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Margaret Ngaruiya and Dr.Amos Njuguna

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EFFECT OF MACROECONOMIC FACTORS ON BOND PRICES: A SURVEY OF BONDS LISTED AT THE NAIROBI SECURITIES EXCHANGE

[1*] Margaret Ngaruiya
Postgraduate Student, United States International University
*Corresponding Author's email: madgengaruiya@gmail.com

[2] Dr.Amos Njuguna,
Lecturer, United States International University

Abstract

Purpose: The purpose of this study was to establish the effect of macroeconomic factors on bond price.

Methodology: The research used an explanatory research design. 65 bonds listed in 23 categories at the NSE. The study used secondary data collected from NSE and the (KNBS) Kenya National Bureau of Statistics. A sample of 10 bonds was selected as these bonds were issued in the January 2008 and were still not mature by the 31st December 2012. Standard deviations were calculated for all the variables in the study. Further statistical analysis was carried out by use of correlation and regression analysis where bond prices were regressed against inflation, exchange rates and economic growth measured using the Kenya's Gross Domestic Product growth. The Statistical Package for Social Sciences (SPSS) version 17 was used to conduct the analysis. The findings were presented in form of tables and figures.

Results: The study concluded that inflation had negative and significant relationship on the bond prices. It was also possible to conclude that there was a positive and insignificant relationship between exchange rate and the bond price. The study also concluded that there was a positive and insignificant relationship between GDP and the bond price

Unique contribution to theory, practice and policy: This study recommends that investors who are looking to buy into bonds should factor in inflation as this determines the bond prices. It is recommended that economic growth should be enhanced through the pursuit of expansionary monetary and fiscal policies. The study also recommends that investors should also consider factors such as exchange rate as this determines the bond prices. It is recommended that the monetary authority should use policies aimed at weakening the Kenya shilling as doing so would increase bond prices. This is because bond prices would be cheaper and more attractive to foreign investors.

Keywords: *Inflation, Exchange rates, Economic growth, bond price. Nairobi Securities Exchange.*

1.0 INTRODUCTION

1.1 Background of the Study

Macroeconomics is a branch of economics dealing with the performance, structure, behavior, and decision-making of an economy as a whole, rather than individual markets, which include national, regional, and global economies (Sheffrin, 2003). Macroeconomists study aggregated

indicators such as GDP, unemployment rates, and price indices to understand how the whole economy functions.

Macroeconomists develop models that explain the relationship between such factors as national income, output, consumption, unemployment, inflation, savings, investment, price, money supply, government deficits, international trade and international finance (Mark, 1986). Macroeconomic models and their forecasts are used by both governments and large corporations to assist in the development and evaluation of economic policy and business strategy (Blancard, 2011).

Macro-economic factors such as inflation, GDP growth, interest rates on alternative financial instruments and exchange rates were employed as control variables across most studies. However, Birchwood (2004) explicitly examined the impact of macroeconomic influences on nominal and real interest spreads in the Caribbean region. He concluded that differences in interest rate spreads across the region may be due to differences in economic cycles, inflation and liquidity conditions, while the differences in the exchange rate regime affected the magnitude of the spreads. The study also found that countries with fixed exchange rates exhibited lower inflation rates and the highest real spreads (Birchwood, 2004).

The exchange rate risk occurs when the amount being paid in currency is worth less in real term where bond yield will be influenced (Hilscher & Nosbusch, 2010). Hence, the existence of exchange rate risk is positive correlation with world market bond portfolio. Also, Purchasing Power Parity theoretically can be used to hedge the exchange rate risk of UK government in purchasing and selling of government bonds. Investors can gain returns by hedging government bonds and therefore his paper concludes that the exchange rate has an impact in influencing government bond yields (Hilscher & Nosbusch, 2010).

Research has been made in examined the effect of market value of privately held U.S and Canadian government debt on the real Canadian dollar/U.S dollar exchange rate by Mcmillan and Koray (1990). In the paper, a model allowing small autoregression to find out if there is any relationship between debt and six other variables - exchange rate, output, price level, interest rate, nominal money and government purchases for both U.S and Canadian. They find that debt shock tend to have a negative relationship on both interest rate and exchange rate, which matched with the Ricardian Equivalence framework.

Research that explains the relationship between the yield curve and macroeconomic variables are important for public policy, bond valuation and investment decisions. This significance has recently induced many other papers in studying this issue. To construct a fine yield curve model, Duffie and Kan (2002) have considered models in which quite a number of unobserved factors explain the whole set of yield curves. There are many term structure models using latent factor models in which the factors are giving indirect comparisons to macroeconomic variables. In the other way around, there are other studies trying to clarify the relationships between bond yields and macro variables in direct model by using vector autoregressive (VAR) models. In a study done by Evans and Marshall (1998), they used VAR models in seeing the relationship of yields of various maturities together with macro variables.

There are many macro factors that basically explain movements at the period of short end and middle of the yield curve (Ang & Piazzesi, 2003). However, unobservable factors are still

significant in explaining most of the movement at the long end of the yield curve. Also, they mentioned the pricing kernel, where macro variables are incorporated as factors in a term structure model. The function of price kernel is to price all bonds in the economy, including government bonds. Price kernel is influenced by shocks of both observed macro factors and unobserved factors. However, since macro variables are correlated with yields, therefore incorporating macro variables may lead models to forecast better than models which omit these factors.

1.2 Problem Statement

The environment of the stock market in Kenya changed considerably in the late 1970s and especially in the 1980s & 90s when it moved from over reliance on the T-bills as the only vehicle of investment to the stock market when the Kenyan Government realized and embraced the need to design and implement policy reforms to foster sustainable economic development with an efficient and stable financial system (NSE, 2011).

This spurred increased activity at the NSE leading to a dramatic increase towards more active stock portfolio management, encouraging substantially more dispersed performance by stock portfolio managers and investors. The dispersion in turn created a demand for techniques that would help investors evaluate the performance of stocks and bonds. The question now is what models are to be used for the above purpose? What are the factors for inclusion on estimating the bond prices? And how will this model be subsequently used to evaluate future bond prices in Kenya. The problem is that despite the increased activity and size of the stock market, the bond market still remains small with majority of the bonds issued by the government and a handful of others by private sector organizations (NSE, 2011). The NSE handbook (2011) indicates that the highest market activity is experienced in the stock market and the bond market only contributes to a very small percentage of the total market activity.

The problem of low participation and size of the bonds market may have been caused by the failure of investors to understand the factors that drive the bond prices. Many models on the factors affecting bond prices have been advanced. For instance, Bhole & Mahakud (2009), Chau (2012) advocate for the use of the Capital Asset pricing Model (CAPM) in estimating the price of bonds. Merton (1973) & Riley (2003) suggest that the Inter Temporal Capital Asset Pricing Model (ICAMP) is superior to the Capital Asset Pricing Model (CAPM) in estimating bond prices. Bai & Green (2008); Eita, (2011); Chau (2012) have advanced the Abitrage Pricing Model (APT) as a superior approach to selecting the factors that influence bond prices.

However, none of the models are conclusive enough. While some models used in various studies show that the government debt, exchange rate and inflation rate have a positive relationship with bond prices, others show that they have a negative relationship while others don't show any relationship at all. In addition, there are scarce studies on the factors that influence bond prices in Kenya. Majority of the studies focus on developed economies eg Bhole & Mahakud (2009); Bai & Green (2008) & Chau, (2012) and fail to focus on Kenya which is a developing economy. The lack of conclusiveness of the studies and the scarcity of studies in Kenya on factors affecting bond prices forms the knowledge gap. It is for this research gap that this study seeks to close.

1.3 Research Objective

The objective of this study was to investigate the effect of macro-economic factors on bond prices.

2.0 LITERATURE REVIEW

Inflation reflects erosion in the purchasing power of money – a loss of real value in the internal medium of exchange and unit of account within the economy (Central Bank of Iceland 2008). A chief measure of price inflation is the inflation rate, the annualized percentage change in a general price index (normally the Consumer Price Index) over time (Mankiw, 2005).

Inflation's effects on an economy are various and can be simultaneously positive and negative. Negative effects of inflation include an increase in the opportunity cost of holding money, uncertainty over future inflation which may discourage investment and savings, and if inflation is rapid enough, shortages of goods as consumers begin hoarding out of concern that prices will increase in the future. Positive effects include ensuring that central banks can adjust real interest rates (intended to mitigate recessions), and encouraging investment in non-monetary capital projects (Mankiw, 2005).

Exchange rates are determined in the foreign exchange market (Sheffrin, 2003) which is open to a wide range of different types of buyers and sellers where currency trading is continuous: 24 hours a day except weekends, i.e. trading from 20:15 GMT on Sunday until 22:00 GMT Friday.

Empirical evidence indicates that nominal exchange rate changes are not fully passed through to goods prices. In fact, it appears that consumer prices are very unresponsive to nominal exchange rate changes (Parsley & Wei, 2001). An implication of this finding is that the "expenditure-switching" effect of exchange rate changes might be very small. That is, a change in the nominal exchange rate might not lead to much substitution between domestically-produced goods and internationally-produced goods, because the relative prices of those goods do not change much for final users. If the exchange rate change has little effect on the behavior of final purchasers of goods, then it may take large changes in exchange rates to achieve equilibrium after some shock to fundamentals (Devereux and Engel, 2000).

Jahjah, Wei and Yue (2012) conducted a study on exchange rate policy and sovereign bond spreads in developing countries. The authors analyzed how exchange rate policy affects the issuance and pricing of international bonds for developing countries, and found that countries with less flexible exchange rate regimes pay higher sovereign bond spreads and are less likely to issue bonds. Quantitatively, changing a free-floating regime to a fixed regime decreases the likelihood of bond issuance by 4.6% and increases the bond spread by 1.3% on average. Furthermore, countries with real exchange rate overvaluation have higher bond spreads and higher bond issuance probabilities. Moreover, such positive effects of real exchange rate overvaluation tend to be magnified for countries with fixed exchange rate regimes. The results suggested that choosing a less flexible exchange rate regime in general leads to higher borrowing costs for developing countries, especially when their currencies are overvalued.

Some research, Bar and Campbell (1997) related UK government bond price and real interest rate in order to find out the relationship between them. In their paper, they used the simple asset

pricing method to transfer the prices of UK nominal and index-linked government bonds into implied expected real interest rate. As a result, they find that the short run movement in three-month real interest rate and three-month inflation is negatively related.

Christiansen (2000) continue the study of Balduzzi *et al*. (1997) on the influence of macroeconomic announcements. The research investigated the effect of macroeconomic news announcements on the US Treasury bond market. The study mainly concerned on the impact of employment situation and price index report on Treasury bond yield. By applying multivariate model in exercise the test macroeconomic news announcement on Treasury bond yield she found that the announcements of macroeconomic variables' news significantly impact on the volatility of Treasury bond returns.

Kenny (2013) asserts that while all areas of the bond market ultimately take their cue for Treasuries – since, correctly or otherwise, U.S. government bonds are seen as being the safest investment in the world and are therefore the baseline for the rest of the market – certain types of bonds tend to benefit from stronger growth, rather than being hurt by it. Typically, these areas are high yield bonds, emerging markets bonds, and lower-rated corporate bonds. This is because their yields are high enough that modest moves in Treasury yields have less effect on their performance. As an example, if the 10-year Treasury is yielding 2.0%, a mortgage-backed security with a yield of 2.5% (a 0.5 percentage-point gap) is affected to a greater extent than a below-investment grade corporate bond yielding 8.5% (a 6.5 percentage-point gap). Second, the bonds of corporations and emerging markets trade based on their underlying financial strength. The better their balance sheets, cash balances, and underlying business trends, the less likely they are to default (i.e., miss a payment of principal or interest). And the lower the likelihood of a default, the lower the yield investors will demand to compensate them for the risk of investing in that particular security. As a result, while stronger economic growth can be a negative for Treasuries, it is much more likely to be a positive factor for higher-yielding bonds where the issuer's creditworthiness is a primary concern for investors. This helps make the case for why investors should diversify rather than emphasize on any one segment of the bond market. Overall, this implies that high yielding bonds have low prices. The effect of economic growth on bond yields is positive but negative on bond prices.

3.0 RESEARCH METHODOLOGY

The research used an explanatory research design. 65 bonds listed in 23 categories at the NSE. The study used secondary data collected from NSE and the (KNBS) Kenya National Bureau of Statistics. A sample of 10 bonds was selected as these bonds were issued in the January 2008 and were still not mature by the 31st December 2012. Standard deviations were calculated for all the variables in the study. Further statistical analysis was carried out by use of correlation and regression analysis where bond prices were regressed against inflation, exchange rates and economic growth measured using the Kenya's Gross Domestic Product growth. The Statistical Package for Social Sciences (SPSS) version 17 was used to conduct the analysis. The findings were presented in form of tables and figures.

4.0 RESULTS AND DISCUSSIONS

4.1 Effect of Inflation on Bond Price

4.1.1 Descriptive Results

The study sought to establish the effect of inflation on bond price

Table 1: Descriptive Results for Inflation

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
2008	12	15.10	3.08	0.89	13.14	17.06	7.93	18.70
2009	12	10.62	2.46	0.71	9.06	12.18	7.14	14.62
2010	12	4.10	1.22	0.35	3.32	4.88	3.18	7.52
2011	12	13.98	4.85	1.40	10.89	17.06	5.42	19.72
2012	12	9.64	5.45	1.57	6.18	13.10	3.20	18.31
Total	60	10.69	5.32	0.69	9.31	12.06	3.18	19.72

Results in Table 1 revealed that inflation had a mean of 15.10% in 2008 and in the year 2009 the mean reduced to 10.62% and in 2010 the mean declined further to 4.10 and in the year 2011 the mean increased effectively from 4.10 to 13.97 and declined to 9.6 in the following year. The results implied that the inflation rate has generally declined over the 5 year period. Perhaps, this could be attributed to the macroeconomic policies being instituted by the government to combat inflationary pressures.

4.1.2 Correlation between Inflation and Bond Prices

The study sought to establish whether inflation influences bond price.

Table 2: Correlation between Inflation and Bond Prices

		Average Bond prices	Inflation
Average Bond prices	Pearson Correlation	1	-.489**
	Sig. (2-tailed)		.000
	N	60	60
Inflation	Pearson Correlation	-.489**	1
	Sig. (2-tailed)	.000	
	N	60	60

**. Correlation is significant at the 0.01 level (2-tailed).

Results in Table 2 revealed that there was a negative and significant relationship between inflation and the bond price (r= -0.489, p value <0.01). The results were interpreted to imply that a rise in inflation is associated by a decline in bond prices and this further implied that arise in inflation may have led to low bond yields as it is an established fact that bond prices and yields are negatively correlated.

4.1.3 Regression Analysis of Inflation and Bond Prices

Regression analysis was conducted to empirically to determine the relationship between the effects of inflation on bond price.

Table 3: Regression Coefficients

Estimate	Value	T-Statistic	P value
(Constant)	123.151	37.137	.000
Inflation	-1.188	-4.270	.000
F	18.237		.000[a]
R	.489[a]		
R square	.239		
Dependent variable	Average Bond prices		
Independent variable	Inflation		

Result in Table 3 indicates that the goodness of fit of the model was satisfactory. This finding was supported by an r squared of 0.239. An r squared of 0.239 indicates that 23.9% of variation in bond price is explained by inflation rate.

Regression results indicate that the inflation is negatively related to bond prices. This was evidence by a regression coefficient of -1.188 (p value = 0.000). The relationship was significant at 0.05 critical value since the reported p value 0.000 was less that the critical value of 0.05. An increase in inflation by one unit leads to a decrease in bond price by -1.188 units.

An Analysis of Variance (ANOVA) statistics indicate that the overall model was significant. This was supported by an f statistic of 18.237 (p value = 0.000). The ANOVA results demonstrated that the independent variable (inflation) is a good predictor of average bond prices.

4.2 Effect of Exchange Rates on Bonds

4.2.1 Descriptive Results

The study sought to establish the effect of exchange rate on bond price. The findings were presented in the following sub section. The particular exchange rates that the study focused on were USD rate, UK Pound rate, Euro rate and the SA rand and the Ugandan shilling.

4.2.2 Exchange Rates for Dollar

Table 4: Descriptive Statistics for Dollar

					95% Confidence Interval for Mean			
	N	Mean	Std. Deviation	Std. Error	Lower Bound	Upper Bound	Minimum	Maximum
2008	12	69.19	5.88	1.70	65.45	72.92	61.90	78.18
2009	12	77.35	1.93	0.56	76.13	78.57	74.74	80.26
2010	12	79.23	2.03	0.59	77.94	80.53	75.79	81.43
2011	12	88.81	6.24	1.80	84.84	92.78	81.03	101.27
2012	12	84.63	1.17	0.34	83.88	85.37	82.90	86.34
Total	60	79.84	7.80	1.01	77.83	81.86	61.90	101.27

Results in Table 4 indicated the exchange rates for dollar. In the year 2008, the dollar had a mean of 69.19, in the year 2008 and in 2009 the mean increased to 77.35 the mean figure slightly increased to 79.23 in 2010 and in 2011 the mean increased to 88.81 and decreased further to 84.63 in 2012. The findings implied that the Kenyan shilling had consistently depreciated against the US dollar over the 5 year period and this could have caused bonds to be cheaper to foreign investors.

4.2.3 Exchange Rate for UK Pound

Table 1: Descriptive Statistics for UK Pound

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
2008	12	127.29	6.32	1.82	123.27	131.31	116.53	138.46
2009	12	120.90	4.87	1.41	117.81	124.00	113.98	127.22
2010	12	122.51	4.59	1.32	119.59	125.43	115.2	128.52
2011	12	142.34	9.45	2.73	136.33	148.34	127.7	159.41
2012	12	134.51	3.00	0.87	132.60	136.41	131.18	139.02
Total	60	129.51	9.93	1.28	126.94	132.08	113.98	159.41

Results in Table 5 indicated the exchange rates for dollar. In the year 2008, the dollar had a mean of 127.29 and the mean reduced to 120.90 in 2009 and it slightly increased to 122.51 in 2010 and further increased to 142.34 in 2011 and increased to 134.51 in the year 2012. The findings implied that the Kenyan shilling had generally depreciated against the UK Pound over the 5 year period and this could have caused bonds to be cheaper to foreign investors.

4.2.4 Exchange Rates for Euro

Table 2: Descriptive Statistics for Euro

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
2008	12	101.22	2.86	0.83	99.41	103.04	96.32	105.56
2009	12	108.73	3.05	0.88	106.80	110.67	104.85	114.54
2010	12	105.12	3.93	1.14	102.62	107.62	98.79	112.20
2011	12	123.60	9.42	2.72	117.61	129.59	108.16	138.74
2012	12	108.93	2.83	0.82	107.13	110.73	103.46	113.56
Total	60	109.52	9.09	1.17	107.17	111.87	96.32	138.74

Results in Table 6 indicated the exchange rates for Euro. In the year 2008, the Euro had a mean of 101.22 and decreased to 108.73 in 2009 and to 105.12 in 2010 and it slightly increased to 123.60 in 2011 and decreased to 108.93 in the following year. The findings implied that the Kenyan shilling had generally depreciated against the EURO over the 5 year period and this could have caused bonds to be cheaper to foreign investors.

4.2.5 Exchange Rates for SA Rand

Table 3: Descriptive Statistics for SA Rand

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean Lower Bound	95% Confidence Interval for Mean Upper Bound	Minimum	Maximum
2008	12	8.56	0.66	0.19	8.15	8.98	7.83	9.77
2009	12	9.26	0.83	0.24	8.73	9.79	7.95	10.07
2010	12	10.83	0.62	0.18	10.44	11.23	10.01	11.79
2011	12	12.27	0.83	0.24	11.74	12.79	10.56	13.23
2012	12	10.36	0.36	0.10	10.13	10.59	9.85	10.9
Total	60	10.26	1.45	0.19	9.88	10.63	7.83	13.23

Results in Table 7 indicated the exchange rates for SA Rand. In the year 2008, the SA Rand had a mean of 8.56 and increased to 9.26 in 2009 and also to 10.83 and in 2010 it slightly increased to 12.27 in 2011 and increased to 10.36 in the last year. The findings implied that the Kenyan shilling had generally depreciated against the SA rand over the 5 year period and this could have caused bonds to be cheaper to foreign investors.

4.2.6 Exchange Rate for Uganda Shilling

Table 4: Descriptive Statistics for Uganda Shs

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean Lower Bound	95% Confidence Interval for Mean Upper Bound	Minimum	Maximum
2008	12	24.92	1.16	0.34	24.18	25.65	23.07	27.05
2009	12	26.27	1.33	0.38	25.42	27.11	24.73	28.84
2010	12	27.46	0.92	0.27	26.87	28.05	25.53	28.59
2011	12	28.43	0.67	0.19	28.01	28.85	27.61	29.69
2012	12	29.52	0.97	0.28	28.90	30.13	27.9	31.26
Total	60	27.32	1.91	0.25	26.82	27.81	23.07	31.26

Results in Table 8 indicated the exchange rates for Uganda shilling. In the year 2008, the shilling had a mean of 24.92 and increased to 26.27 in 2009, and increased to 27.46 in 2010 and to 28.43 in 2011 and further to 29.52 in 2012. The finding implied the exchange rate for Uganda shilling increases consistently. The findings implied that the Kenyan shilling had generally appreciated against the Ugandan Shilling over the 5 year period and this could have caused bonds to be more costly to foreign investors from Uganda.

4.4.7 Correlations between Exchange Rates and Bonds

The study sought to establish whether exchange rate influences bond price.

Table 5: Correlations between Exchange Rates and Bonds

		Average Bond prices	Exchange Rates
Average Bond prices	Pearson Correlation	1	.140
	Sig. (2-tailed)		.286
	N	60	60
Exchange Rates	Pearson Correlation	.140	1
	Sig. (2-tailed)	.286	
	N	60	60

Results in Table 9 revealed that there was a positive and insignificant relationship between exchange rate and the bond price ($r = 0.140$, $p > 0.01$). The findings implied that a rise in exchange rate which was also interpreted as depreciation or weakening of the Kenyan Shilling was associated with a positive increase in bond prices. However, the association was not statistically significant.

4.2.8 Regression Analysis of Exchange Rate and Bond Price

Regression analysis was conducted empirically to determine the relationship between the effects of exchange rate on bond price.

Table 6: Regression Coefficients

Estimate	Value	T-Statistic	P value
(Constant)	91.932	5.322	.000
Exchange Rates	.232	1.077	.286
F	1.160		.286[a]
R	.140[a]		

R square	.020
Dependent variable	Average Bond prices
Independent variable	Exchange Rates

Result in Table 10 indicates that the goodness of fit of the model was satisfactory. This finding was supported by an r squared of 0.020. An r squared of 0.020 indicates that 2.0% of variation in bond price is explained by exchange rate.

Regression results indicate that the exchange rate is positively related to bond prices. This was evidence by a regression coefficient of 0.232 (p value = 0.286). The relationship was insignificant at 0.05 critical value since the reported p value 0.000 was more than that the critical value of 0.05. An increase in exchange rate by one unit leads to an increase in bond price by 0.232 units.

An Analysis of Variance (ANOVA) statistics indicate that the overall model was significant. This was supported by an f statistic of 1.160 (p value = 0.286). The ANOVA results demonstrated that the independent variable (exchange rate) is a good predictor of average bond prices

4.3 Effect of GDP on Bonds

4.3.1 Descriptive Results

The study sought to establish the effect of GDP on bond price.

Table 7: Descriptive Statistics for GDP

					95% Confidence Interval for Mean			
	N	Mean	Std. Deviation	Std. Error	Lower Bound	Upper Bound	Minimum	Maximum
2008	12	339477.75	7211.61	2081.81	334895.71	344059.79	327656.00	344414.00
2009	12	348795.75	1154.49	333.27	348062.22	349529.28	347387.00	350457.00
2010	12	368748.00	4798.75	1385.28	365699.02	371796.98	362850.00	374731.00
2011	12	384796.25	5729.76	1654.04	381155.74	388436.76	379401.00	393200.00
2012	12	406701.38	27229.74	7860.55	389400.42	424002.33	373778.00	441430.50
Total	60	369703.83	27536.28	3554.92	362590.45	376817.20	327656.00	441430.50

Results in Table 11 revealed that GDP had a mean of 3339477.75 in 2008 and a mean of 348795.75 in 2009 and in 2010 to 212 the mean increased gradually from 348795.75 in 2009 to 3688748.00 in 2010 to 384769.25 in 2011 finally to 406701.38. The findings implied that the national incomes had consistently increased over the 5 year period. This further implied that the government had put it in place macroeconomic policies which were expansionary in nature and which supported the creation of additional incomes. Such expansionary measures included a reduction in interest rates and an increase in government expenditure.

4.3.2 Correlations between GDP and Bonds

The study sought to establish whether GDP influences bond price.

Table 8: Correlations between GDP and Bonds

		Average Bond prices	GDP
Average Bond prices	Pearson Correlation	1	.038
	Sig. (2-tailed)		.771
	N	60	60
GDP	Pearson Correlation	.038	1
	Sig. (2-tailed)	.771	
	N	60	60

Results in Table 12 revealed that there was a positive and insignificant relationship between GDP and the bond price ($r= 0.038$, $p > 0.01$). The findings implied that an increase in Gross domestic product was associated with a rise in the average bond prices. However, the relationship was not statistically significant implying that factors other than GDP could have contributed to the change in the average bond prices.

4.3.3 Regression Analysis of GDP and Bond Price

Regression analysis was conducted empirically to determine the relationship between the effects of GDP on bond price.

Table 9: Regression Coefficients

Estimate	Value	T-Statistic	P value
(Constant)	103.791	4.546	.000
GDP	1.802	.293	.771
F	.086		0.000

R	.038[a]
R square	0. 001
Dependent variable	Average Bond prices
Independent variable	GDP

Regression result in Table 13 indicates that the goodness of fit of the model was satisfactory. This finding was supported by an r squared of 0.001. An r squared of 0.001 indicates that 0.01% of variation in bond price is explained by GDP.

Regression results indicate that GDP is positively related to bond prices. This was evidence by a regression coefficient of 1.802 (p value = 0.771). The relationship was insignificant at 0.05 critical value since the reported p value 0.000 was more than that the critical value of 0.05.

An Analysis of Variance (ANOVA) statistics indicate that the overall model was significant. This was supported by an f statistic of 0.086 (p value = 0.771). The ANOVA results demonstrated that the independent variable (GDP) is a good predictor of average bond prices.

5.0 CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

5.1.1 Effect of inflation on bonds prices

Results led to the conclusion that the inflation rate has generally declined since year 2008. This indicated that the government may be using macroeconomic policies aimed at reducing the inflation in Kenya. The findings revealed that there was negative correlation between inflation and bond prices. This implies that an increase in inflation was associated with a decrease in bond prices. The findings were supported by regression results. It was concluded from the regression results that inflation had negative and significant relationship on bond prices. It was noted that an increase in inflation by one unit leads to a decrease in bond prices of 1.188 units.

5.1.2 Effect of Exchange Rates on Bonds Prices

It was concluded from the findings that the US dollar Kenya Shilling exchange consistently increased for the period 2008 to 2012. This is an indication that the Kenyan shilling is depreciating and this further implied an unfavorable balance of payments. The study indicated that the UK pound to the Kenya Shilling exchange rate has generally increased thus indicating that the Kenya shilling has depreciated. The Euro, the South African Rand and the Ugandan Shilling exchange to Kenya shilling also increased implying that the Kenya Shilling depreciated. It was concluded that there was a positive and insignificant relationship between exchange rate and the bond price. This implied that an increase in exchanges lead to an increase in bond prices though not significantly.

5.1.3 Effect of Economic Growth on Bonds Prices

The study concluded that the GDP has consistently increased for the 5 years under study. This implied that economic growth led to an increase in bond prices. The study results indicate that

the government maybe pursuing policies aimed at enhancing the national incomes. Such polices were expansionary in nature. The results further revealed that a rise in GDP by 1 unit led to an increase in bond prices by 1.802 units. The study also concludes that there was a positive and insignificant relationship between GDP and the bond price.

5.2 Recommendations

5.2.1 Effect of Inflation on Bond Prices

This study recommends that investors who are looking to buy into bonds should factor in inflation as this determines the bond prices. Since inflation has a negative impact on bond prices, the government policy making organ mandated with the control of inflation should pursue measures to reduce the inflation rate. These measures should include monetary policies such as reduce the interest rates, open market operations geared at reducing the amount of money supply in the economy. The government may also pursue contractionary fiscal policy aimed at reducing inflation. These polices would include reducing government spending.

5.2.2 Effect of Economic Growth on Bond Prices

The study recommends that investors who are looking to invest into bonds should consider government policies as this determines the bond prices. It is recommended that economic growth should be enhanced through the pursuit of expansionary monetary and fiscal policies. The use of expansionary monetary policy would be to reduce the interest rates and this would increase the access to finance. These would ensure that more factors of production are put into productive use and thus increasing the national income. Expansionary fiscal policies should include an increase in government spending.

5.2.3 Effect of Exchange Rates on Bond Prices

The study also recommends that investors should also consider factors such as exchange rate as this determines the bond prices. It is recommended that the monetary authority should use policies aimed at weakening the Kenya shilling as doing so would increase bond prices. This is because bond prices would be cheaper and more attractive to foreign investors.

REFERENCES

Ang, A. & Piazzesi M. (2003). A No-Arbitrage Vector Autoregression Of Term Structure Dynamics with Macroeconomic and Latent Variables. *Journal of Monetary Economics*. 50, 745–787

Bai Y.& Green C.J. (2008). *Determinants of Cross-Sectional Stock Return Variations In Emerging Markets.* AES, Business School, Napier University, Edinburgh, EH14 1DJ, United Kingdom

Bhole, L.M., & Mahakud, J. (2009). *Financial institutions and markets: structure, growth and innovations.* (5 ed., pp. 38-39). New Delhi: Tata McGraw-Hill.

Birchwood, A.(2004). *An Examination of the Macro-economic Influence on Nominal and Real Interest Rate Spreads in the Caribbean*. Presented at the XXXVIth Annual Monetary Studies Conference, Central Bank of Trinidad & Tobago

Blanchard, O. (2000). *Macroeconomics* (2nd ed.). Englewood Cliffs, N.J: Prentice Hall

Blanchard, O.(2011). *Macroeconomics Updated* (5th ed.). Englewood Cliffs: Prentice Hall. ISBN 978-0-13-215986-9.

Chau, M. (2012).*Macroeconomic Determinants of Gold Industry Stock Returns*. Honors Projects. Paper 26. http://digitalcommons.iwu.edu/busadmin_honproj/26

Devereux, M. B., & Engel, C. (2000). *Monetary policy in the open economy revisited: price-setting and exchange rate flexibility*, National Bureau of Economic Research, working paper no. 7665

Duffie D. & Kan R. (2002). Universal State Prices and Asymmetric Information, *Journal of Mathematical Economics* 38, 191–196

Eita J.H (2011). *Determinants of Stock Market Prices in Namibia.Working* Paper 209. Monash University.

Evans L.C. & Marshall A.D. (1998). Monetary Policy and the Term Structure of Nominal Interest Rates: Evidence and Theory. *Carnegie-Rochester Conference Series on Public Policy*, 49, 53-111

Hilscher J. & Nosbusch Y. (2010). Determinants of Sovereign Risk: Macroeconomic Fundamentals and the Pricing of Sovereign Debt. *Review of Finance* (14): 235–262.

Jahjah, S., Wei, B. and Yue, V.Z. (2012). *Exchange Rate Policy and Sovereign Bond Spreads in Developing Countries.* International Finance Discussion Papers

Kenny, T. (2013). *The Impact of Inflation on Bonds*. Retrieved from http:// bonds about.com/ od/ bonds101/a / The Impact Of Inflation On Fixed Income-Investments.htm

Mankiw, N. G. (2002). *Macroeconomics* (5th ed.). NewYork. Worth Publishers .

Mcmillin W. D. & Koray F. (1990). Does Government Debt Affect Exchange Rate? An Empirical Analysis of the U.S- Canadian Exchange Rate. *Journal Economic Business ,42, 279-288*.

Merton R.C. (1973). An analytic derivation of the efficient portolio frontier, *Journal of Financial and Quantitative Analysis* 7 (1973), 1851–1872.

NSE (2011). NSE Handbook 2011.

Parsley, D. C., & Wei, S. (2001). Explaining the border effect: the role of exchange rate variability, shipping costs and geography, *Journal of International Economics* 55, 87-105

Riley, N. (2003, September 03). *Reduce your risk with ICAPM* . Retrieved from http:// www.investopedia. com/articles/financial-theory/09/ICAPM-and-CAPM.asp

Sheffrin, S.M. (2003). *Economics: Principles in action. Upper Saddle River, New Jersey* 07458: Pearson Prentice Hall. pp. 552. ISBN 0-13-063085-3.