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DETERMINANTS OF BOND MARKET INDEX AT THE NAIROBI SECURITIES EXCHANGE IN KENYA

HENRY LONGEI, ABDALLAH ALI

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Henry Longei^{*1}, Abdallah Ali²

^{*1} Jomo Kenyatta University of Agriculture and Technology P.O BOX 81310-80100, Mombasa, Kenya

² Jomo Kenyatta University of Agriculture and Technology P.O BOX 81310-80100, Mombasa, Kenya

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ABSTRACT

This study evaluated the determinants of the bond index at the N.S.E. The study evaluated the effects of key variables namely, interest rate, inflation and exchange rate on the market index of bonds at the N.S.E. The effect of the changes of each of the above variables on the market index was determined. The researcher employed a descriptive research design. The target population comprised of 42 investment Banks and 21 Stock Brokers at the NSE. For each category, 2 staff members were selected. Therefore a sample size of 96 staff members was chosen. The study adopted a regression of the variables against the market index of the N.S.E. The data from the study was analysed quantitatively using SPSS software version 22. Ms Excel was used to generate trend lines. The data analysed were represented using tables, graphs and pie charts in a more detailed and comprehensive manner for easy interpretation of information. The study revealed that interest rate, inflation and exchange rate were found to be satisfactory variables in bond market index. This was supported by coefficient of determination of 46.2%. Regression of coefficients results indicated that interest rate and Bond market index were negatively and significantly related ($r=-0.216$, $p=0.006$). Further, regression results showed that inflation and Bond market index were negatively and significantly related ($r=-0.146$, $p=0.030$). Trend analysis results indicate that inflation and bond market index were inversely related. Finally, Regression results indicated that exchange rate and Bond market index were negatively and significantly related ($r=-0.186$, $p=0.011$). A trend analysis between exchange rate and bond market index indicated that exchange rate and bond market index were inversely related. Based on the findings the study concluded that interest rate, inflation and exchange rate were key determinants of bond market index at the Nairobi Securities Exchange. The three variables were found to have an inverse relationship with bond market index. This study found that interest rate, inflation and exchange rate affected bond market index. It was therefore recommended that the Central Bank of Kenya identifies policy intervention to cab this situation.

Key terms: bond, Bond Market Index, Capital market, Co-integration, financial asset, Interest rate, Inflation, Exchange rate

INTRODUCTION

One way a company can raise capital to finance growth and expansion is by way of issuing debt. In issuing debt, the company borrows from various sources (Cournède, & Denk, 2015). A bond is a debt instrument and normally a cheaper source due to tax relieve on its interest. Most middle and lower income countries in Africa have developed corporate bond market in the national policy agenda (Irving, 2010). Bond holders are creditors and have a higher claim on company assets.

Bonds are normally transacted at the exchange. Capital market plays a vital role in trading of bonds. A capital market is a major barometer in measuring aggregate performance of the economy (Nzotta & Okereke, 2009). Evidence shows that there is a direct correlation between the levels of development of a nation's capital market and the social economic development (Ogunmuyiwa, 2010).

In the 1980, the Government of Kenya first launched a bid to use treasury bonds (Ngugi, 2009). Corporate bonds in Kenya were first issued on 8th November 1996 (East Africa Developed Bank), Ngugi, (2009). The Government of Kenya is tapping the country's digital finance prowess to raise critical infrastructure funds. The National Treasury has teamed up with a local mobile money pioneer Safaricom, to launch the so-called M-Akiba bond. It is the first government security carried exclusively on mobile phones. M-Akiba is a national economic solution that has the potential of filling-in for foreign investment (Allen, 2015).

The extent to which fiscal spending in finance through treasury bonds and bills and the degree to which this sustains a critical level of supply of government debt securities has important implication for the development of Kenya's economy. For Corporates bonds, market help reduce the cost of financing first by allowing institution to borrow direct from investors (disintermediation) and secondly by reducing the

maturity risk and currency mismatch in the books of account, (Ngugi, 2009)

Bonds in Kenya market are traded on a separate bond market known as Fixed Income Securities Board FISB (Ngugi, 2009). To list at the N.S.E. a company needs to register under the company's Act and be limited by shares with minimum capital of 50 million and net asset of 100 million as guarantee. N.S.E. automated trading at the exchange in November 2009. The automated trading on government bonds made a significant step in the efforts of N.S.E. and C.B.K. towards creating debt in capital market by providing the necessary liquidity (N.S.E. Handbook, 2013) to Kenya as an emerging economy in Africa. Kenya's stock market performance is highly depended on the nature of macroeconomic variables , (Othiambo, 2012). The participants in the debt market are usually Institutional Investors made up of pension funds, banks and unit trusts, government and individual investors. Trading in Bonds in Kenya is governed by rules and regulations set by N.S.E. and C.M.A.

To list at the N.S.E. and issue bond, a corporate organization needs to be registered under the companies Act and limited by shares. The bond to be issued must be freely transferable. Financial theory suggest that, as financial market becomes more liberised, there has been a close relationship between stock returns and macroeconomic variables including interest rates, exchange rate, gross domestic product (G.D.P.) inflation, money supply (Kirui, 2014) .These variables have been viewed as the most important determinants of stock market behavior as they are all used to describe the state of macro economy that the investor must monitor and forecast in order to make choices regarding their investment decisions (Junkin, 2012).

This research undertakes to establish whether the following variables have an effect on bond index at the N.S.E. These variables are interest rate, exchange rate and inflation. When there is a rise in interest rate and opportunity cost goes up,

individual investors would prefer to invest in non – fixed income securities such as bonds (Adam and Juenebond, 2008). There is a clear indication that there exists interrelation among stock market, interest rate and exchange rate (Kirui, 2014).

Diebold and Rudebusch (2013) examined the correlation between Nelson - Siegel yield factor and macroeconomic variables. The study revealed that the level factor is highly correlation with inflation. Bauer and Neely (2014) found that inflation surprises have a large effect on the level of the yield curve. Better interest rate forecast are obtained in an affine model in which macro factors are added to the usual factors. (Kirui, 2014).

Muthike and Sakwa (2012) , explains that currency volatility has some effects on stock returns, When currency appreciate, in a situation where the county is export -oriented, it is expected that there will be a reduction in the competitiveness of her export, and would therefore have a negative impact on the domestic stock market. This is because the export oriented companies quoted at the stock exchange would be less profitable and this may in turn become less attractive to investors.

Maghyreh (2002) investigated the long-run relationship between the Jordanian stock prices and selected macroeconomic variables, again by using Johansen's (1988), cointegration analysis and monthly time series data for the period from January 1987 to December 2000. The study showed that macroeconomic variables were reflected in stock prices in the Jordanian capital market.

Gunasekarage, Pisedtasalasai and Power (2004), examined the influence of macroeconomic variables on stock market equity values in Sri Lanka, using the Colombo All Share price index to represent the stock market and (1) the money supply, (2) the treasury bill rate (as a measure of interest rates), (3) the consumer price index (as a

measure of inflation), and (4) the exchange rate as macroeconomic variables.

Most studies on securities at the N.S.E. has concentrated on stocks, little studies has been done on the bond market at N.S.E. The result of studies by Greenwood and Vayanos, (2010), Krishnamurthy and Vissing-Jorgensen, (2011) and Hall and Sargent (2011) pointed to a negative relationship between interest rate and bond prices. Researches have been done to try and establish whether there is a positive relationship between exchange rate and stock prices. Mukhejee and Nakia (1995), their study established that with the rise in demand in the economy, the stock market level is also pushed up, suggestion that stock market returns are positively connected to the charges in the exchange rate.

Studying the determinants of bond index at the N.S.E. is an essential area that requires more attention from researchers. This research seeks to establish the determinants of bond index at the N.S.E. by focusing on macroeconomic variables of interest, inflation & exchange rate. The researcher will try to establish whether there is a negative relationship between interest rates and bond index for the following reasons: First, interest rates can influence the level of corporate profits which in turn influence the price that investors are willing to pay for the stock through expectations of higher future dividends payment. A reduction in interest rates reduces the costs of borrowing thus serves as an incentive for expansion. This will have a positive effect on future expected returns for the firm; secondly as substantial amount of stocks are purchased with borrowed money, hence an increase in interest rates would make stock transactions more costly. Investors will require a higher rate of return before investing. This will reduce demand and lead to a price depreciation.

The results of studies by Greenwood and Vayanos, (2010), Krishnamurthy and Vissing-Jorgensen, (2011) and Hall and Sargent (2011) pointed to a

negative relation between inflation and stock prices. The researcher will try and establish whether an increase in the rate of inflation is likely to lead to economic tightening policies, which in turn increases the nominal risk-free rate and hence raises the discount rate. A depreciation of the Kenyan shilling will lead to an increase in demand for Kenya's exports and thereby increasing cash flows to the country. Alternatively, if the Kenya shilling is expected to appreciate, the market will attract investments. This rise in demand will push up the stock market level, suggesting that stock market returns will be positively correlated to the changes in the exchange rates (Mukherjee & Naka, 1995).

The impact of exchange rate changes on the economy will depend to a large extent on the level of international trade and the trade balance. Hence the impact was determined by the relative dominance of import and export sectors of the economy.

Study Objectives

- To establish whether interest rate has an effect on bond index at N.S.E.
- To establish whether inflation has an effect on bond index at the N.S.E
- To establish whether exchange rate has an effect on bond index at the N.S.E.

RELATED LITERATURE

Theoretical Framework

There were three main theories that were relevant for this study in terms of understanding, measuring and managing determinant of bond index.

Asset Approach Theory of Exchange Rate

According to Frenkel (1976), modern exchange rate models emphasize financial-asset markets. Rather than the traditional view of exchange rates adjusting to equilibrate international trade in goods, the exchange rate is viewed as adjusting to

equilibrate international trade in financial assets. Because goods prices adjust slowly relative to financial asset prices and financial assets are traded continuously each business day, the shift in emphasis from goods markets to asset markets has important implications.

Exchange rates change every day or even every minute as supplies of and demands for financial assets of different nations change. An implication of the asset approach is that exchange rates should be much more variable than goods prices. This seems to be an empirical fact. Such figures are consistent with the fact that exchange rates respond to changing conditions in financial-asset markets and are not simply reacting to changes in international goods trade.

Exchange rate models emphasizing financial-asset markets typically assume perfect capital mobility. In other words, capital flows freely between nations as there are no significant transactions costs or capital controls to serve as barriers to investment. Within the family of asset-approach models, there are two basic groups: the monetary approach and the portfolio-balance approach.

In the monetary approach the exchange rate for any two currencies is determined by relative money demand and money supply between the two countries. Relative supplies of domestic and foreign bonds are unimportant. The portfolio-balance approach allows relative bond supplies and demands as well as relative money-market conditions to determine the exchange rate. The essential difference is that monetary-approach (MA) models assume domestic and foreign bonds to be perfect substitutes, whereas portfolio-balance (PB) models assume imperfect substitutability. If domestic and foreign bonds are perfect substitutes, then demanders are indifferent toward the currency of denomination of the bond as long as the expected return is the same. In this case, bond holders do not require a premium to hold foreign bonds—they would just as soon hold foreign bonds as domestic ones—so

there is no risk premium, and uncovered interest rate parity holds in MA models.

With imperfect substitutability, demanders have preferences for distributing their portfolio over the assets of different countries. That is, asset holders have a desired portfolio share for any particular country's assets due to the portfolio diversification. If the supply of one country's assets increases, they will hold a greater proportion of that country's assets only if they are compensated. This requires a premium to be paid on these assets.

In general, then, PB models have risk premiums in the forward exchange rate that are a function of relative asset supplies. As the supply of country *A*'s financial assets rises relative to *B*'s, there will be a higher premium paid on *A*'s assets. An implication of this premium is that uncovered interest rate parity will not hold because risk premiums will exist in the forward market. This premium is missing in the MA model because there it is assumed that investors don't care whether they hold country *A* or country *B* bonds or in what mix they are held. We might guess that the PB approach is more relevant if we doubt the MA assumption of perfect substitutability of assets internationally. In such cases, we would view the exchange rate as being determined by relative supplies of domestic and foreign bonds as well as domestic and foreign money.

Segmented Markets Theory

This theory assumes that markets for different-maturity bonds are completely segmented. The interest rate for each bond with a different maturity is then determined by the supply of and demand for the bond with no effects from the expected returns on other bonds with other maturities. In other words, longer bonds that have associated with them inflation and interest rate risks are completely different assets than the shorter bonds. Thus, the bonds of different maturities are not substitutes at all, so the expected returns from a bond of one maturity has

no effect on the demand for a bond of another maturity.

The Liquidity Premium Theory

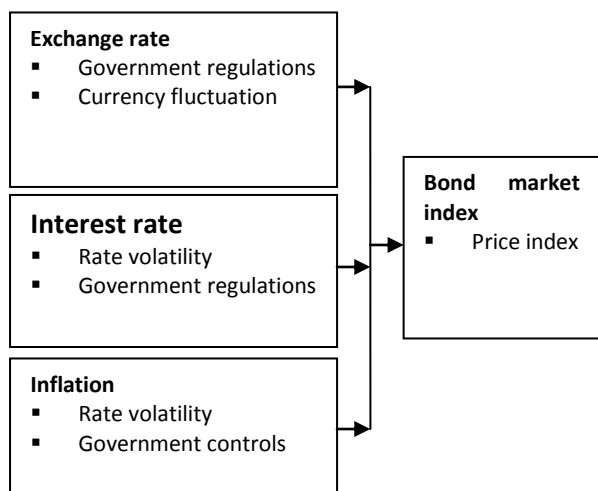
Uncertainty about inflation creates uncertainty about a bond's real return, making the bond a risky investment. The further we look into the future, the greater the uncertainty about the level of inflation, which implies that a bond's inflation risk increases with its time to maturity. Interest-rate risk arises from a mismatch between investor's investment horizon and a bond's time to maturity. If a bondholder plans to sell a bond prior to maturity, changes in the interest rate generate capital gains or losses. The longer the term of the bond, the greater the price changes for a given change in interest rates and the larger the potential for capital losses. As in case of inflation, the risk increases with the term to maturity, so the compensation must increase as with it.

The buyer of long-term bonds would require compensation for the risks they are taking buying long-term bonds. The liquidity premium theory views bonds of different maturities as substitutes, but not perfect substitutes. Investors prefer short rather than long bonds because they are free of inflation and interest rate risks. Therefore, they must be paid positive liquidity (term) premium, to hold long-term bonds. The yield, therefore, has two parts, one that is risk free and another that is a premium for holding a longer-term bond. Liquidity premium theories produce yield curves that more steeply upward sloped.

Like the expectations theory, the liquidity premium theory predicts that interest rates of different maturities will move together because the long-term rates are essentially tied to the short-term rates. Long rates will also be less volatile because part of the long rate, which is just an average of the short rates, will smoothen out the volatility in the short rates. And finally, since the risk premium increases with time to maturity, the liquidity premium theory tells us that the yield

curve will normally slope upwards, only rarely will it lie flat or slope downwards.

Conceptual framework



Independent Variables Dependent Variable

Figure 1: Conceptual Framework

Interest rate

Investors who own fixed income securities should be aware of the relationship between interest rates and a bond's index. As a general rule, the price of a bond moves inversely to changes in interest rates: a bond's price will increase as rates decline and will decrease as rates move up. Bonds can also be classified into Fixed Rate and Floating Rate Bonds. A bond whose interest rate stays the same over its lifespan is referred to as a fixed interest bond. A bond whose interest rate varies periodically over its life span is referred to as a floating interest bond. The changes in rates usually reflect economic conditions. A floating rate is usually pegged to another economic indicator such as Treasury bill rates or even inflation and is determined using a prescribed formula (Ross, et al, 2002).

Ajayi et al. (1998) observed that when the stock prices decrease, it is expected that the wealth of the domestic investors also go down. Moreover, it may also lead to a lower demand for money hence interest rate decreases. *Ceteris paribus*, the lower the interest rates the higher the stock

prices. Higher stock prices may in turn lead to a surge in capital outflows. This will lead to depreciation of domestic currency. This is a clear indication that there exists interrelationship among stock market, interest rate, and exchange rate.

In Kenya, interest rates have been rising and falling depending on the economic situation of the economy. Changes in the official rate also affect the market value of securities, such as bonds and equities. The price of bonds is inversely related to the long-term interest rate, so a rise in long-term interest rates lowers bond prices, and *vice versa* for a fall in long rates. If other things are equal (especially inflation expectations), higher interest rates also lower other securities prices, such as equities. This is because expected future returns are discounted by a larger factor, so the present value of any given future income stream falls. Other things may not be equal for example, policy changes may have indirect effects on expectations or confidence.

Inflation

A high inflation rate raises the cost of living and results to a shift of resources from investments to consumption. The demand for market instruments falls leading to reduction in the volume of stock traded. This will force the monetary policy authorities to respond to the increased rate of inflation with economic tightening policies, which in turn increases the nominal risk-free rate and hence raises the discount rate in the valuation model (Adam & Twenoboa, 2008). Nominal contracts that disallow the immediate adjustment of the firm's revenues and costs prevent cash flow to grow at the same rate as inflation (DeFina, 1991).

Kenyan economy has witnessed some significant changes in inflation over time. Consumer Price Index (CPI) increased by 0.95 percent from 137.96 to 139.28 in April 2013 (Republic of Kenya, 2013). There was subsequent effect on stock returns as a result of these changes.

An efficient capital market is one in which security prices adjust rapidly to the arrival of new information and, therefore, the current prices of securities reflect all information about the security. What this means, in simple terms, is that no investor should be able to employ readily *available information* in order to predict stock price movements quickly enough so as to make a profit through trading shares. Championed by Fama (1970), the efficient market hypothesis (EMH), in particular semi-strong form efficiency, states that stock prices must contain all relevant information including publicly available information, has important implications for policy-makers and the stock-broking industry alike. Islam and Watanapalachaikul (2003) showed a strong, significant long-run relationship between stock prices and macroeconomic factors (interest rate, bonds price, foreign exchange rate, price-earnings ratio, market capitalization, and consumer price index) during 1992-2001 in Thailand.

Exchange Rates

Kirui (2014), concludes that empirical evidence shows that there is a negative relationship between stock returns and the exchange rate. His conclusion is that exchange rate affects stock returns. Other macroeconomic variables were not important in explaining stock returns. One standard deviation shock to the first differenced value of log of exchange rate negatively affected stock returns. This is evidence that stock returns were negatively related to changes in exchange rates.

The currency volatility has effects on the stock returns. When currency appreciates, in a situation where the country is export-oriented, it is expected that there will be a reduction in the competitiveness of her exports, and would therefore have a negative impact on the domestic stock market. This is because the export-oriented companies quoted on the stock exchange market would be less profitable and this may in turn become less attractive to investors (Muthike &

Sakwa, 2012). The opposite happens in a scenario where currency depreciates as exports become competitive. The witnessed fluctuations in Kenya shilling will have an effect on the stock prices depending on whether it appreciates or depreciates. As of May 16th 2013 the Kenya shilling exchange rate remained fairly stable against major international world currencies. The Kenya shilling firmed up against US Dollar to trade at an average rate of Ksh 83.81 (Republic of Kenya, 2013). This change in exchange rates may have a bearing on stock returns in NSE depending on the behavior of currency, whether it appreciates or depreciates.

Through the employment of Hendry's (1986) approach which allows making inferences to the short-run relationship between macroeconomic variables as well as the long-run adjustment to equilibrium, they analysed the influence of interest rate, inflation, money supply, exchange rate and real activity, along with a dummy variable to capture the impact of the 1997 Asian financial crisis. The results confirmed the influence of macroeconomic variables on the stock market indices in each of the six countries under study, though the type and magnitude of the associations differed depending on the country's financial structure.

Islam (2003) examined the short-run dynamic adjustment and the long-run equilibrium relationships between four macroeconomic variables (interest rate, inflation rate, exchange rate, and the industrial productivity) and the Kuala Lumpur Stock Exchange Composite Index. His conclusions were similar: there existed statistically significant short-run (dynamic) and long-run (equilibrium) relationships among the macroeconomic variables and the KLSE stock returns.

Bond Market Index

The financial markets are made up of millions of individual stocks, bonds, derivatives, other financial securities and currencies. Financial

market indices aggregate vast amounts of price and other information about subsets of financial markets which, amongst other things, help investors keep track of broad market developments. Financial market indices represent a way of measuring the performance of a particular segment of a financial market. The performance of these indices, and many others, is monitored closely by investors, central banks and other regulators, and by the mainstream media and other regulators (Clare & Thomas, 2015).

Because financial market indices are often based upon very large numbers of securities, they can be seen as a barometer for both the related financial market and the wider economy. For example, the performance of both equity and government bond indices are often seen as good proxies for underlying economic conditions, or at least sentiment about economic conditions.

Nearly all central banks analyse the performance of broad financial market indices in their regular assessments of the health of their respective economies, Clare and Thomas, 2015. The Nairobi Securities Exchange has partnered with FTSE, a British company to provide FTSE-NSE Kenyan Shilling Government Bond Index. The index will be important for tracking performance as well as tracking risk. The yield curve is just a line with yields and duration. An index has one number that goes up and down and it is easier to track than a whole line full of yields. The yield curve, which maps the interest rates and the duration of the bond, is what has been used by investors to track their performances at the NSE The East African, 2012.

The Financial Times termed the Kenyan bonds market “arguably the most developed local bond market,” where the governments bonds make up the big offerings but other firms are also quick to issue them. Turnover in 2010 raced o Ksh966

billion (\$11.5 billion) helped by the trading system and very low interest rates. In June 2011, it was Ksh891billion (\$10.6 billion) despite high interest rates and runaway inflation. The East African, 2012.

METHODOLOGY

The researcher employed descriptive research design. According to Sekaran and Bougie (2011) descriptive study is undertaken in order to ascertain and be able to describe the characteristics of the variable of interest in a situation. The research model is as follows;

$$\text{Bond market index (Y)} = a + b_1x_1 + b_2x_2 + b_3x_3 + e$$

Where;

Y is Bond market index

a is a constant

b_1, b_2, b_3 are regression coefficient

x_1 , is interest rate

x_2 , is inflation

x_3 , is exchange rate

e is error term

FINDINGS

Descriptive Statistics

This section provided results on measures of central tendency of independent variables. Table 1 showed the results of the study. The results showed that the overall mean inflation was 10.23636 from the year 2006 to 2016. The minimum and the maximum inflation rate was 4.0 for the year 2010 and 26.2 for the year 2008 respectively. Its standard deviation was 6.2327 users which indicated that the inflation was varying across the years 2006 to 2016.

Table 1: Descriptive Statistics

Variable	Observations	Minimum	Maximum	Mean	Std. Deviation
Inflation	11	4	26.2	10.23636	6.2327
Exchange rate (Us Dollar)	11	66.766	101.485	82.95673	11.16286
Interest rate	11	3.6097	12.7525	8.231318	2.299495
Bond Market index	11	95	135	114.55	11.716

The overall mean for exchange rate was 82.95673. The minimum exchange rate was 66.766 for the year 2007 while the maximum exchange rate was 101.485 for the year 2016. Its standard deviation was 11.16286 which indicate that the exchange rate was varying across the years.

Further, the results showed that the overall mean for interest rate was 8.231318 from the year 2006 to 2016. The minimum and the maximum interest rate was 3.6097 for the year 2010 and 12.7525 for the year 2012. Its standard deviation was 2.299495 which indicate that the interest rate was varying across the years.

Finally, the results also showed that the overall mean for bond market index was 114.55 for the year 2006 to 2016. The minimum and the maximum bond market index from the year 2006 to 2016 was 95 and 135 respectively. Its standard deviation was 11.716 which shows that bond market index varied across the year 2006 to 2016.

Trend Analysis

Interest rate for the years 2006-2016

Figure 2 indicated the general trend for interest rate 2006 to 2016. The trend line showed that interest rate was varying across the years 2006 to 2016. The rate of interest was low at 3.6097 for the year 2010 and high at 12.7525 for the year 2012. The trend line showed that rate of interest varied across the years.

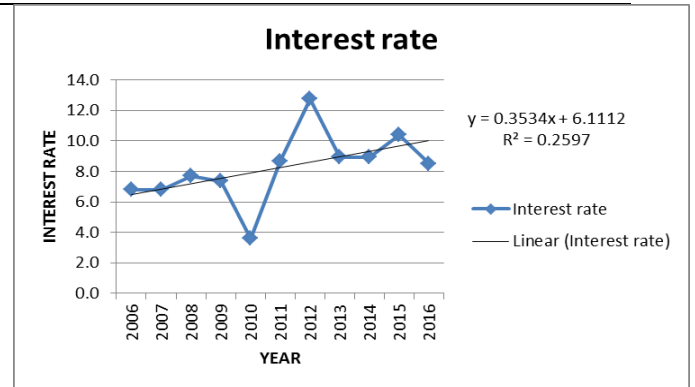


Figure 2: Interest rate

Source: Research Findings

Further, the study sought to relate growth of interest rate and bond market index for the years 2006 to 2016. A trend analysis of the two variables was plotted. Results are shown in figure 3. Results indicated that interest rate and bond market index were inversely related. This means that as bond market index increases, interest rate decreases and vice versa. Therefore, interest rate and Bond market index were negatively and significantly related. Bond Prices and Interest Rates move inversely, that is, in the opposite direction. Falling rates caused bond prices to rise and rising rates caused bond prices to fall.

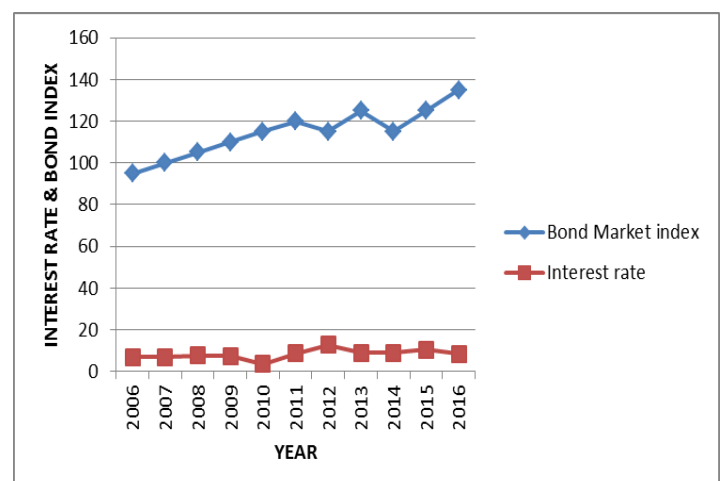


Figure 3: Interest rate and Bond market index

Exchange rate from the year 2006-2016

Figure 4 indicated the general trend for exchange rate 2006 to 2016. The trend line showed that exchange rate was varying across the years 2006 to 2016. The rate of exchange was low at 66.766 for the year 2006 and high at 101.485 for the year 2016. The trend line shows that exchange rate has been growing steadily since 2006.

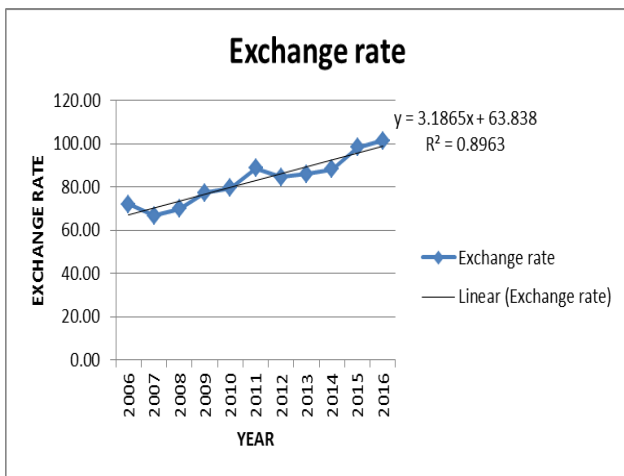


Figure 4: Exchange rate

Further, the study sought to relate changes in exchange rate and bond market index for the years 2006 to 2016. A trend analysis of the two variables was plotted. Results are shown in figure 5. Results indicate that exchange rate and bond market index were inversely related. This means that as bond market index increases, exchange rate decreases and vice versa. Therefore, exchange rate and Bond market index are negatively and significantly related.

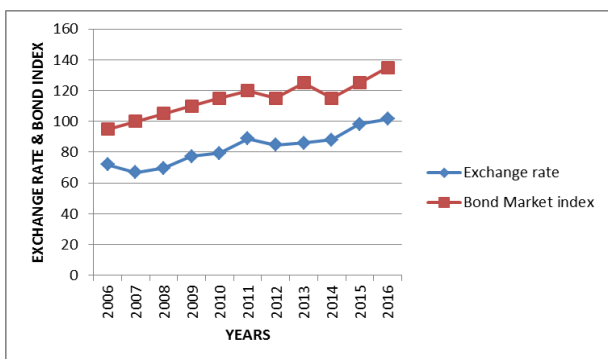


Figure 5: Exchange rate and Bond market index

Inflation rate for the years 2006-2016

Figure 6 indicated the general trend for inflation for the years 2006 to 2016. The trend line shows that rate of inflation was varying across the years 2006 to 2016. The rate of inflation was low at 4.0 for the year 2010 and 26.2 for the year 2008 respectively. The trend line shows that inflation rate has been decreasing gradually since the year 2006.

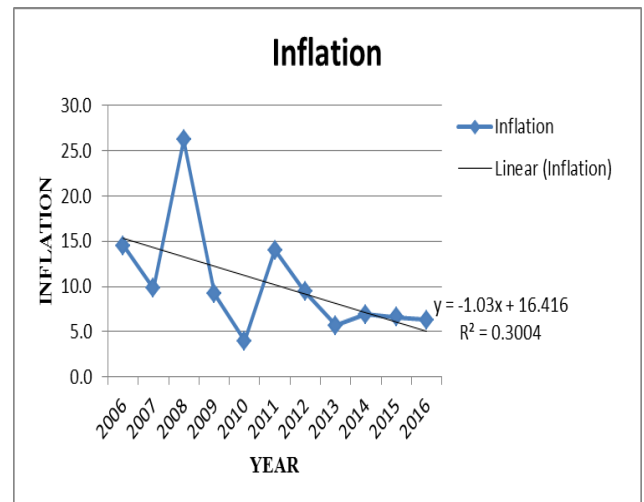


Figure 6: Inflation

Further, the study sought to indicate rate of inflation and bond market index for the years 2006 to 2016. A trend analysis of the two variables was plotted. Results are shown in figure 7. Results indicate that inflation and bond market index were inversely related. This means that as bond market index increases, rate of inflation decreases and vice versa. Therefore, inflation rate and Bond market index are negatively and significantly related.

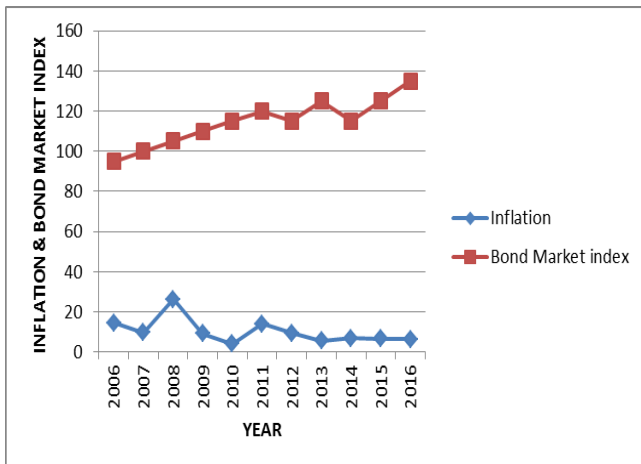


Figure 7: Inflation and Bond market index

Bond market index for the years 2006-2016

Figure 8 indicated the general trend for bond market index for the years 2006 to 2016. The trend line shows that bond market index has been growing steadily from the year 2006 to 2016. The trend line also shows that bond market index has been varying across the years.

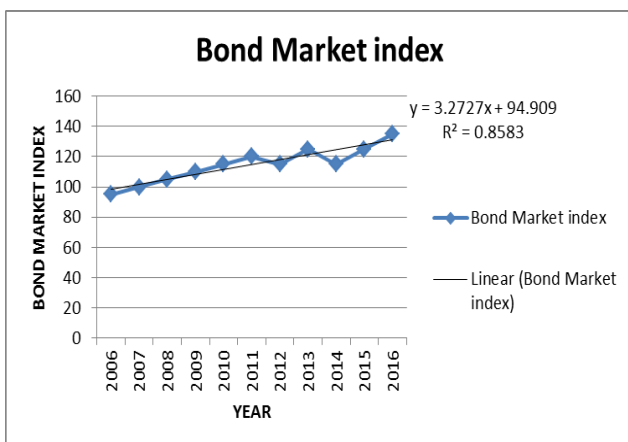


Figure 8: Bond market index the years 2006-2016

Source: Research Findings

Further, the study sought to show rate of inflation, exchange rate, interest rate and bond

Table 2: Hypothesis testing for Interest rate

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error			
(Constant)	4.275	.179		23.942	.000
Interest rate	-.420	.061	-.601	-6.933	.000

market index for the years 2006 to 2016. A trend analysis of the four variables was plotted. Results are shown in figure 9. Results indicate that rate of inflation, exchange rate; interest rate and bond market index were inversely related.

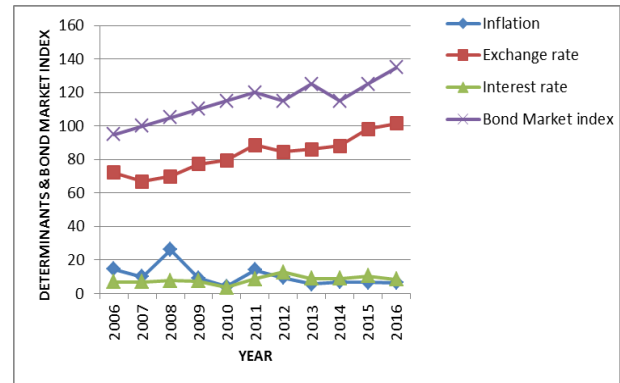


Figure 9: Determinants of Bond market index

Hypothesis testing

Hypothesis testing for Interest rate

The first Hypothesis to be tested was:

H₀₁: There is no significant relationship between interest rate and bond index at the Nairobi Securities Exchange

The hypothesis was tested by using simple linear regression and determined using t-value (Table 2). The acceptance/rejection criteria was that, if the p value is greater than 0.05, we fail to reject the H₀₁ but if it's less than 0.05, the H₀₁ is rejected. The null hypothesis was that there is no significant relationship between interest rate and bond index at the Nairobi Securities Exchange.

Results in Table 2 showed that the p-value was 0.000. This was supported by a calculated t-statistic of -6.933 (taken as absolute value of 6.933) which was larger than the critical t-statistic of 1.96. The null hypothesis was therefore rejected. The study therefore adopted the alternative hypothesis that there is a significant relationship between interest rate and bond index at the Nairobi Securities Exchange.

Hypothesis testing for Inflation

The first Hypothesis to be tested was:

Table 3: Hypothesis testing for inflation

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error			
(Constant)	4.131	.177		23.332	.000
Inflation	-.351	.057	-.556	-6.169	.000

Results in Table 3 showed that the p-value was 0.000. This was supported by a calculated t-statistic of -6.169 (taken as absolute value of 6.169) which is larger than the critical t-statistic of 1.96. The null hypothesis was therefore rejected. The study therefore adopted the alternative hypothesis that there is a significant relationship between inflation and bond index at the Nairobi Securities Exchange.

Hypothesis testing for Exchange rate

The first Hypothesis to be tested was:

Table 4: Hypothesis testing for Exchange rate

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error			
(Constant)	4.203	.186		22.614	.000
Exchange rate	-.395	.063	-.561	-6.251	.000

Results in Table 4 show that the p-value was 0.000. This was supported by a calculated t-statistic of -6.251 (taken as absolute value of 6.251) which was larger than the critical t-statistic of 1.96. The null hypothesis was therefore rejected. The study therefore adopted the alternative hypothesis that there is a significant

Table 5: Correlation matrix

H₀₁: There is no significant relationship between inflation and bond index at the Nairobi Securities Exchange

The hypothesis was tested by using simple linear regression and determined using t-value (Table 3). The acceptance/rejection criteria was that, if the p value is greater than 0.05, we fail to reject the Ho₁ but if it's less than 0.05, the Ho₁ is rejected. The null hypothesis was that there is no significant relationship between inflation and bond index at the Nairobi Securities Exchange.

H₀₁: There is no significant relationship between exchange rate and bond index at the Nairobi Securities Exchange

The hypothesis was tested by using simple linear regression and determined using t-value (Table 4). The acceptance/rejection criteria was that, if the p value is greater than 0.05, we fail to reject the Ho₁ but if it's less than 0.05, the Ho₁ is rejected. The null hypothesis was that there is no significant relationship between exchange rate and bond index at the Nairobi Securities Exchange.

relationship between exchange rate and bond index at the Nairobi Securities Exchange.

Correlation matrix

The study sought to establish the association among the study variables. The results are as presented in Table 5.

		Interest rate	inflation	Exchange rate	Bond market index
Interest rate	Pearson Correlation	1.000	.608**	.574**	-.601**
	Sig. (2-tailed)		0.000	0.000	0.000
Inflation	Pearson Correlation	.608**	1.000	.518**	-.556**
	Sig. (2-tailed)	0.000		0.000	0.000
Exchange rate	Pearson Correlation	.574**	.518**	1.000	-.561**
	Sig. (2-tailed)	0.000	0.000		0.000
Bond market index	Pearson Correlation	-.601**	-.556**	-.561**	1.000
	Sig. (2-tailed)	0.000	0.000	0.000	

(Source: Author 2017)

The results in Table 5 indicated that interest rate and bond market index were negatively and significantly related ($r = -.601$, $p = 0.000$). Further, correlation results showed that inflation and bond market index were negatively ($r = -.556$, $p = 0.000$). Finally, correlation results showed that exchange rate and bond market index are negatively and significantly related ($r = -.561$, $p = 0.000$).

Model summary

The results presented in table 6 present the fitness of model used of the regression model in explaining the study phenomena. Interest rate, inflation and exchange rate were found to be satisfactory variables in bond market index. This is supported by coefficient of determination of 46.2%.

Table 6: Model summary

Indicator	Coefficient
R	0.680
R Square	0.462

(Source: Author 2017)

This means that interest rate, inflation and exchange rate explain 46.2% of the variations in the dependent variable which was bond market index. These results further meant that the model applied to link the relationship of the variables was satisfactory.

Analysis of Variance

Table 7 provided the results on the analysis of the variance (ANOVA). This was to establish whether there was any significant difference among the variables means. Independent variables were explored to determine whether they existed any significance difference with the dependent variable (Bond market index).

Table 7: Analysis of Variance

Indicator	Sum of Squares	df	Mean Square	F	Sig.
Regression	17.601	3	5.867	23.802	.000b
Residual	20.459	83	0.246		
Total	38.06	86			

(Source: Author 2017)

The results indicated that the overall model was statistically significant. Further, the results implied that the independent variables were good predictors of Bond market index. This was supported by an F statistic of 23.802 and the reported p value (0.000) which was less than the conventional 0.05 significance level. Therefore, the result findings from the ANOVA showed that there exist a significant difference between interest rate, inflation and exchange rate and the Bond market index.

Table 8: Regressions of coefficients

Variable	B	Std. Error	Beta	t	Sig.
(Constant)	4.650	0.191		24.321	0.000
Interest rate	-0.216	0.077	-0.309	-2.815	0.006
Inflation	-0.146	0.066	-0.232	-2.205	0.030
Exchange rate	-0.186	0.072	-0.264	-2.594	0.011

(Source: Author 2017)

Thus, the optimal model for the study was;

$$\text{Bond market index} = 4.650 - 0.216\text{Interest rate} - 0.146\text{Inflation} - 0.186\text{Exchange rate}$$

This overall model showed that interest rate decreased Bond market index by -0.216units; inflation would decrease Bond market index by -0.146. Exchange rate would also decrease the Bond market index by -0.186units. Finally, the positive constant (4.650) represents other determinants which can increase Bond market index but had not been included in the model.

CONCLUSIONS

The conclusions of this study were informed based on the findings of the study. Each objective was reviewed and a conclusion provided that covers theory and practice. The purpose of this study was to establish the determinants of bond market index at the Nairobi Securities Exchange.

Based on research finding it can be concluded that interest rate is a key determinant of bond market index. Interest rate has an inverse relationship

Regression Coefficients

Regression of coefficients results in table 8 showed that interest rate and Bond market index were negatively and significantly related ($r=-0.216$, $p=0.006$). The table further indicated that inflation and Bond market index are negatively and significantly related ($r=-0.146$, $p=0.030$). It was further established that exchange rate and Bond market index are negatively and significantly related ($r=-0.186$, $p=0.011$).

with bond market index. Falling interest rates cause bond prices to rise and rising interest rates cause bond prices to fall.

Further, it was concluded that that exchange rate was a key determinant of bond market index. Exchange rate had a negative relationship with bond market index. A falling exchange rates caused bond prices to rise and rising exchange rates caused bond prices to fall.

Finally, it can be concluded that inflation was a key determinant of bond market index. Inflation had an inverse relationship with bond market index. When inflation was lower bond prices go up and when inflation rise bond prices fall.

RECOMMENDATIONS

This study found that interest rate, inflation and exchange rate affect bond market index. It was therefore recommended that the Central Bank of Kenya identified policy intervention to cab this situation.

SUGGESTIONS FOR FURTHER STUDY

Further research should be done targeting to establish the effect of bond market determinants

on the financial performance of commercial banks and microfinance institutions (MFIs).

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