Bond Foreign Portfolio Investment of Public Sector and Perfomance of Nigeria Bond Market

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Abstract
The study examined the impact of bond foreign portfolio investment in the public sector on performance of bond market in Nigeria. Using bond yield as proxy for performance. Data span from 1981-2018 was used. The nature of the data utilized in this research is a combination of time series and cross-sectional data which is referred to as panel data. Descriptive statistical analysis was used to explain the variations among the variables, Augmented Dickey Fuller Unit Root test, ordinary least square regression model as our estimation technique, Johasen multivariate co-integration test. And finally, Granger causality was applied to evaluate effects and impacts among the variables.

Keywords: **Foreign Portfolio Investment in the Public Sector on Performance of Bond Market in Nigeria.**

Introduction

Public sector bond are government bond and are considered low risk bond .A bond is a debt security, under which the issuer owes the holders a debt and (depending on the terms of the bond) is obliged to pay them interest (the coupon) or to repay the principal at a later date, termed the maturity date. Financial markets are becoming more globally integrated, medium- and longer-term local currency bond yields are increasingly influenced by foreign investors who take positions in these buoyant markets. They are securities that promise either a fixed stream of income or a stream of income that is determined according to a specified formula. (Bodie *et al.,* 2008; Ezirim, 2005). Foreign portfolio investment is the transfer of financial assets across international frontiers in exchange for profit. As an aspect of international capital flow, foreign portfolio investment is the process where investors procure controlling interest in foreign firms in want of profit (Baghebo & Apere, 2014). In addition, as pointed out by Peiris (2010), foreign investors could act as catalysts for the development of local bond markets, particularly by diversifying the investor base, creating greater demand for local emerging market debt securities, and increasing market liquidity. Financing Nigeria infrastructural deficits through bond foreign portfolio investment according to Ezirim (2005), Investment is the application of resources to financial assets (securities) or real assets. There are a number of factors that attract foreign investment into the Nigerian bond market for example CBN policy plays a significant impact on the stability of the bond market (Adyorough, 2010). In most countries there appears to be a strong connection between foreign investment and bond yield and Nigeria is not an exception. Although the Nigerian bond market when compared to developed bond markets could be perceived as small in terms of size, the country 's government bond market is perceived to be more liquid than the corporate bond market aspect. The outcome of this, was the establishment of a domestic debt securities markets which has attracted the attention of domestic and foreign policy makers (Financial Stability Forum, 1999). The internal debt is dominantly government bond. It stems from the demand to identify and exploit other financing options available to the different levels of government, local governments and their states to

bridge the recurrent national budget deficit and gap in the revenue to budget as well as the capital investment need of the economy. Coupled with the high cost of borrowing from the banking sector triggers the preference for domestic debt securities, which provides less risky, less costly and easily accessible finance. Bond market, which involves domestic debt (typically Federal Government, State Government, and municipal bonds) as well as corporate bond performance is a crucial aspect of debt management. It supports the external debt component and ensures a balance debt portfolio of a country in order to reduces pressure on from either side due to domestic and or global financial dynamics. The essence of domestic and public debt management is to ensure that investment financial needs and its payment obligations are met at the lowest possible cost over the medium to long run. consistent with a prudent degree 2 of risk (IMF and World Bank, 2001). An effective domestic debt management would enhance efficient budget deficit and capital investment financing while at the same time reduce future indebtedness due to the new revenue centers created by capital investments. In a similar vein, effective public debt management would ensure a balanced and sustainable national debt portfolio, eliminate the problem of debt overhang. As such a bio-directional and a reverse relationship is the gap we intend to fill in this investigation on bond foreign portfolio investment in the public sector and performance of Nigeria bond market.

2.   Literature Review

This study conceptualizes the bond market performance in relations to foreign portfolio investors subscribing into Nigeria government bond (public sector bond), by attempting to see the impact of bond foreign portfolio investments in public sector on performance of Nigeria bond market. This investigation disaggregates foreign portfolio investments as foreign inflow of investments into bonds and equity.

Empirical Review

In Nigeria a number of studies that were carried out on the relationship between foreign investment in capital market have divergent results.

Eichengreen and Luengnaruemitchai (2006) surveyed 41 Asian countries useing the generalized least square (GLS) tool of analysis. Their study, which covered the period 1990-2011 (22 years),revealed economy size, trade openness, interest rate, and banking system determine bond market performance. The result emphasized on trade openness as very critical for inflow of investment to a country.

Onaolapo and Oluwafemi (2010), in Nigeria examine the development of the bond market in relation to the Nigeria economy using OLS regression analysis. The study reveals a considerable link between bond market and economic growth, with bond market size, liquidity being significant determinants of economic growth in Nigeria.

Domestic Debt and the Nigeria Economy was a study made by Adofu and Abula (2010) investigating the empirical relationship between debt and economic growth in Nigeria using OLS regression techniques. The findings indicate that domestic debt has a negative effect on the growth of the Nigerian economy.

Durham (2003) on the effects of foreign portfolio investment and "other" foreign investment on economic growth using cross-country data observes that FPI has no effect on economic growth and does not correlate positively with macroeconomic volatility. This result is in line with the study of Sethi and Patnaik (2004) on impact of international capital flows on India's financial markets and economic growth. By using monthly data, they find that FDI positively affects the economic growth, while the effect of Foreign Portfolio Investment is negative.

The review of past empirical literature has clearly shown that there exists a gap in literature as the findings of past studies lacked bio-directional approach or the reverse relationship. consensus which indicates the need for further studies in the area of bond foreign portfolio investment of the public sector and bond yield performance in the Nigeria bond market. Although, a large number of studies suggest that foreign portfolio investment and bond foreign portfolio investment enhances and growth of host countries market but there exists a lot of evidence that suggests otherwise too.

Theoretical Review

So many theories have been used by many researchers to connect changes in foreign portfolio investment and stock market returns. Theories like the capital asset pricing model, efficient market hypothesis, arbitrage pricing theory, push factor and pull factor theories. A way of connecting foreign portfolio investment and capital market performance is through these theories. This work specifically focuses on Arbitrage Pricing Theory (APT).

Arbitrage Pricing Theory (APT)

APT is a security pricing model that generates the pricing relation in the capital asset pricing model and also builds on the perception of the separating distributions (Dybvig & Ross, 2003; Obere, 2009). APT backed by the law of one price and entails that the returns on any stock be linearly related to a set of indexes (Elton, Martin, Stephen, & William, 2011).

The principal strength of the APT approach is that it is based on the no-arbitrage condition which holds for any subset of securities hence removing the need to identify all risky assets or a "market portfolio" to test the APT. Hence it can be tested over a class of assets such as common stocks or a small set such as the stocks making up the index (Elton et al. 2011). "According to the fundamental theorem of asset pricing, non-presence of arbitrage, existence of a stable and constant positive linear pricing rule, and existence of an optimum for an agent who prefers more to less are the same (Dybvig & Ross, 2003). "This means that the asset pricing model can be expressed as a linear function of factors, which are the determinants of the return of the asset. From a single-factor model, uncertainty in asset returns comes from a common or macroeconomic factor and a firm-specific cause, where the common factor has zero expected value.

Research Methodology

Research Design

The nature of the data utilized in this research is a combination of time series and cross-sectional data which is referred to as panel data.

Data Estimation Techniques

To ensure data stationarity among the variables we conducted the Augmented Dickey Fuller unit Root test, this is to avoid non-stationarity problems commonly associated with times series data. Furthermore, we carried out the descriptive statistical analysis to explain the variations among the variables of the study and examine such indices which include the men, median, and the standard deviation. We adopted the ordinary least square regression model as our estimation technique of the research work. To determine the long run equilibrium of the variables we utilized the Johasen multivariate co-integration test. And finally Granger causality was applied the evaluate effects and impacts among the variables.

Model Specification

H0: There is no significant relationship between bond foreign portfolio investment in the public sector and bond yield in the Nigeria bond market. The specified model in this case is:

$$PUBY = f(BFPI, EXRT, INFL, GDP, INTR) \qquad (1)$$

Where *PUBY* = Public Sector bond yield

BFPIP = FPI inflows to the bonds market of the public sector

EXRT = Exchange rate

INFL = inflation rate (to measure macroeconomic instability)

GDP = growth rate

INTR = interest rate in the money market (a trade-off for participation in the bonds market)

In its econometric form, the model is specified as:

$$BY_t = \alpha_0 + \alpha_1 BFPIP_t + \alpha_3 EXRT_t + \alpha_4 INFL_t + \alpha_5 GDP_t + \alpha_6 INTR_t + \varepsilon_t \qquad (2)$$

Where all variables are as earlier defined and

α_o =   Intercept

α_1-α_k =   Unknown parameters

A-priori expectation = $\alpha_1 < 0$ $\alpha_2 < 0$ $\alpha_3 < 0$ $\alpha_4 < 0$ $\alpha_5 < 0$

Estimation Results/Analysis

Table 1 : Descriptive Statistics Results

	PUBY	PUBFBI	EXRT	INFL	GDP GROWTH	INTR
Mean	7.396457	892.2432	90.31771	63.87543	3.961352	12.11343
Median	7.200000	174.1560	106.7100	56.28000	4.631193	10.82000
Maximum	16.14000	6076.002	306.3100	111.7200	15.32916	23.99000
Minimum	2.232000	0.714000	0.750000	35.20000	-10.92409	4.700000
Std. Dev.	2.740294	1674.462	84.34111	21.18290	4.685511	4.980668
Skewness	0.877400	2.170940	0.771985	0.836108	-0.535479	0.842311
Kurtosis	4.561237	6.464733	3.128955	2.548340	4.796555	3.028086
Jarque-Bera	8.045305	44.99877	3.500692	4.375439	6.379567	4.139830
Probability	0.017905	0.000000	0.173714	0.112172	0.041181	0.126197
Sum	258.8760	31228.51	3161.120	2235.640	138.6473	423.9700
Sum Sq. Dev.	255.3131	95329982	241856.4	15256.31	746.4363	843.4400
Observations	35	35	35	35	35	35

Source: E-Views 10 Output

Table 1 above displays the mean values of 7.3%, 892.2%, 90.3%, 63.87%, 3.96% and 12.11% for public sector bond yield (PUBY), Public sector bond foreign portfolio investment (PUBFPI), Exchange rate (EXRT), inflation rate (INFL), real gross domestic product(RGDP) and interest rate (INTR) for the review period. The results revealed that the coefficient of skewness for PUBY (0.877400), EXRT (0.771985), INFL(0.836108), RGDP (-0.535479) and INTR (0.842311) are below distribution. The probability values of the Jarque-Bera statistics in the table show significance at the 5% level which is an indication that the time series data were normally distributed. The standard deviation values of 2.740294 for PUBY, 4.980668 for INTR and -0.535479 for RGDP are relatively low which implies a minimal level of dispersion.

Table 2: Augmented Dickey- Fuller   Unit Root Test Result For Data Stationarity

Variables	Probability	T-Statistics	Order/Level of Integration
Public Sector Bond Yield	0.0412	-3.031280	I(0)
Public Sector Bond Foreign P Inflows	0.0000	-7.459637	I(2)

Exchange rate	0.0001	-5.200678	I(1)
Inflation rate	0.0000	-5.855009	I(1)
Growth rate	0.0166	-3.422852	I(0)
Interest Rate	0.0001	-5.191949	I(1)

Source: E-Views 10 Output

The results of the Augmented Dickey-Fuller stationarity test are presented in table 2 above. The variables are integrated at both level which is order I(0) , 1st difference (1) and at 2nd difference at the 5% level of significant . Therefore the hypothesis of non-stationarity is thus rejected at level, first difference and second difference respectively. The data was further subjected to Johasen Co-integration test to establish the long run relationship between the dependent variable and the explanatory variables.

Table 3: Johansen Multivariate Co-Integration Test

Date: 03/05/20   Time: 19:50
Sample (adjusted): 1985 2017
Included observations: 33 after adjustments
Trend assumption: Linear deterministic trend
Series: PUBY PUBFBI EXRT INFL GDP_GROWTH
INTR
Lags interval (in first differences): 1 to 1

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.664808	112.9399	95.75366	0.0020
At most 1 *	0.585754	76.86924	69.81889	0.0123
At most 2	0.536867	47.78649	47.85613	0.0508
At most 3	0.309508	22.38503	29.79707	0.2776
At most 4	0.181772	10.16343	15.49471	0.2684
At most 5	0.101805	3.543148	3.841466	0.0598

 Trace test indicates 2 cointegrating eqn(s) at the 0.05 level
 * denotes rejection of the hypothesis at the 0.05 level
Source: E-Views 10 Output

The above table indicates 2 co-integrating equations at the 0.05 level as the trace statistics is greater than the critical value at 0.05%. Therefore, we reject the null hypothesis at the 0.05% level of no co-integrating equation. The outcome endorse   a long run correlation between all the variables employed .

Table 4: Regression Analysis

Dependent Variable: PUBY

Method: Least Squares
Date: 03/05/20   Time: 23:42
Sample (adjusted): 1983 2017
Included observations: 35 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
PUBFBI	0.000131	0.000361	0.363380	0.7190
EXRT	0.010181	0.008542	1.191820	0.2430
INFL	0.060578	0.018806	3.221183	0.0031
GDP_GROWTH	0.084677	0.078539	1.078151	0.2899
INTR	0.431999	0.070500	6.127641	0.0000
C	-3.077977	1.945318	-1.582249	0.1244

R-squared	0.661648	Mean dependent var	7.396457
Adjusted R-squared	0.603311	S.D. dependent var	2.740294
S.E. of regression	1.725926	Akaike info criterion	4.084209
Sum squared resid	86.38579	Schwarz criterion	4.350840
Log likelihood	-65.47366	Hannan-Quinn criter.	4.176250
F-statistic	11.34189	Durbin-Watson stat	1.868891
Prob(F-statistic)	0.000004		

Source: E-Views 10 Output

The value of the Coefficient of determination which is the R-squared indicates that 66% of the variations of public sector bond yield are explained by the interactions of the explanatory variables. The probability of the (F-stat) is highly significant at the 5% level of significance which indicates that regression model fitted the data which is goodness of fit. The Durbin-Watson statistics   is significant therefore the problem of auto correlation is non-suspect hence our model can be dependent on upon in making useable conclusion on the explanatory power of the independent variables on public sector bond yield.

Test for Hypothesis

The hypothesis of a significant linear relationship between the dependent and independent variables is validated as a group and the Prob. shows the significant level of the T-statistics. The results of the t-test in the table above indicates that the probabilities of interest rate and inflation rate are statistically significant and positive for public sector bond yield at the 0.05 level of significance, thus we reject

the null hypotheses and accept the alternate hypotheses. While, public sector bond foreign portfolio investment, exchange rate, and real gross domestic product failed the T-statistics test at 5% level of significance which shows that they are not good predictors of public sector bond yield . Therefore, we accept the null hypothesis which states that there is no significant relationship between bond foreign portfolio investment in the public sector and bond yield in the Nigeria bond market.

Table 5: Multicolinearity Test for the independent variables

	PUBFBI	**EXRT**	**INFL**	**GDP GROWTH**	**INTR**
PUBFBI	1.000000	0.816805	-0.327081	-0.100036	-0.355776
EXRT	0.816805	1.000000	-0.577146	0.213480	-0.504515
INFL	-0.327081	-0.577146	1.000000	-0.436440	0.262224
RGDP_GRO WTH	-0.100036	0.213480	-0.436440	1.000000	-0.019747
INTR	-0.355776	-0.504515	0.262224	-0.019747	1.000000

Source: E-Views 10 Output

The correlation matrix above shows that the explanatory variables are not associated in a significant mode which implies that there is no perfect relationship among the variables.

Table 6: Pair wise Granger Causality Test

Pairwise Granger Causality Tests
Date: 03/05/20 Time: 22:02
Sample: 1980 2018
Lags: 2

Null Hypothesis:	**Obs**	**F-Statistic**	**Prob.**
PUBFBI does not Granger Cause PUBY	33	0.08791	0.9161
PUBY does not Granger Cause PUBFBI		0.21169	0.8105
EXRT does not Granger Cause PUBY	35	1.02572	0.3708
PUBY does not Granger Cause EXRT		0.40886	0.6681
INFL does not Granger Cause PUBY	36	0.13674	0.8727

PUBY does not Granger Cause INFL		1.07131	0.3549
GDP_GROWTH does not Granger Cause PUBY	36	0.17572	0.8397
PUBY does not Granger Cause RGDP_GROWTH		0.13833	0.8713
INTR does not Granger Cause PUBY	36	1.79866	0.1824
PUBY does not Granger Cause INTR		0.24076	0.7875

Source: E-Views 10 Output

The result of the pairwise causality test is estimated by the value of the probability against the 5% level of significance. The evidence of the causal relationship flowing from the explanatory variables to the dependent and vice versa is not significant at the 5% level of significance which implies that there is no causality between public sector bond yield and selected independent variables.

Discussion of Findings

There is no significant relationship between bond foreign portfolio investment of the public sector on bond yield in the Nigeria bond market. the coefficient of public sector bond foreign portfoli investment failed the significance test at the 5 percent level. Decision was to accept null hypothesis. The results of the t-test in the table above indicates that the probabilities of interest rate and inflation rate are statistically significant and positive for public sector bond yield at the 0.05 level of significance, thus we reject the null hypotheses and accept the alternate hypotheses. While, public sector bond foreign portfolio investment, exchange rate , and real gross domestic product failed the T-statistics test at 5% level of significance which shows that they are not good predictors of public sector bond yield . Therefore , we accept the null hypothesis which states that there is no significant relationship between bond foreign portfolio investment in the public sector and bond yield in the Nigeria bond market.

Conclusion

The investigation showed that there is little or no impact derived from bond foreign portfolio investment of public sector on the bond yield proxy for performance in this investigation. Whether by way of returns boost government bond attractiveness and or the other variables like foreign exchange impacting bond yield. this study indicates that the banking sector remains very critical in performance

of the bond market looking at the interest rates. Forex market looking at the exchange rates of foreign currency. Inflation level on bond pricing and the composition of external debt to growth rate are germane in shaping Nigeria's public bond market performance.

Recommendations

Since bond foreign portfolio investment has not been able to trigger the much-required attractiveness by way of performance and investment funding for development of Nigeria bond market and the economy as a whole. It is then important going forward by way of government policies and legislations to look inward for viable sources of funding rather than debt funds. Equally, domestic investment is a better option for when target is debt funds. Domestic investors should be the way to go subsequently when government at different levels attempt to raise investment funds rather than targeting foreign investors.

1. Government should look at converting a greater percentage of foreign public bond to domestic investment bonds through re-negotiation under some modified arrangement.

2. Government should increase effort at creating more investor confidence ensuring effective governance and proper protection of the sector. To achieve this, the international best practice could be carefully reviewed and adopted in a calculated manner in public bond issuance.

3. Government should invest more on human capital development in other to provide the bond market with the required qualified staffs operators and manager to effectively increase the domestic patronage of government bonds.

REFERENCES

Adofu, I. & Abula, M.(2010).Domestic Debt and the Nigerian Economy. Current Research *Journal of Economic Theory*. II (1), 22-26.

Adyorough, T. (2010).The Mechanics of a Bond Market in Nigeria. Solution to liquidity constraints in over the counter bond trading. Available at http://focusnigeria.com/nigeria-bond-market.htm.visited on 20/12/2010.

Baghebo, M., & Apere, T. (2014). Foreign portfolio investment and economic growth in Nigeria (1986 - 2011), *International Journal of Business and Social Science*, *5*(11), 108-115.

Durham, J.B. (2003) Foreign portfolio investment, foreign bank lending and economic growth, *International Finance Discussion Paper*, No. 757.

Eichengreen, B. & Luengnaruemitchai P. (2006). Why Doesn't Asia Have Bigger Bond Markets? In Asia Bond Markets: Issues and Prospects.

Ezirim F. 2005 "impact of bank lending on liquidity of banks in Nigeria", *IJJS Publication Journal.* 2: 44-56.

IMF, WB.(2001). Guidelines for Public Debt Management. The International Monetary Fund and the World Bank. Washington, D.C.

Onaolapo, A. A. & Adebayo E. O. (2010). Effective Development of the Bond Market and the Nigeria Economy. *Journal of Management and Society*, 1(2), 38-43, December Edition.

Peiris, S.J., 2010. Foreign Participation in Emerging Markets' Local Currency Bond Markets (IMF Working Paper No. 10/88). International Monetary Fund.

Sethi, N. & Patnaik, K. U. S. (2004) Impact of international capital flows on India's economic growth, 1-19 https://www.citeseerx.ist.psu.edu/accessed October 19, 2019.