

## **The Effect of Selected Macro-Economic Variables On Bond Market Development In Kenya**

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**This study sought to investigate the effect of selected macro economic variables on bond market development in Kenya. A causal research design was used to find out the effect of macroeconomic variables on bond market development. Secondary data was used to model the macroeconomic factors influencing development of the bond market. The entire bond market in Kenya was covered. Data was analyzed using descriptive and regression analysis. T-test was used to interpret the significance of the relationship. The study found out that bank size, exports and fiscal policy had no effect on bond market development while exchange rate, interest rate and GDP per capita had a positive effect. However, economic size measured as GDP at purchasing power parity had a negative effect. It can therefore be concluded that exchange rate, interest rate, GDP per capita and GDP at purchasing power parity do affect bond market development. It is therefore recommended that more focus should be given, on the four main variables identified, by the policy makers in order to spur more growth in the bond market. A further investigation would be necessary in order to establish the effect of other macroeconomic and institutional variables not covered by this study.**

**Keywords:** Macro-economic variables, Bond market, Purchasing Power Parity and fiscal Policy

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## INTRODUCTION

Financial markets are markets in which funds are transferred from people who have an excess of available funds to people who have a shortage. Financial markets such as bond and stock markets are crucial to promoting greater economic efficiency by channeling funds from people who do not have a productive use for them to those who do. A well functioning financial market is a key factor in producing high economic growth and vice versa (Mishkin, 2010). A bond market is an important component of a developed financial market. Due to its positive influence on the development of an economic and financial system, and numerous advantages that a bond market provides, the development of a bond market remains critical to a country's financial system and economy (Sprcic and Wilson, 2007).

A bond is a financial debt instrument requiring the issuer (borrower) to repay to the lender the amount borrowed plus interest over a specified period of time. The issuer of the bond will repay to the lender/investor the amount borrowed (principal) plus interest over a specified period of time (Fabozzi and Jacob, 1999). A bond market is the environment in which the issuance and trading of debt securities occurs. The bond market typically constitutes global and domestic bonds. Domestic bonds primarily includes government bonds, municipal bonds and corporate bonds, and facilitates the transfer of capital from savers to the issuers or organizations requiring capital for government projects, business expansions and ongoing operations (Welch, 2009). Macroeconomics is concerned with the economy as a whole.

It's concerned with aggregate demand and supply. Aggregate demand is the total amount of spending in the economy, whether by consumers by overseas customers for our export, by the government, or by firms when they buy capital equipment or stock up on raw materials. Aggregate supply is the total national output of goods and services (Mishkin, 2010).

Factors that typically influence the rate of development of a bond market are described as bond market determinants. They vary and include a range of macro-level, industry level, market level and firm level factors (Sprcic and Wilson, 2007). The literature has provided several: Regulatory enforcement; absence of public sector funding needs; banking concentration; corporate governance and transparency; law and order; size of an economy; the stage of economic development; the openness of an economy; among others.

The bond market in Kenya plays a pivotal role in fostering economic development in the country through offering investment opportunities to both local and foreign investors and also financing government budget deficit. The bond market in Kenya constitutes only a domestic market segment as distinct from a global market component. The domestic market constitutes government and corporate bond segments both of which have primary and secondary bond markets. As at 2012, in terms of absolute value, the size of domestic bond markets in Kenya was approximately worth \$ 6 billion which was about 16% of the GDP in 2012 (CBK, 2012; KNBS, 2013; Kenya Economic

Update, 2012). Bond products in the Government bond market include – fixed coupon rate bonds; zero coupon rate bonds; floating rate bonds; restructuring bonds; amortized and savings development bond; among others. In the corporate market, the bonds are either secured or unsecured. Bonds in both markets range from one to thirty years.

Kenya's financial sector is heavily bank-dominated. Banks, however, are not well suited to finance long-term investments on a large scale, as the marriage of short-term liabilities and long-term assets results in maturity mismatches in their balance sheets. The existence of a robust bond market mitigates this potential maturity mismatch of a bank-dominated financial sector, reduces financial sector fragility, and provides long-term capital for business investment more cheaply (Yoshitomi and Shirai, 2001). Bond market development therefore remains a key policy issue in Kenya. The literature has identified certain factors and conditions as facilitators of faster development of bond markets (Fabella and Madhur, 2003).

Bond markets in general and corporate bond markets in particular have been found to develop rapidly in countries where the macroeconomic environments have been more stable and predictable. Meanwhile, in countries where the macroeconomic environment has been relatively volatile, the corporate bond market has had to rely heavily on government support in one form or another (Fabella and Madhur, 2003). Experience from industrial countries has suggested that a healthy government bond market creates a conducive environment for the

development of a robust corporate bond market (IMF, 2002).

An efficient, well regulated and market driven banking sector also fuels bond market development. This proposal may sound somewhat ironic given that the literature has variously regarded the banks as major competitors to bonds. However, it is important to recognize that a banking system that is free from political interference and operating on market principles can be an important source of demand for the bond market. It is generally observed that where rules are clear, banks are more market-oriented, and where the macroeconomic environment is stable, corporate bond markets have developed rapidly for example Australia; Hong Kong, China; and Taipei, China after financial deregulation in the 1980s). Today, banks in these countries are major buyers of corporate bonds. Hence, a robust banking sector operating along market principles will reinforce rather than weaken the bond market (Yoshitomi and Shirai, 2001; Brouwer, 2002).

Pardy (1992) noted that there are two variables which are necessary for faster development of capital market: macroeconomic and fiscal environment and market infrastructure. The macroeconomic factors included inflation, interest rate, foreign exchange rates and government expenditure.

A range of macro-level, industry level, market level and firm level factors influence the rate at which bond markets develop (Sprcic and Wilson, 2007). Regulatory enforcement; absence of public sector funding needs; banking

concentration; corporate governance and transparency; law and order; riskiness of investment environment; geographical/disease endowment environment; interest rate variability were observed to have a huge impact on bond market development (Eichengreen and Luengnaruemitchai, 2004). The size of an economy; the stage of economic development; the openness of an economy; the exchange rate variability, the size of the banking system; and interest rate variability also had contribution towards bond market development (Bhattacharyay, 2013).

### **Effect of macroeconomic variables on bond market development**

Beck, Demirguc-Kunt and Levine (1999) proved a positive relationship between the level of GDP per capita and a size of a bond market. The economic size measured as GDP at purchasing power parity (ppp) measures country size. Small size is determinant of the inability of developing countries to have a deep and liquid bond market and they are characterized by price volatility as buyers and sellers exist. Banking system size measured as domestic credit provided by the banking sector to GDP is also important for development of bond market. Banks serves as dealers and market makers but on the other hand banks and bonds compete in providing finance, and well developed banking systems can deprive bonds of market share.

High level of interest rates tend to have a depressing impact on issuance and bond market development since few firms can service debts when interest rates are high. Where interest rates are variable investors will have a little appetite for long-term

fixed-rate notes because there is high risk that the purchasing power of long-term fixed rate assets will be eroded. Greater exchange rate flexibility encourages the development of domestic bond market. Pegged exchange rates encourage foreign investors to underestimate the risk of lending to banks and corporations, and the resulting foreign competition may slow the development of domestic intermediation. Gross Domestic Production (GDP) per capita which is the developmental stage of the economy is expected to have a positive relationship with bond market development. Underdeveloped countries have a volatile investment environment, domination of government in commercial activities, weak creditors' rights, lack of transparency and poor corporate governance (Adelegan and Radzewicz, 2009).

### **METHOD**

The study adopted a causal research design, since the study aimed at establishing the cause and effect relationships between bond market size and seven determinants of bond market development. The population in this study constituted the entire bond market in Kenya (20 corporate bonds, 56 treasury bonds (government) and 5 Infrastructure bonds that have been issued and are being traded at the NSE). A census was conducted. The study collected secondary data for the purpose of investigating the extent to which bond market determinants have contributed to the development of the bond market in Kenya. Secondary data was obtained from time series annual reports of the Central Bank, Capital Markets Authority (CMA), Nairobi Stock Exchange (NSE) and Kenya National

Bureau of Statistics (KNBS) The data spanned the years 2008 through to 2012.

The regression model below was used to establish the relationship between the variables:

$$F_t = B_0 + B_1X_{1t} + B_2X_{2t} + B_3X_{3t} + B_4X_{4t} + B_5X_{5t} + B_6X_{6t} + B_7X_{7t} + U$$

Where,

t = years, 2008-2012;

F<sub>t</sub> = Total bond market size in proportion to GDP in year t;

X<sub>1t</sub> = Economic size measured as GDP at purchasing power parity;

X<sub>2t</sub> = Exports as proportion of GDP year t;

X<sub>3t</sub> = Banking system size as a proportion GDP year t;

X<sub>4t</sub> = Interest rate spread in year t;

X<sub>5t</sub> = Exchange rate variability in year t;

X<sub>6t</sub> = Fiscal policy in year t;

X<sub>7t</sub> = Developmental stage of the economy in year t;

B<sub>0</sub> is the constant or the intercept terms for bond (total) models;

B<sub>t</sub> are the coefficients of the independent variables; and

U, are the independent normal distribution error terms with mean zero.

## RESULTS AND DISCUSSIONS

**Table 1: Descriptive statistics of model variables**

	Ft	X1t	X2t	X3t	X4t	X5t	X6t	X7t
Mean	0.052	568.014	0.149	0.299	10.430	0.141	0.050	1453.522
Standard Error	0.007	5.026	0.004	0.027	0.447	0.047	0.003	12.891
Median	0.040	564.667	0.151	0.313	10.193	0.080	0.050	1445.020
Mode	0.040	#N/A	#N/A	#N/A	#N/A	#N/A	0.050	#N/A
Standard Dev.	0.016	11.238	0.008	0.061	1.000	0.105	0.007	28.824
Sample Variance	0.000	126.287	0.000	0.004	1.000	0.011	0.000	830.839
Kurtosis	-3.33	-1.231	1.763	1.503	0.257	-3.09	2.000	-1.239
Skewness	0.609	0.745	-1.03	-1.28	0.966	0.534	0.000	0.741
Range	0.030	25.844	0.022	0.154	2.498	0.222	0.020	66.140
Minimum	0.040	558.193	0.137	0.200	9.458	0.042	0.040	1428.450
Maximum	0.070	584.038	0.158	0.354	11.956	0.263	0.060	1494.590
Sum	0.260	2840.071	0.747	1.493	52.149	0.704	0.250	7267.610
Count	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000
Largest(1)	0.070	584.038	0.158	0.354	11.956	0.263	0.060	1494.590
Smallest(1)	0.040	558.193	0.137	0.200	9.458	0.042	0.040	1428.450
Conf. L.(95.0%)	0.020	13.953	0.010	0.076	1.242	0.130	0.009	35.790

Source: Computation from raw data obtained from CMA, CBK, KNBS and NSE

### **Regression analysis**

A regression analysis was conducted on total bond market size against bond market development, which was surrogated by seven variables namely; economy size; exports; bank size; interest rate spread; exchange rate variability; fiscal policy; and

developmental stage of the economy. The regression equation was as follows:

$$F_t = B_0 + B_1X_{1t} + B_2X_{2t} + B_3X_{3t} + B_4X_{4t} + B_5X_{5t} + B_6X_{6t} + B_7X_{7t} + U$$

Data for the above variables was generated for a period that spanned the years 2008 to

2012. The data was subjected to a regression analysis, with the findings discussed below:

**Table 2: Model summary of bond market size on bond market development determinants**

Regression Statistics	
Multiple R	1
R Square	1
Adjusted R Square	65535
Standard Error	0
Observations	5

Source: Computation from raw data obtained from CMA, CBK, KNBS and NSE

Table 2 indicates that the bond market development determinants accounted for almost all of the variations in the size of the bond market as was explained by the predictor variables ( $X_{1t}$ ;  $X_{2t}$ ;  $X_{3t}$ ;  $X_{4t}$ ;  $X_{5t}$ ;

$X_{6t}$ ;  $X_{7t}$ ) as indicated by the R square statistic 1. The model thus explained almost all of the development in the bond market size. This meant that the model was useful in explaining bond market development of the bond market size.

**Table 3: Anova for bond market size on bond market development determinants**

ANOVA	df	SS	MS	F	Significance F
Regression	7	0.00108	0.000154	.000	.000
Residual	0	0	65535		
Total	7	0.00108			

Source: Computation from raw data obtained from CMA, CBK, KNBS and NSE

Table 3 clearly indicates that the regression accounted for almost all of the variations in bond market size; 0.00108 out of 0.00108; with none of the variations being accounted for by other factors external to the model (Residual) as indicated by the sum of the squares (SS).

Residual (or error) represents unexplained (or residual) variation after fitting a regression model. It is the difference (or left over) between the observed value of the variable and the value suggested by the regression model.

**Table 4: Coefficients of the model**

	Coefficients	Standard Error	t Stat	P-value
Intercept	2.3074712	0	65535	.000
X1t	-0.0167899	0	65535	.000
X2t	0	0	65535	.000
X3t	0	0	65535	.000
X4t	0.06390573	0	65535	.000
X5t	0.26514471	0	65535	.000
X6t	0	0	65535	.000

X7t	0.00452527	0	65535	.000
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Source: Computation from raw data obtained from CMA, CBK, KNBS and NSE

Table 4.4 depicts the numerical relationship between the independent variable and the predictor variables in the following resultant equation:

$$F_t = 2.3074712 - 0.01678899X_{1t} + 0.06390573X_{4t} + 0.26514471X_{5t} + 0.00452527X_{7t}$$

### CONCLUSION

The findings of this study indicate that bond market development is determined by exchange rate, interest rate, GDP at PPP and GDP per capita. The P- value of 0.00 showed that there was a correlation between the dependent (bond market development) and independent variables (economic size, exports, banking system size, interest rate, exchange rate, fiscal policy and developmental stage of the economy). Three study variables, however, had no effect on bond market development that is exports, bank size and fiscal policy given the coefficient of zero (refer to table 4).

The magnitude of the influence is given by the coefficients which were zero for three variables that is exports, bank size and fiscal policy. The economic size which had a coefficient of -0.0167899 shows it has negligent negative influence on the bond market development. It shows that one unit of change in economic size results in - 0.0167899 change in bond market development which could have a minimal effect. A unit of change in interest rate spread resulted in 0.06390573 change in

bond market development. An increase in interest rate led to an appreciable increase in bond market development. The exchange rate had the most significance influence on the market development with a coefficient of 0.26514471. A unit of change in the exchange rate resulted to change of 0.2654471 in the bond market development. The stronger the Kenyan currency is against dollar the more vibrant the bond market is. The GDP per capita gives the developmental stage of the economy. GDP per capita had a positive influence on the bond market at 0.00452527. A unit change of GDP per capita led to an increase of 0.00452527 to bond market development which has little significance (refer to table 4.4). The results revealed that there is a relationship between bond market development and selected macroeconomic variables that is GDP at PPP, interest rates, exchange rate and GDP per capita. There results also exhibited no relationship between bank size, exports and fiscal policy. Exchange rate had the highest influence on bond market development as compared to other variables while economic size had a negative relationship indicating that when the economy is growing there is less need to issue bonds since the government and corporate sector can easily finance their expenditures.

### IMPLICATION ON POLICY AND PRACTICE

From the study findings there is need to create awareness of the role of bond market in the economy and there is need to establish sound macroeconomic policy by

the policy makers with a keen interest on exchange rate, interest rate, GDP per capita and GDP at PPP. The level and volatility of interest rate, the volatility of changes in the exchange rate and capital control are very important in domestic bond market development. This will spur the development of the bond market.

Further investigation may be done to establish the effect of other bond market development determinants outside this study on bond market size. Additionally, further investigation may be done into why the bond market development determinants exhibited the specified relationships and coefficient magnitude against bond market size. A study should also be done to include other emerging economies in the region such as the East African countries. It would enable these countries formulate sound policies in developing their bond markets.

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