FOREIGN EXCHANGE VOLATILITY AND FINANCIAL PERFORMANCE OF BOND MARKET IN KENYA

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ABSTRACT

Foreign exchange rate volatility has characterized the Kenyan market environment leading to effects on the financial markets. The bond markets in Kenya have also been witnessing a fluctuating trend from 2010 to 2023; the same period where the foreign exchange rate fluctuation has been at the highest. This study explored the interrelation between performance financial and foreign exchange volatility of bond markets in Kenya. The precise goal was to investigate the impact of inflation, money supply and interest rate on bond markets performance from a financial perspective. The period of study was from 2010 to 2023. The research was underpinned on the interest rate parity theory, quantity theory of money, monetary theory of inflation, and modern portfolio theory. The research utilized a causal research design and targeted 26 institutions from various sectors including banks, investment Firms, pension funds and insurance. A census was employed in analyzing these institutions. Data collection was done using a secondary data collection tool and the analysis was done using a panel regression model with the aid of Stata version 14. Descriptive statistics, correlation analysis and inferential statistics were conducted. The diagnostic tests which include normality test, heteroscedasticity test and multicollinearity tests were equally carried out. A Hausman test was done to determine whether a fixed effect or a random effect model will be applied in the study. Finally, the study adhered to the

ethical considerations throughout the period of study. The findings also indicate that the R2 (coefficient of determination) is 0.694 implying that 69.4 percent of the changes in bond market turnover is explained by inflationary changes, interest rates and money supply. The findings from panel regression analysis indicate an significant inverse and relationship between inflation and bond market turnover holding other variables constant (r=-.768, p<.05). The outcome from panel regression analysis indicate that interest rates and bond market turnover have a significant and positive relationship (r=.055, p<.05). The regression analysis shows that money supply has a positive effect on bond market turnover holding other factors constant (r=.458, p>.05). The study further recommends that investors should use financial instruments like forward contracts, options, or futures, to guard against unfavorable movements. This strategy helps ensure that inflationary effects do not erode the returns from the bond investment. Regarding the significance of interest rates in bond markets, the study recommends that in volatile markets, focusing on short-term bonds may be advantageous as they typically have less sensitivity to interest rate changes compared to long-term bonds.

Key words: Foreign exchange rate volatility, bond market, bond investment

INTRODUCTION

Background of the study

Financial markets in emerging economies are intricately connected to global economic forces, with foreign exchange dynamics playing a significant role in shaping their performance. This paper investigates the intricate link between foreign exchange fluctuation and the financial well-being of Kenya's bond market (Raymond, 2024).

In the context of the Kenyan financial landscape, where the bond market serves as a key avenue for capital mobilization and investment, understanding the impact of currency fluctuations becomes paramount (Financial Sector Deepening Africa, 2023). The primary focus of this research lies in investigating the interplay between foreign exchange volatility and the financial success of the Kenyan bond market. The research especially analyzed how exchange rate variations impact important aspects such as inflation, interest rates, and money supply (MS), and how these variables subsequently affect bond pricing and demand in the Kenyan market. In emerging economies like India, Mexico and Brazil, the nexus between exchange rate fluctuations and performance of bond markets from a financial view has been established. A study by Bailey and Chung (2015) on the foreign exchange volatility on the Mexican bond market indicated that volatility affects the bond market yields and could potentially increase the risks for the investors while impacting on the debt markets. According to Trading Economics (2019), the net yield of government ten-year bond in Brazil was 3.91 percent, Russia was 2.67 percent, China was 0.50 percent, Mexico was 3.87 percent, and India was 3.18 percent while the United States was 0.45 percent. This indicates a lower bond yield hence a lower cost of debt repayment due to stable currencies and low risk ratings that these countries have.

In Africa, the bond market has experienced consistent expansion, driven by the increasing demand for financial resources by governments to support growing expenditures and finance developmental initiatives such as infrastructure projects. In some instances, these funds are allocated to settle public debts. Despite this growth, a significant obstacle to further advance is the prevalence of exchange rate volatility (Meyer & Hassan, 2020. The escalating ERV in many countries has notably hampered bond yields. In a broader perspective, the fluctuation and stability of exchange rates in African nations serve as indicators of how the global market perceives the local economy. Consequently, a favorable outlook results in the appreciation of the home currency, whereas an adverse perception leads to currency depreciation (Hellowel, Vecchi&Caseli, 2015)

An analysis of the African market shows that owing to high-risk ratings in the global market, government bonds have higher yields which lead to higher cost of loans (Olabisi & Stein, 2015). This indicates that there is an inverse correlation between ERV and bonds and increase in bond yields may affect the government's ability to repay debt. In South Africa, there has been high ERV, and this has adversely affected the yields on government bond (Meyer & Hassan, 2020). According to Trading Economics (2019), the bond yield in South African bond

market was 3.53 percent which was lower compared to Zambia which has a smaller bond market. This was attributed to the ERV. According to Trading Economics (2019), Nigeria which is the biggest economy in Africa had a bond yield of 2.81 percent which was lower in comparison to emerging economies like Brazil which had 3.91 percent over the same period. In Kenya, the most recent activities in the bond market include the Kenya Mortgage refinancing company's 7-year issue and the Acorn Holdings first ever green bond in 2020. The green bond was worth 5.7 billion shillings and was listed at the Nairobi Securities Exchange (NSE) and International Securities Market (ISM). In 2021, the East Africa Breweries issued a five-year bond while at the same period family bank issued a five-year bond. Earlier in 2020, Centum Investments issued a three-year bond. In terms of its input, to the GDP, corporate bonds contribute to only 0.2 percent with the commercial banks taking a lead role in the market. This however reveals that the activities in the bond market have not been intensive. Several factors have been brought forth to explain this phenomenon. A report by the FSD Africa (2023) attributed the low activities in the bond market to macroeconomic dynamics like the ERV, interest rates and inflation.

Financial Performance of Bond Markets

Financial performance has been defined and described by various scholars. Corporate Finance Institute (2023) describes financial performance as a complete assessment of the overall standing of a company or organization in various categories including assets, liabilities, expenses, revenue, equity and profitability. Financial performance allows the internal users to examine the standing and well-being of their organization while for external users it enables them to assess their investment potential. Therefore, financial performance is evaluated through various metrics, including return on assets, inventory turnover ratio, profit margin, current ratio, working capital, and turnover. (Corporate Finance Institute, 2023).

Verma (2024) characterizes financial performance as the level to which financial goals have been attained. It quantifies the results of an organization's activities and policies in financial terms, thereby assessing the overall fiscal health of a corporation over a certain duration. Verma (2024) states that in measuring financial performance, four areas are given a lot of consideration, namely, financial structure analysis, working capital analysis, activity analysis and profitability analysis. Lenglet (2023) further defines financial performance as a company's capability to make profits and increase shareholders' value over time.

The Kenyan bond market has undergone substantial growth recently. Firms registered on the Nairobi Securities Exchange (NSE) have engaged in secondary bond issuances to advance their business goals. An analysis of the financial performance of enterprises that have executed secondary bond issuance reveals a decline in performance after these transactions. Understanding the result of bond issuance on firm's financial success is vital for the sustainability of the business. Studies on the nexus between debt and corporate financial success has demonstrated that debt influences performance (Nzau, Kungu &Onyuma, 2019).

Scholars have established that bond markets have an influence on financial performance though the effects vary from study to study. Globally a study by Darmouni and Papoutsi (2021) on bond financing in Europe found that bond financing had helped firms improve their financial performance as it allowed firms to increase their portfolio. Another study by Laborda and Sanchez-Guerra (2020) established that bond finance in Europe can help firms improve their financial performance in the short run. In Africa a study by Obalade and Khumalo (2022) focused on bond market in South Africa and found that financial performance can be enhanced through bonds in the short term. Olabisi and Nyejiuwa (2021) conducted a study revealing that bond markets affect the financial health growth of publicly listed companies in Nigeria. Omollo (2018) examined the role of bonds in the financial success of NSE listed firms in Kenya. Empirical findings indicated that debt instruments, specifically bonds, exert adverse and huge impact on firm's financial success. Nzau, Kungu, and Onyuma (2019) Investigated the effect of bond issuance on publicly traded companies' financial performance. The findings indicated that bond issuance positively influenced financial performance, albeit insignificantly.

An assessment of firms' financial records between 2021 and 2023 by Capital Market Authority (2018) showed declining financial performance as shown by bond market turnover. According to the NSE (2023), the performance of the bond market declined by 47 percent as of April 2023 in comparison to the same period the preceding year. Within the first quarter of 2023, there was also an overall decline in bond market performance by 14.9 percent from Kes. 191 in 2022 to Kes. 163 billion in 2023. This research ascertained the financial performance based on the bond market turnover.

Foreign Exchange Rate Volatility

The exchange rate (ER) is regarded as the value of a nation's currency relative to the currency of another country. Prior to 1970, there was a fixed exchange rate regime for currency mostly under the control of the Bretton Woods Agreement. This was however replaced by the floating exchange rate regime which meant that the prices of currencies were subject to demand and supply. As a result, investors are now subject to currency risks, which, as noted by Adler (1984), are a consequence of fluctuations in a nation's actual currency value of assets and obligations due to unforeseen ER variations. ER Volatility describes the intensity of the rate of currency dispersion relative to that of a different country currency over time (Polyzoidou, 2014). Therefore, this study decisively assessed the bond markets' financial performance relative to exchange rate volatility. Taggert and McDermott (2000) states that exchange rate volatility induces uncertainty in both micro and macroeconomic environments, rendering the prediction of future income, expenses, assets, and market real value with a high level of probability unfeasible. Taiwo and Adesola (2013) further elucidate that exchange rate volatility results in fluctuations in a firm's and a country's net financial position and net foreign investment position. Consequently, this implies that companies that participate in international trade are negatively affected in terms of earnings as exchange rates fluctuate. The floating rate of exchange between Kenya's currencies and other foreign currencies is impacted by the pressures of demand and supply. The CBK sets a value which become a reference point for the forex bureaus, commercial banks, and other participants in the market (Musyoki, 2017).

In Kenya, over the last 10 years, there has been a noteworthy increase in ERV, reaching an unprecedented peak of 157 between the Kenyan shilling and the US dollar as of December 2023. Table 1 illustrates the average exchange rates.

Year	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Exchange rate	80.830	85.210	86.030	86.310	90.590	102.310	102.400	103.232	101.840	101.340	109.200	113.130	123.370	157.390

 Table 1: Average Exchange Rate (Kshs verses US Dollar)

Source (Central Bank of Kenya, 2023)

Table 1 reveals a noticeable trend of the Kenyan currency depreciating rapidly against USD since 2010. In 2010, 1 USD equated to 80.83 Kenyan shillings, depreciated to 85.21 in 2011and maintained relative stability in 2012 and 2013 but slightly depreciated in 2014 to close at 90.59. Subsequently, the weakening trend continued with further depreciation to 102.50 in 2016 and 2017 at 103.20. Between 2018 and 2019 there was relative stability at 101.34 but thereafter a relative decline to 113.13 in 2021, 123.37 in 2022, and a substantial increase to 157.39 as of December 2023. This depreciation has consequential impacts on the bond market, affecting bond yields and debt repayment. The research sought to elucidate the effect of exchange rate volatility on the financial health of bond markets by examining the Kenyan context. This study therefore analyzed foreign exchange volatility based on inflation, interest rates and money supply. The major reason for focusing on these variables is that they have an influence on foreign exchange rate volatility (Taiwo & Adesola, 2013).

Inflation

As put forth by Mulwa (2013) inflation describes the pace at which the overall price levels of goods and services is increasing, and, consequently, fall of purchasing power. Central banks endeavor to bring to a halt harsh inflation, as well as harsh deflation, to minimize excessive prices growth. The determinants of inflation are essential factors to consider when exploring various monetary policy blueprints to adopt. One of the foremost influencers of inflation is exchange rate volatility and the domestic prices' sensitivity level towards the volatility. This trend is described as the exchange Rate Pass Through (ERPT). Akofio-Sowah (2009) explains this trend as the change in import prices of local currency (in percentage) that is attributed to a unit percentage change in currency prices of importing and exporting country. When import prices respond entirely to exchange rate fluctuations, the phenomenon is termed total passthrough. Nevertheless, price response of below if there is a less than 100percent means that there is an incomplete pass through. For Kenya which is predominantly an open economy, inflation is as a result of domestic and external factors. The external factors mainly occur when there is a fluctuation in real rate of exchange or when the world commodity prices have increased significantly. Therefore, the rate of exchange regime is instrumental in the reduction of the fluctuation risks in the Real Exchange Rate (RER) and this impact on inflation rate and the economy.

Interest rates

The connection between exchange rates (ER) and Interest rates (IR) has been apparent and this has brought a lot of special interest. This has been due to the considerable role that they play in determining the changes in real and nominal economic dynamics which include trade flows, external debt and domestic inflation (Kyule, 2016). The introduction of policies on ER, monetary policies and inflation targeting blueprints further spur interest rates (IR) in emerging economies. The IR and ER variability has been rising recently in comparison with past periods with its characteristic rigid ER regime albeit debates on the level of fluctuations (Irungu, 2017). High IR is an advantage to lenders within an economy in form of high returns hence they tend to attract foreign capital inflow promoting the ER to increase. The impact of high IR is nevertheless mitigated if a country's inflation is higher than in other countries even though other factors may largely drive the currency towards decline. The opposite link exists for declining IR which implies that lower IR tends to decrease ER (Bergen, 2010).

Money supply

Hongmei (2021) found a significant favorable link between money supply and bond market turnover. Qing and Kusairi (2019) studied the ER and money supply effect on Malaysia's bourse, finding that interest rates (IR), money supply (MS), and real effective ERs, exert a lasting influence on performance of the bourse in near term. Alternatively, the spread on interest demonstrated a detrimental effect on the performance of the bourse. The volatility demonstrated considerable persistence between Interest spread, exchange rate, money supply, and stock market.

Bond Market in Kenya

The Kenyan bond market constitutes the treasury bonds and the corporate bonds. The commencement of Treasury bonds was during the1980s. Treasury bonds were incepted with a goal of ensuring effective domestic debt management and capital raising. As experienced from every new initiative, its inception was marred by challenges which inhibited the bond market growth. The strategy of management of debt however witnessed a paradigm shift in Kenya in 2001, as the government came up with deliberate initiatives that recognized the need for long term and stable income sources. This essentially marked a significant turning point in the Kenyan bond market.

The Successful bond' market development was premised on numerous vital conditions, which included conducive policies at the macro-economic level, developed money market, vigorous legal blueprint, active participation and most significantly a suitable trading system. The M-Akiba bond is a government bond that is straightforwardly recognizable. This infrastructure bond was a consequence of partnership for financial inclusion between government and capital market stakeholders to initiate a retail bond whose trading can be done entirely on mobile phone.

Corporate bonds were incepted in the Kenyan market in 1996, when EADB issued a bond at a cost of ninety nine percent and raised Six hundred million shillings. Moreover, EABD initiated

a two billion mid-term note, and listed it in the market in 2001. This was seen as a move away from long-term instruments. Consequently, the funds were aimed at improving lending using domestic currencies while alleviating ER risks resulting from long-term borrowing in foreign currencies (Ringui,2012). Shelter Afrique equally made a 350 million medium term note in 3 phases starting with December 2000 issue. The proceeds thereof were utilized in Kenya's housing development. Safaricom became the first local firm to issue bonds with an aim of expanding capacity and network coverage to advance network reliability and availability (Ringui,2012).

Corporate bonds market in Kenya has been characterized by depressed trading action in comparison to the treasury bonds' market due to information asymmetry among prospective issuers, unstable and high IR, domestic debt crowding and absence of yield curve to price long-term instruments. Notwithstanding these hurdles, there has been considerable progress in bond market development. The fact that commercial banks cannot meet all the corporate funding requirements makes it imperative to diversify and grow corporate bond market.

The latest performance of bond markets depicts a fluctuating trend in performance. Table 1.1 shows the bond market turnover from 2010 to 2023.

Year	Treasury bond turnover	Corporate bond turnover
2010	488.89	12.47
2011	436.74	8.52
2012	563.82	1.86
2013	451.58	0.88
2014	504.30	1.95
2015	302.14	2.96
2016	431.93	1.56
2017	432.83	3.08
2018	561.53	1.19
2019	651.35	3.70
2020	690.67	1.18
2021	956.11	0.86
2022	741.50	0.34
2023	309.90	0.02

 Table 1.1: Bond Turnover in Billions of Shillings

Source: Capital Markets Authority (2023)

The bond market turnover as shown in Table 1.1 shows that in 2010 the Treasury bond turnover was 488.89 billion which declined to 436.74 billion in 2011. However, in 2012, the turnover improved to 563.82 billion then declined to 451.58 billion in 2013. The year 2015 witnessed

the highest drop in bond market turnover from 504 billion in 2014 to 302 billion. The year 2021 saw the highest turnover of 956 billion and declined in 2022 and 2023 to 741.5 billion and 309.9 billion respectively. Regarding the corporate bond turnover, 2010 saw the highest turnover at 12.4 billion which declined to 8.52 billion in 2011 before sharply declining to 1.86 in 2012. As of 2023, the corporate bond turnover was 0.02 billion which was the lowest for the thirteen-year period.

Statement of the Problem

Despite its ability to finance and raise long term finance at affordable rates, the bond market in Kenya has in the recent years witnessed little activity (Financial Sector Deepening Africa, 2023). A report by the Financial Sector Deepening (FSD) Africa (2023) indicated that in terms of performance, the Kenvan bond market was becoming depressed as the macroeconomic stability indicators like inflation and exchange rates hit the sector. The bond market turnover statistics as of 2023, according to the Capital Markets Authority (2023) shows that in 2010 the Treasury bond turnover was 488.89 billion which declined to 436.74 billion in 2011. However, in 2012, the turnover improved to 563.82 billion then declined to 451.58 billion in 2013. The year 2015 witnessed the highest drop in bond market turnover from 504 billion in 2014 to 302 billion. The year 2021 saw the highest turnover of 956 billion and declined in 2022 and 2023 to 741.5 billion and 309.9 billion respectively. Regarding the corporate bond turnover, 2010 saw the highest turnover at 12.4 billion which declined to 8.52 billion in 2011 before sharply declining to 1.86 in 2012. As of 2023, the corporate bond turnover was 0.02 billion which was the lowest for the thirteen-year period. This indicates that the performance of the bond market in Kenya is not stable as witnessed from the fluctuations and decline over the period. In this context, this paper sought to investigate the effect of fluctuations in currency exchange rate on financial success of the Kenya's bond markets.

Previous research has concentrated on examining the nexus between currency rates and performance of government bonds leaving out the corporate bonds which are issued by private sector organizations. A study by Otieno (2018) examined fluctuations in exchange rate effect on Treasury bond. The research did not however examine the corporate bonds issued by private institutions. A study by Mbithi (2013) examined exchange rate fluctuations effect on financial performance of firms listed at Kenya's NSE but does not specifically focus on the bond markets. A study by Hassan and Meyer (2020) examined the effect of ERV on government bond market but within the context of South Africa. This shows that there are conceptual and contextual gaps that need to be filled. For instance, most of these studies have majorly focused on the treasury bonds and leave out the corporate bonds which form part of the bond market. Additionally, these studies were conducted in markets outside Kenya. The current study however examined the bond market broadly covering both the government bonds and corporate bonds and how they have been influenced by the ERV in the recent years within the Kenyan context.

Objectives of the Study

General Objectives

The primary research objective was to examine the impact of exchange rate volatility on financial performance of bond markets in Kenya.

Specific Objectives

The research precise objective were;

- i. To examine the impact of inflation rates on financial performance of bond markets in Kenya
- ii. To evaluate the impact of interest rates on financial performance of bond markets in Kenya
- iii. To assess the effect of money supply on financial performance of bond markets in Kenya

Research Hypothesis

The research was dictated by the subsequent hypothesis.

HO₁: An Inflation rate do not have a notable impact on financial performance of bond markets in Kenya.

HO₂: Interest rate do not have a noteworthy outcome on financial performance of bond markets in Kenya.

HO3: Money supply has no notable effect on financial performance of bond markets in Kenya.

Significance of the study

The bond market in Kenya has in the recent years witnessed little activity. This is despite its ability to finance and raise long term finance at affordable rates (Financial Sector Deepening Africa, 2023). A report by the Financial Sector Deepening (FSD) Africa (2023) indicated that in terms of performance, the Kenyan bond market was becoming depressed as the macroeconomic stability indicators like exchange rates and inflation hits the sector. This study through its findings hence sought to suggest solutions to various stakeholders within the bond market sector.

For policymakers, encompassing government entities, Retirement Benefits Authority (RBA), Central Bank of Kenya (CBK) and Capital markets Authority (CMA), the study holds significance. It is expected to provide a robust foundation for formulating fiscal and monetary policies geared towards fostering the rapid growth of bond markets in developing countries like Kenya. Additionally, it is expected to encourage the strategic leveraging of the untapped potential within the bond markets, thereby contributing to the general economic advancement. Furthermore, the research aimed to enhance understanding of the characteristics inherent in the Kenyan bond market, shedding light on how these traits are shaped by components of foreign exchange rate volatility, including rate of inflation, money supply, and prevailing interest rates, in the context of emerging markets.

This research also enhanced the current body of knowledge on the effects of ERV on the financial success of Kenya's bond market. This contribution established a basis for future

research analyzing the individual elements of exchange rate fluctuations and their wider impact on bond markets and the financial environment.

Scope of the study

The research centered on Bond Market Turnover at the NSE from 2013 to 2023. This formed the research time scope. The focus of this period was driven by the rapid weakening of the Kenyan shilling against hard currencies during this period. Further this period was focused because according to the Capital Markets Authority (2023) Treasury bond turnover has been fluctuating since 2013. Regarding the corporate bond turnover, 2013 turnover was Kshs. 1.86 billion but as of 2023, the corporate bond turnover was 0.02 billion which was the lowest for the thirteen-year period. This is why the current study examined this period. In terms of the contextual scope, the study focused on exchange rate volatility in bond markets. The exchange rate fluctuation was interrogated based on the money supply, rates of inflation, and interest rates. Financial performance of bond markets was examined based on the Bond market turnover within the research period.

Limitation of the study

The anticipated limitation was authenticity of research data. The study utilized secondary data; hence the challenge lied in ensuring that the data available online is authentic. To mitigate this obstacle, the researcher guaranteed that all data was obtained from original sources, including the KNBS, CBK, NSE, and other trustworthy entities.

Organization of the Study

The format of the study is divided into five sections as follows: Section one delineates the background of study, statement of problem, aims, research hypothesis, relevance, study scope, and study constraints. The second section includes the Conceptual framework and review of available literature. The third section delineates the study technique, encompassing sample size, the target audience, research design, operationalization and measurement of variables, data collecting, diagnostic tests, and ethical issues. Section four gives analysis of findings and the fifth section presented the study summary, conclusions and study recommendations.

RESEARCH METHODOLOGY

Research Design

It is the plan that guides data collection, and analysis (Cooper & Schindler, 2009). Causal research design was utilized during this research which is used when ascertaining the effect and cause associations among variables (Mugenda & Mugenda, 2013). Causal design is suitable for this research as it purposes to inquire the currency rate of exchange volatility effect on Kenya's bond market performance.

Target Population

A population comprises the entirety of factors pertinent to a researcher. This study encompasses all financial institutions traded on the NSE and the CBK, a principal bond issuer. The financial institutions will constitute listed banks, listed investment companies, listed insurance companies and Pension Funds. Therefore, the target population was 26 institutions. A census method was employed to the 26 institutions (Appendix I) that make up the units to be analyzed and financial statements of the firms made up observable units.

Empirical Model

The research will adopt a panel regression model. This model takes into account heterogeneity, gets individual specific estimates and allows for individual explicit variables. Thus, the financial performance as measured based on Bond Market Turnover was expressed as a function of exchange rate volatility variables (inflation, interest rates and money supply). The following model was used in the study.

BMT_{it} = $\beta 0 + \beta_1 X_{1it} + \beta_2 X_{2it} + \beta_3 X_{3it} + \epsilon_{it}$ Model 1 Whereby: BMT_{it} – Bond Market Turnover $\beta 0$ =Constant X_{1it} =Inflation X_{2it} =Interest rate X_{3it} =Money supply t =time period $\beta 1 - \beta 3$ = coefficients ϵ_{it} = Error term 2.4 Sampling Design

The study focused on 26 institutions including banks, pension firms, insurance firms, investment firms and government (through CBK) for the period 2010 to 2023. Therefore, a census method was the most preferable. Mugenda & Mugenda (2013) proposed this method in the case of a small population. The choice of these institutions was due to their involvement in bond market transactions. The list of the institutions is as per attached in Appendix I.

Operationalization and variables measurement

Table 3.1 presents measurement and how variables were operationalized.

Variable	Туре	Operationalization	Measurement	Measurement
				scale
Financial	Dependent	Performance in bond	Natural log of	Ratio
Performance	Variable	market in terms of the turnover	values of Bond Market Turnover	
Inflation	Indonandant	Pata of increase in	Inflation rate	Datia
Innation	Variable	rate of increase in average costs of commodities in an economy over a given time	innation rate	Kallo
Interest rates	Independent Variable	Rate charged to a borrower by a lender (financial institution) for the amount borrowed	CBK rate	Ratio
Money supply	Independent Variable	Total money value circulating within the economy over a given time	Natural log of Value of money supply	Ratio

Table 3.1: Operationalization and Variables measurement

Data Collection

The research utilized secondary data which spanned 14 years from 2010 to 2023. The data was collected for three weeks to ensure conclusive extraction of data.

Procedures for data collection

The Nairobi Securities Exchange listed commercial banks, CBK, RBA and CMA websites provide a source of Secondary data for the study using a data collection schedule. Specific data on the variables under study was mainly sourced from the regulatory reports and financial statements of the institution. A summarized data extracted is summarized on Appendix IV.

Data Analysis

Data analysis aims at generating results that can help in making inferences (Kothari, 2014). The analysis applied both inferential and descriptive. Descriptive statistics deals with mean and standard deviation (Kothari, 2014). Inferential analysis focused on panel regression. A 95%

confidence level was used in hypotheses testing. Further, Diagnostic tests was conducted to verify compliance with the assumptions of the CLRM.

Diagnostics Tests

Diagnostic tests for normality, multicollinearity, and homoscedasticity was conducted prior to drawing inferences and outcomes from the research. The intent of these tests was to make sure that the data is sufficient for analysis.

Normality test

Doonik Hansen test was done to check whether the data was distributed normally distributed. For the Doonik Hansen test, the null hypothesis (HO) assumes normal distribution. If p-values are >0.05 HO is not rejected and as a result the data can be used (Verbeek, 2012). Nonparametric tests were used if normality exists since they are distribution free tests.

Multicollinearity Test

Multicollinearity is where there is a high correlation among the predictor variables (Chris, 2008). It increases the variables' p-values in so doing cause inefficient estimates and poor inferences. The study adopts a variance inflation factor (VIF). The established threshold is that <10 demonstrate low degree of multicollinearity which is the acceptable tolerance level. In high multicollinearity, the greatly correlated variables would be transformed (Verbeek, 2012).

Homoscedasticity Test

It is conducted to ascertain if the errors' variance is constant over time. Breusch Pagan Godfrey test was employed based on Chris (2008). A P-value >.05 demonstrate that heteroscedasticity is absent hence implies that the residuals have homoscedasticity which is desired in good regression model. In the existence of heteroskedasticity, variables would be transformed to logs.

Autocorrelation Test

The test for autocorrelation was carried out and will aim at evaluating the degree to which similar variables are correlated across various observations used in the data (Greene, 2008). Autocorrelation problem may occur where a model used is not accurately specified. In conducting this test, a Durbin Watson (DW) Test was used. The DW test has a range from zero to four whereby a value close to two indicates less autocorrelation. A value close to zero or four shows positive and negative autocorrelation.

Stationarity Test

Stationarity was conducted to determine if the mean, variance and standard deviation varies over a given period. The Augmented Dickey-Fuller Test was employed in this analysis. In this test, the null hypothesis suggests that the variable has a unit root, whereas the alternative hypothesis suggests that the variable has no unit root. When a P value is <.05, the HO is discarded which implies that the variable has no unit root (Greene, 2008).

Hausman Specification Test

Hausman test is employed to choose if to use fixed or random model for analysis. The HO assumes random effect model while fixed effect is the alternative model (Sheytanova, 2015). Null hypothesis is rejected where p-value <.05 hence the favored model is fixed effect. If P-value > 0.05 a random effect model is preferred.

Ethical Considerations

The research complied with the ethical regulations pertinent to Kenyatta University. Specifically, a permit for research was obtained from NACOSTI which was utilized in institutional engagement for relevant data. Furthermore, all ethical requirements pertaining to research were strictly observed.

FINDINGS AND DISCUSSION

Descriptive Analysis

It focused on analyzing the means and standard deviations for the data collected for each variable. Descriptive analysis is presented on table 4.1.

Variable	Mean	Standard Deviation
Bond Market Turnover (Kshs' billions)	540.28	175.77
Average Inflation rate (percentage)	6.93	2.50
Annual CBK rate (Percentage)	9.73	2.98
Money Supply (Kshs' Billion)	3,134.57	1,404.14

Table 4.1: Descriptive data

Source: Data from research (2024)

As per Table 4.1, bond market turnover had a mean of Kshs. 540.28 billion over the period 2010 to 2023. The standard deviation (S.D) was 175.77. This implies that over the period 2010 to 2023, the average bonds (treasury and corporate bonds) reached Kshs. 540 billion. The standard deviation implies that there have been much variations in the value of bonds over the period. The results also imply that the average rate for inflation was 6.93 with a 2.50 standard deviation. The results imply that the rate of inflation in percentages has averaged 6.93 over the period 2010 to 2023. The standard deviation (>) also indicates that there have been fluctuations and variations of the rate over the period of study. As put forth by Mulwa (2013) the determinants of inflation are essential factors to consider when exploring various monetary policy blueprints to adopt. One of the foremost influencers of inflation is exchange rate volatility and the domestic prices' sensitivity level towards the volatility. Based on the findings it is apparent that there have been fluctuations in prices over the period of study.

The findings also indicate that the CBK annual rate which was applied in the research to measure the interest rates averaged 9.73 and S.D of 2.98. This suggests that the CBK rate has averaged 9.73 percent between 2010 to 2023. The standard deviation is also an indicator that

the period has seen much fluctuation in the rate over the period of study. As stated by Irungu, (2017) the IR volatility has been rising recently in comparison with past periods with its characteristic rigid ER regime albeit debates on the level of fluctuations High IR is an advantage to lenders within an economy in form of high returns hence they tend to attract foreign capital inflow.

Finally, the study findings indicate that the mean value of supply of money was 3,134.57 billion with a standard deviation of 1,404 billion. From the results it can be inferred that the average value of money supply was Kes 3,134 billion over the study period. The standard deviation is an indicator that the value of money supply has seen a lot of variations over the period of study. Hongmei (2021) found a significant favorable link between money supply and bond market turnover.

Diagnostic Tests

Before carrying out inferential analysis, diagnostic tests were done to ascertain if the data set met the assumptions. Tests for normality, multicollinearity, homoskedasticity, autocorrelation, stationary and Hausman specification test were carried out.

Normality Tests

Doonik Hansen test for normality was carried out to check if the data is normally distributed. For the Doonik Hansen test, the null hypothesis (HO) assumes normal distribution. Table 4.2 summarizes the results.

Variable	PR (Skewnes)	Pr (Kurtosis)	adjchi2	Prob>chi2			
Bond Market Turnover	0.740	0.145	2.35	0.307			
Inflation Rates	0.001	0.043	12.02	0.002			
Interest rates	0.707	0.816	0.19	0.908			
Money supply	0.898	0.163	2.08	0.356			
Multivariate normality test							
Doornik-Hansen chi2 (20) = 15.302 prob>chi2 = 0.084							

Table 4.2: Normality Test Results

The null hypothesis (HO) assumes data is distributed normally under the normality test. If p-values are >0.05 HO is not rejected and as a result the data can be used (Verbeek, 2012). Examining the findings in Table 4.2, the p value is .084 which is >.05 hence the Ho is not rejected indicating that the data was distributed normally.

Multicollinearity Tests

Multicollinearity test was conducted to ascertain the level of correlation among predictor variables. The Variance Inflation Factor (VIF) was used, and the findings summarized on Table 4.3.

Variable	VIF	1/VIF
Bond Market Turnover	1.98	0.505
Inflation	1.84	0.543
Interest rates	1.77	0.565
Money supply	1.92	0.521
Mean VIF	1.88	

The study adopted a variance inflation factor (VIF). The established threshold is that <10 demonstrate low degree of multicollinearity which is the acceptable tolerance level. As per the findings in Table 4.3, the VIF figures are <10 hence there was no multicollinearity problem in the data set.

Homeskedasticty Tests

Homoscedasticity test was conducted to ascertain if the errors' variance is constant over time. Breusch Pagan Godfrey test was employed, and table 4.4 presents the results.

Table 4.4: Homoscedasticity Test Results						
Breusch-Pagan / Cook-Weisberg test for heteroskedasticity						
Ho: Constant Variance						
Variables: Fitted values of Bond market turnover, Inflation rates, Interest rates, Money supply						
chi2 (1)	=	1.28				
Prob>chi2	=	0.2582				

Under the Breusch-Pagan test a P value >.05 demonstrate that heteroscedasticity is absent hence implies that the residuals have homoscedasticity which is desired in good regression model. From Table 4.4 results, it is apparent that the P values are >.05 which is an indication of an absence of heteroscedasticity.

Autocorrelation Tests

Autocorrelation test was conducted with the aim of evaluating the degree to which similar variables are correlated across various observations used in the data. The study used DW test, and table 4.5 shows the findings.

Bond Market	Coef.	Std. Err.	Т	p> t	[95% Cor	nf. Interval]	
Inflation	-0.768	0.279	-2.74	0.010	-0.197	1.339	
Interest rates	0.055	0.010	5.46	0.000	0.035	0.076	
Money supply	1.458	2.685	0.54	0.592	-4.052	6.968	
_Cons	0.609	0.055	1.10	0.274	-0.049	0.172	
Original Deathing Western Statistic 2 270							

Table 4.5: Autocorrelation Test Results.

Original Durbin-Watson Statistic 2.279

Transformed Durbin-Watson Statistic 2.001

DW statistic takes a range of between 0 to 4. Where autocorrelation is absent, the value will be 2.0. Values that are less than 2 indicate weak autocorrelation whereas values above 2 indicates strong autocorrelation. The DW statistic that is transformed is 2.001 as per table 4.5 findings hence autocorrelation did not exist.

Stationarity Tests

Stationarity test was conducted to determine if the mean, variance and standard deviation varies over a given period. The analysis utilized the ADF and the findings are presented in table 4.6 below.

		ADF Critical v		
	Test statistic	1%	5%	P Value
z(t)	-3.587	-4.159	-3.504	0.003
z(t)	-10.362	-4.168	-3.508	0.000
z(t)	-4.013	-3.520	-2.954	0.000
z(t)	-5.328	-4.024	-3.443	0.000

Table 4.6: Stationarity test Results

In the ADF test, the null hypothesis postulates that there is a unit root in the variable, while the alternative hypothesis posits that there is no unit root in the variable. When P value is <.05, we reject the null hypothesis, and this implies that there is no unit root in the variable. As per the results tabulated on Table 4.6, it can be concluded that the data set did not have a unit root hence did not have a stationarity problem.

Hausman Specification Test

Prior to carrying out an inferential analysis, a Hausman specification test was carried out to determine which model between the fixed effect or the random effect was employed. The section therefore presents findings for the Hausman test and panel regression output. Table 4.7 presents the Hausman specification test.

				Sqr.t (diag(v_b-			
	(b)	(B)	(b-B)	v_B)			
	Random	Fixed	Difference	S.E.			
Inflation	-1.321197	1.457716	-2.778913	7.722357			
Interest rates	4.032643	40.10629	-36.07364	1301.307			
Money supply	16.82794	-44.59323	61.42117	3,773.371			
Ho Test: Variance in coefficients is non-systematic							
	Chi2	=2.59					
	Prob>chi2=	0.4591					

 Table 4.7: Hausman Test results

Under the Hausman test, the Ho, the random effect model is preferred whereas the alternative hypothesis preferred model is the random effect model. If p value is <0.05, the Ho is discarded. As per the outcome in Table 4.7, the p value is >.05 hence the Ho was not rejected which indicated the appropriateness of the random effect model.

Inferential Analysis

The section discusses correlation test findings and the panel regression model results. The correlation test was conducted using the Pearson's test while the panel regression test was conducted using the random effect model.

Correlation Test

The correlation was done using the Pearson's correlation test and table 4.8 shows the outcomes.

	Bond Market			Money
	Turnover	Inflation	Interest rates	supply
Bond Market				
Turnover	1			
Inflation	-0.523*	1		
	0.005			
Interest rates	0.517*	0.265	1	
	0.001	0.087		
Money supply	0.287	-0.129	0.299	1
	0.107	0.459	0.081	

 Table 4.8: Correlation Analysis Results

Table 4.8 results indicates existence of an inverse and significant correlation involving inflation and bond market turnover (r=-.523, p<.05). The findings of the study are in tandem with that from past studies. For example, a study by Kobia (2018) established that inflation rates have a negative correlation with profitability as evidence by banks registering losses due to increase in the rates of inflation. Another study by Delani and Tugut (2020) also established an inverse correlation between bank performance and inflation rates. However, a study by Farah (2014) found that inflation rates did not have significant relationship with performance.

From the findings in Table 4.8, there is a significant and positive correlation between interest rates and bond market turnover (r=.517, p<.05). This means that as interest rates increase the bond market turnover increase significantly. Studies conducted before also established a positive correlation between financial performance and interest rates. For example, Ngure (2014) established a significant and positive correlation between financial performance and interest rates. Hossin and Mondol (2020) study discovered a favourable link between rates of interest and performance. A study by Sichoongwe (2016) however found that there was an inverse link between interest rates and performance albeit measured based on stock returns.

Finally, from the findings in Table 4.8, money supply and bond market turnover had a positive and insignificant correlation (r=-.287, p>.05). The findings are consistent with that of Zhang (2021) which found that money supply as one of the macroeconomic factors had a positive relationship with bond market performance. The findings by Schrank (2023) indicated that there is a noteworthy correlation between government bond yields and money supply implying that as the money supply increases, the government bond yield also increases. However, the

findings are not consistent with that of Yim and Huang (2019) which found that money supply and bond market performance has a significant relationship.

Panel Regression Analysis

The random effect model was used for Panel regression analysis and the results are shown on table 4.9.

R-sq: within $= 0.5542$				Obs per	group: min =	10
between = 0.6940				avg = 10).0	
overall = 0.6532				max =	10	
Bond Market	Coef.	Std. Err.	Т	p> t 	[95% Coi	nf. Interval]
Inflation	-0.768	0.279	-2.74	0.010	-0.197	1.339
Interest rates	0.055	0.010	5.46	0.000	0.035	0.076
Money supply	1.458	2.685	0.54	0.592	-4.052	6.968
_Cons	0.609	0.055	1.10	0.274	-0.049	0.172
sigma_u	44.543					
sigma_e	6.911					
Rho	0.976					



From the panel regression finding in Table 4.9, in its apparent that in the lack of the predictor variables (money supply, inflation and interest rates) the bond market turnover is at .609 times. The findings also indicate that the R2 (coefficient of determination) is 0.6532 implying that 65.3 percent of the changes in bond market turnover is explained by inflationary changes, rates of interest and supply of money. The findings are consistent with past studies which indicated that foreign exchange volatility has an influence on bond markets. A study by (Olabisi & Stein, 2015) found that foreign exchange volatility has an influence on bond markets albeit negatively. This means there is an inverse association between fluctuation in rates of exchange and bonds yields. An increase in bond yields may affect the government's ability to repay debt. In South Africa, there has been high currency fluctuation, and the government bond yields has been adversely influenced (Meyer & Hassan, 2020).

The first study objective was to examine the inflation impact on bond market turnover. The Ho was that there was no notable impact on bond market turnover due to inflation. From the findings in Table 4.8, there is an inverse and major correlation between inflation and bond market turnover holding other variables constant (r=-.768, p<.05). Therefore inferred that inflation has a major impact on bond market turnover. The study findings are consistent with that from past studies. For example, a study by Kobia (2018) established that inflation rates have a negative correlation with profitability as evidence by banks registering losses due to

increase in the rates of inflation. Another study by Delani and Tugut (2020) also established an inverse correlation between bank performance and inflation rates. However, a study by Farah (2014) found that inflation rates did not have significant relationship with performance.

The second research's objective was aimed at examining the interest rates effect on the bond market turnover. The null hypothesis was that interest rates have no major impact on bond market turnover. As per the findings in Table 4.9, it is apparent that bond market turnover and interest rates are significantly and positively related (r=.055, p<.05). The Ho was then rejected as the p value was <.05 and therefore inferred that interest rates has a significant effect on bond market turnover. A fundamental principle governing bonds is that their prices have an inverse relationship with interest rates. A rate rise makes bonds that are newly issued offers higher yields compared to bonds that already exist in the market. (Dhir, 2024). While rising interest rates may initially decrease the market value of existing bonds, they also create opportunities for reinvestment. When investors sell older bonds at a discount due to rising rates, they can reinvest that capital into new bonds that offer higher yields. Over time, this reinvestment can lead to an overall increase in returns for bond portfolios as investors capitalize on higher prevailing rates. Previous studies also established a positive relationship between interest rates and performance. For example, Ngure (2014) established a positive and significant correlation between rates of interest and performance from a financial perspective. Hossin and Mondol (2020) research found a favorable relationship between rates of interest and performance. A study by Sichoongwe (2016) however found an inverse relationship between rates of interest and performance when measured on stock returns.

Third objective aimed at analyzing the effects of money supply (MS) on bond market performance. The null hypothesis was that MS have noteworthy impact on bond market turnover. From the findings in Table 4.9, supply of money has a favorable effect on bond market turnover holding other factors constant (r=.458, p>.05). The Ho was not discarded since p > .05 hence the conclusion that MS has a non-major impact on bond market turnover. An increase in the money supply often stimulates demand for various financial assets, including bonds. Investors seeking returns may turn to bonds as a safer investment compared to equities or other riskier assets during harsh economic times or volatility. As demand for bonds rises due to increase liquidity in the market, bond prices go up while yields decline.

The findings are consistent with that of Zhang (2021) which found that money supply as one of the macroeconomic factors had a positive relationship with bond market performance. The findings by Schrank (2023) indicated a substantial correlation between money supply and yields on treasury bonds implying that as money supply increases, the government bond yield also increases. However, the findings are not consistent with that of Yim and Huang (2019) which found that money supply and bond market performance has a significant relationship.

SUMMARY, CONCLUSION AND RECOMMENDATIONS

Study Summary

The findings show that the R2 (coefficient of determination) is 0.653 implying that 65.3 percent of the changes in bond market turnover is explained by changes in inflation rates, Supply of money and interest rates.

The first study objective was to examine inflation impact on bond market turnover. The null hypothesis was there is no notable impact on bond market turnover because of inflation. From the findings in correlation analysis there is an inverse and significant correlation between inflation and bond market turnover (r=-.523, p<.05). The results from panel regression analysis indicated that there is an inverse and major correlation between inflation and bond market turnover holding other variables constant (r=-.768, p<.05). Since the p<.05, the Ho was discarded and therefore inferred that inflation has a major impact on bond market turnover.

The research's second objective was aimed at examining the interest rates impact on the bond market turnover. The Ho was that IRs have no significant effect on bond market turnover. From the correlation analysis, it was found that interest rates have a positive and significant correlation with the turnover in the bond market (r=.517, p<.05). This means that as interest rates increase the bond market turnover increase significantly. The panel regression analysis results indicated interest rates and bond market turnover have a positive significant relationship (r=.055, p<.05). The Ho was rejected as the p <.05 and therefore inferred that there is a significant effect on turnover in the bond market attributed interest rates.

The last objective was aimed at analyzing the impact of money supply on bond market performance. The HO was that MS has no significant effect on bond market turnover. From the findings in correlation analysis, money supply and bond market turnover had a positive and insignificant correlation (r=-.287, p>.05). The panel regression analysis indicates that money supply has a positive effect on bond market turnover holding other factors constant (r=.458, p>.05). The HO was not rejected since the p value is >.05 hence the conclusion that MS has a non-noteworthy effect on bond market turnover.

Study Conclusion

The study concludes that foreign exchange volatility components (inflation, interest rates and money supply) have a significant effect on bond market turnover. It also concludes that inflation has a major and negative correlation with bond market turnover hence an increase in inflation negatively and significantly influences bond market turnover.

The study further concludes that interest rates have an important and positive impact on bond market turnover implying that raise in interest rates results into an increase in bond market turnover holding other variables constant.

Finally, the study concludes that supply of money has a positive but insignificant effect on bond market turnover.

Study Recommendations

The study further recommends that investors should closely monitor inflation rates. Understanding these factors can assist investors make well-versed decisions about when to enter or exit foreign bond positions based on anticipated changes in currency values. Investors can also use financial instruments like forward contracts, options, or futures, to guard against unfavorable movements. This strategy helps ensure that inflationary effects do not erode the returns from the bond investment.

Regarding the significance of interest rates in bond markets, the study recommends that in volatile markets, focusing on short-term bonds may be advantageous as they typically have less sensitivity to interest rate changes compared to long-term bonds. Additionally, extending duration strategically during periods of expected rate cuts can enhance returns while managing risks associated with foreign exchange fluctuations

Based on the study, the findings, this study will provide a robust foundation for formulating fiscal and monetary policies geared towards fostering the rapid growth of bond markets in developing countries like Kenya. Additionally, it is expected to encourage the strategic leveraging of the untapped potential within the bond markets, thereby contributing to the general economic development of the nation. This research also enhances the current empirical literature on the impact of currency rate fluctuations on the financial success of Kenya's bond market.

The study recommends that future studies examine the relationship between foreign exchange volatility and listed firms the financial performance, using indicators such as profitability and return on investments within the Kenyan market.

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