volatility and Inflation Rates on Bond Performance

<table>
<thead>
<tr>
<th>Model</th>
<th>Coefficientsa</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>B</td>
<td>Std. Error</td>
</tr>
<tr>
<td>1 (Constant)</td>
<td></td>
<td>10.618</td>
<td>12.165</td>
</tr>
<tr>
<td>Exchange Rates</td>
<td></td>
<td>- .092</td>
<td>.145</td>
</tr>
<tr>
<td>(Average monthly rates)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interest Rates</td>
<td></td>
<td>- .237</td>
<td>.144</td>
</tr>
<tr>
<td>Inflation</td>
<td></td>
<td>.360</td>
<td>.181</td>
</tr>
</tbody>
</table>

a. Dependent Variable: Performance %

4.7 Chapter Summary

This chapter involved analysis of data collected and discussion of the results obtained. The chapter presented findings with regards to the relationship between performance of infrastructure bonds and interest rates, inflation rates as well as forex volatility. The chapter also presented descriptive analysis of the findings with regards to the both the independent and dependent variables. The next chapter presents a summary of the study, conclusions and recommendations.
CHAPTER FIVE

5.0 DISCUSSION, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction
This chapter is a synthesis of the entire research with the aim of discussing the findings of the research objectives. The chapter will also provide conclusions drawn on the basis of the findings and will provide recommendations to enhance the performance of the infrastructure bonds based on the objectives selected. The first part of this chapter will focus on the summary of findings; the second part will mainly focus on the discussions, the third part will be on the various conclusions and the final part will provide recommendations for future studies as well as recommendations for improvement.

5.2 Summary
The main objective of the study was to determine the factors that affect the performance of the Kengen Bond between 2010 and 2015. The investigation was guided by following objectives; to determine the effect of interest rates on the performance of the Kengen bond, to establish the effect of forex volatility rates on the performance the Kengen bond and to examine the effect of inflation rates on the performance of the Kengen bond.

This study employed a correlational and causal research designs. The regression model was run to establish the relationship between the selected variables. Correlation analysis was carried to ascertain the strength of linear association between the dependent and independent variables.

The study revealed that there was a negative insignificant relationship between interest and performance of the Kengen bond with a beta value of -0.057 and p value of 0.586 which was more than 0.05. The study further revealed that was a negative insignificant relationship between exchange rates and the performance of the Kengen Bond with a beta value of -0.047 and p value of 0.727 which was more than 0.05. Finally the study revealed that there was a positive relationship between inflation rates and performance of Kengen Bond with a beta value of 0.123 and p value of 0.339 which was more than 0.05.

5.3 Discussion
5.3.1 Effect of Interest Rates on Bond Performance
The study revealed that there was a negative insignificant relationship between interest and bond performance. The findings disagrees with a study by Waweru (2014) who
established that some macroeconomic variables such as interest rates have a positive effect on liquidity of infrastructure bonds which is in line with expectation theory of term structure of interest rates. The results are differing because the infrastructure bond investigated in this study was not the same as those examined by Waweru (2014).

The findings however agree with the findings by Nasser and He (2003) who concluded that movements in the economy and/or of interest rates are of overriding importance in the purchase of fixed-income securities. A rise in interest rates, due for instance, to monetary policy tightening may lead to a financial crisis, with liquidity collapses in security markets. In addition, in the presence of uncertainty, adverse surprises may trigger shifts in confidence, affecting markets and institutions more than appears, thus introducing the potential for a liquidity crisis. According to Adelegan and Radzewicz (2009), high level of interest rates tend to have a depressing impact on issuance and bond market development since few firms can service debts when interest rates are high. When interest rates are variable, investors will have a little appetite for long-term fixed rate because there is high risk that the purchasing power of long-term fixed rate assets will be eroded. Changes in global interest rates also tend to affect the level of spreads, possibly because they lower the cost of funding for international bond investors and the cost of financing for emerging market sovereigns (Andritzky et al, 2007).

The findings also provide an affirmation in line with Singh (1993) who suggested that, if the interest rate is high investment falls, a low rate of interest lead to an increase in investment activity. Increased investment may imply use of more debt. However, in the short run interest is inelastic and fails to influence level of investment. Hence a relation exists between investment and use of debt and level of interest rates. Interest rates represent the cost of borrowing capital for a given period of time.

In addition Reinhart and Sack, (2000), contend that a permanent tightening in fiscal policy should lead to lower real interest rates. Therefore, although the quantity of private sector debt could rise as government debt falls, this adjustment might be less than one for one, abstracting from other effects such as economic growth and increasing financial sophistication. Lower interest rates in the long run will also reduce total demand for debt securities, so the size of the net effect on issuance of private sector debt depends on the elasticities of supply and demand for these securities with respect to the interest rate.
Garcia (1989) suggested that the monthly stance of the Federal Reserve Bank can affect liquidity by altering the terms of margin borrowing and alleviating the borrowing constrains of dealers. Additionally, the author found that monetary expansions are associated with increased liquidity during crisis periods. This was in line with Fujimoto (2004) who also discovered that monetary variables are significant.

Finally the findings provide an assertion that indeed the domestic interest rate represents the opportunity cost of holding money; thus the public would prefer to hold more financial assets such as treasury bills, bonds, etc., during times of high interest rate. Bank interest rate spreads are provided by net interest margin. Here the spread is measured as the difference between the average interest rate earned on loans and the average interest rate paid. If the interest margin is lower, the social costs of financial intermediation will be lower (Maudos & Guevara, 2004). The analysis of net interest margins measured by the cost of financial intermediation; that is, the difference between the gross cost paid by a borrower and the net return received. In the money demand function for the financially developed industrial countries, this is beyond controversy. However, the role of interest rate in developing economies deserves some attention. The standard demand for money model which requires a well-developed financial market has been verified by many theoretical and empirical studies.

5.3.2 Exchange Rates and Bond Performance

The study further revealed that was a negative insignificant relationship between exchange rates and bond performance. The findings agree with Njihia (2005) who sought to assess the effects of macroeconomic variables on the infrastructure bond market which are seen to hinder the development. The study concluded that exchange rate variables negatively affect the development of the bond market which calls for implementation of sound policies. Greater exchange rate flexibility encourages the development of domestic bond market. Pegged exchange rates encourage foreign investors to underestimate the risk of lending to banks and corporations, and the resulting foreign competition may slow the development of domestic intermediation (Adelegan et al, 2009).
Additionally the findings agreed with Mbugua (2003) who examined the relationship between macroeconomic variables notably exchange rate. The study employed a short run time series linear econometric model to estimate effects and contribution of these variables as determinants of domestic bond market development. It was deduced that exchange rate, interest rate and bank credit variables negatively affect the development of the corporate bond market.

Similarly Yuan (2002) shows that the government can stimulate bond performance by issuing securities to absorb the cost of acquiring systematic information and hence internalize all information externalities. After sovereign issuances, both primary and secondary corporate bond markets become more liquid and information-efficient. Therefore, the government has a role in facilitating the development of financial markets. To establish a stable local currency bond market in Kenya, the government through Central Bank adopted market-friendly issuance strategies and undertook critical reforms which among other benefits resulted into a reliable yield curve that became an important pricing benchmark for corporate entities to issue corporate bonds (Kiama, 2013).

From a macroeconomic policy perspective, the lack of bond markets places constraints on the financing of fiscal deficits, while bond markets provide useful market signals for macro-economic policy. Domestic debt is also needed for monetary policy purposes, including for sterilizing inflows of foreign exchange. Kahn (2005) observed that bond markets also help provide interest rates across the maturity spectrum and a more efficient pricing of risk. And by providing an alternative source of financing, they reduce concentration of intermediation in banks. Because lending can be hedged in the bond market, banks have the ability to lend longer.

Further the findings agreed with Goyenko (2009), who noted that the nature of the relationship between bond performance and exchange rate fluctuations over a longer time span, and under a variety of economic conditions, has not been explored yet. There are reasons, however, to expect this relationship to be strong. For instance, a loose monetary policy may decrease illiquidity and encourage more trading by making margin loan requirements less costly and by enhancing the ability of dealers to finance their positions. Monetary conditions may also affect asset prices through their effect on volatility (Harvey & Huang, 2002) and interest rates. Balli (2009) finds significant results that the global
shocks, including some of the macroeconomic news, affect euro bond markets in various levels, creating differences in bond yields even when controlling different market specific factors. He uses daily yield changes and includes some Scandinavian countries in his study. However, he measures only the actual news impact and not the surprise factor of the news bond yields. In addition, unlike Balli(German government) term structure of interest rates on bond yields and spreads during the macroeconomic news announcement dates. Balli (2009) also uses partially different and a less comprehensive set of macroeconomic news.

5.3.3 Effect of Inflation Rates on Bond Performance

Finally the study revealed that there was a positive relationship between inflation rates and bond performance. The findings agreed with Nyambok (2010) in her study on the relationship between inflation rates and liquidity of bonds quoted at the Nairobi Stock Exchange that observed that the overall inflation rates influence the bond liquidity at varying degree depending on segment. Regression models were developed using monthly inflation rates as independent variable and both segment wise and market wise trading volume as dependent variable. The study conducted was for three years from January 2007 to December 2009. The study found a positive relationship between overall inflation rates and bond liquidity at the NSE which is an indication that as inflation rates go up, the overall market liquidity in terms of trading volumes also go up and vice versa. The study made focus on liquidity and not the overall price.

In addition the findings agreed with Riona et al (2010) in a study on the long run relationship between inflation and bond prices using empirical evidence from South Africa. The study presented some time series evidence on using South African data, by applying the structural vector autoregressive (VAR) methodology proposed by King and Watson (1997). The study used quarterly data on nominal stock price index and consumer price index from 1980 to 2010. The empirical results provided considerable support of the view that in the long run real stock prices are invariant to permanent changes in the rate of inflation. The impulse responses reveal a positive real stock price response to a permanent inflation shock in the long run, indicating that any deviations in the short run real stock prices will be corrected towards the long run value.
The findings however were not in agreement with Kullapom and Lalita (2010) who conducted a study on the relationship between inflation and bond performance in Thailand. The study was carried out in the period January 2000 to March 2010. The statistical method vector auto regression (VAR) was used to find and analyse the association. Interview was also conducted to gather opinions of investors in stock exchange of Thailand on how inflation affects equity value. The findings demonstrate that bond performance is irrelevant to inflation.

Shehu (2011) conducted a study on whether inflation has an impact on bond returns and volatility. The study that was based on evidence from Nigeria and Ghana used Generalized Autoregressive Conditional Heteroskedacity (GARCH) model to assess the impact of inflation on bond market returns and volatility using monthly time series data. Results for Nigeria show weak support for the hypothesis which states that bad news exert more adverse effect on stock market volatility than good news of the same magnitude. Furthermore, inflation rate and its three month average were found to have significant effect on bond market in the two countries; therefore, would certainly reduce bond market returns and boost investor confidence.

Similarly the findings are in line with Kiptoo (2010) who conducted a study on an empirical investigation on the relationship between selected macroeconomic variables and bond prices based on evidence from the Nairobi Securities Exchange. The study used NSE 20 Share index to represent all listed companies and covered the period 1978-2008. Data was analysed using unit root test, multicollinearity and regression. The study agrees with that of Kaimba (2010) in that there is significant relationship between the bond prices and both exchange rate and Inflation. She however found insignificant relationship on interest rates, money supply and gross domestic product.

Finally the findings agreed with Siele (2009) in the study on the relationship between bond market and some selected macroeconomic variables in Kenya used NSE 20 share index to represent Kenya Stock Market and real GDP growth rate, inflation, interest and Treasury bill rates as macroeconomic variables. Quarterly time series data for the period 1999-2008 was analysed using summary statistics, correlation and regression analysis to ascertain the relationships. Findings of the study reveal that macro-economic variables explain about 70% of the variation of the bond market share index. The regression
coefficients show that the bond market share index is positively related to inflation rate, Treasury bill rate and gross domestic product while it is negatively related to interest rate. This study results share similar views to those of Kaimba (2010) and Kiptoo (2010).

5.4 Conclusions

5.4.1 Effect of Interest Rates on Bond Performance
The study concludes that there was a negative insignificant relationship between interest and Kengen bond performance. This therefore means that a reduction in the level of interest rates results in an increase in bond performance.

5.4.2 Effect of Forex Volatility on Bond Performance
The study further concludes that there was a negative insignificant relationship between exchange rates and Kengen bond performance. This therefore means that a reduction in the level of forex volatility results in an increase in bond performance.

5.4.3 Effect of Inflation Rates on Bond Performance
Finally the study concludes that there was a positive relationship between inflation rates and Kengen bond performance. This therefore means that an increase in the level of inflation rates results in an increase in bond performance.

5.5 Recommendations

5.5.1 Recommendations for Improvement

5.5.1.1 Effect of Interest Rates on Bond Performance
The study recommends the need for policy makers to ensure that they put in place policy measures that will ensure stability of interest rates in the country. This will create a stable market performance thus increase infrastructure bond market. The management at Kengen also needs to be very vigilant on the changes in interest rates so as to be able to position themselves in a way that they are able to deal with such changes if and when they occur.

5.5.1.2 Effect of Forex Volatility on Bond Performance
The study recommends that CBK provide a mechanism to evaluate exchange rate volatility. This will help to curb the impact that exchange rate volatility currently has on
the economy. This is even more relevant to developing countries, where exchange rate volatility tends to be higher, contributing to a higher exchange rate pass-through to inflation. Thus it is prudent for policy makers to instill sound macro-economic policies especially for interest rates and exchange rates. The volatility of these two variables has significant effects on the performance of infrastructure bonds as per the findings of this study.

5.5.1.3 Effect of Inflation Rates on Bond Performance

The study recommends that given specific context of developing countries like Kenya, significant shocks from the exchange rate will influence inflation rates therefore the monetary policy needs to curb exchange rate volatility which is important in the fight against inflation. Indeed, policy makers should be opting for a more interventionist approach towards the macroeconomic variables so as to spur the development and performance of the infrastructure bonds in Kenya. Governments need to deepen sovereign and multilateral bond issuance as a precursor to corporate and project issuance. Across most of the continent, reforms to date have focused on getting sovereign bonds issued, often to finance infrastructure development.

5.5.2 Recommendations for Further Studies

The study recommends the need for future studies in this area so as to bring forth more knowledge to the existing pool of limited literature especially in Africa as bond development market is at its infancy stage. Based on the study’s findings and discussion, it’s apparent that the research could have improved its objectivity through the inclusion of more variables such as diaspora remittances, GDP. Further studies may dwell into why the macroeconomic variables demonstrated the specified relationships as per the findings of this study. Further research can be attributed to identify microeconomic and other macroeconomic factors that deter performance of infrastructure bonds.
REFERENCES


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## APPENDIX I: SECONDARY DATA SHEET

<table>
<thead>
<tr>
<th>YEAR</th>
<th>Performance</th>
<th>Exchange Rates (Average monthly rates)</th>
<th>Interest Rates</th>
<th>Inflation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jun-10</td>
<td>10.97</td>
<td>81.02</td>
<td>1.15</td>
<td>3.49</td>
</tr>
<tr>
<td>Jul-10</td>
<td>9.19</td>
<td>81.43</td>
<td>1.35</td>
<td>3.57</td>
</tr>
<tr>
<td>Aug-10</td>
<td>4.26</td>
<td>80.44</td>
<td>1.66</td>
<td>3.22</td>
</tr>
<tr>
<td>Sep-10</td>
<td>0.90</td>
<td>80.91</td>
<td>1.18</td>
<td>3.21</td>
</tr>
<tr>
<td>Oct-10</td>
<td>14.32</td>
<td>80.71</td>
<td>0.98</td>
<td>3.18</td>
</tr>
<tr>
<td>Nov-10</td>
<td>9.72</td>
<td>80.46</td>
<td>1.05</td>
<td>3.84</td>
</tr>
<tr>
<td>Dec-10</td>
<td>2.90</td>
<td>80.57</td>
<td>1.18</td>
<td>4.51</td>
</tr>
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