



## Foreign Portfolio Equity Investment and the Performance of the Nigerian Stock Market: A Sectoral Distribution Analysis

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### Abstract

Most developing countries, such as Nigeria, have always been challenged by saving-investment gap, while many of them have consistently harnessed the Foreign Portfolio Investment (FPI) inflows to bridge the gap. In spite of the increased inflow of this type of investment to the Nigerian economy, its influence on stock market performance has been less consensual while such investment is also vulnerable to economic shocks. Therefore, this study examines the effect of foreign portfolio equity investment on stock market performance in Nigeria. The study employed ex-post facto research method using monthly time series data from 2007 to 2017. Using Kruskal-Wallis non-parametric test and the Autoregressive Distributed Lag (ARDL) model, the results reveal that there exists a significant difference in the sectoral distribution of FPI inflows to the Nigerian economy. It also finds that foreign portfolio equity investment has a significant positive influence on the Nigerian stock market performance at 5% level (t-stat= 6.8913, P= 0.0000<0.05; R<sup>2</sup> = 0.77). The study concludes that foreign portfolio equity investment significantly predict stock market performance in Nigeria, and therefore recommends that the regulatory authorities should deepen the equity stocks of the market and encourage more firms to get listed on the Nigerian Stock Exchange with a view to channelling more investments into the economy thereby fast-tracking industrialisation and economic development.

**Key words:** Foreign portfolio equity investments; Stock market performance; Sectoral distribution of FPI

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### INTRODUCTION

Stock market performance and the leveraging of portfolio investment as a good avenue for bridging the saving-investment gap, especially in developing countries, have captivated the interest of governments, investors, policy makers and researchers. Portfolio investment is a cluster of financial investment instruments which can easily be traded. These instruments include stocks, bonds, and money market instruments of different foreign and domestic businesses (Okonkwo, 2016). These instruments of portfolio investments are highly liquid in nature, which implies that they are easily convertible to currency at any time. Chaudry, Farooq and Mushtaq (2014) classified portfolio investments into two categories: first is portfolio investment according to financial instruments which are stocks, bonds and money market instruments; second is portfolio investment according to economic sectors which include government, banks, stock market and other sectors of the economy.

The stock market is an important medium that provides companies with an invaluable avenue to raise funds for their businesses. The stock market allows companies to be publicly listed and traded, or to raise additional capital for expansion by floating stocks of ownership in an exchange market. A critical factor of a stock market is its liquidity which refers to the ease with which investments in financial securities are acquired and

disposed (Somuncu & Karan, 2005; Marcin, Robert, & Kryzstof, 2013; Ngerebo-A & Torbira, 2014; Adjei, 2015; Gerlach & Yook, 2016; Kumar, Gupta, & Sharma, 2017). The market liquidity makes investment in stocks more attractive compared to other less liquid investments such as real estate. Usually, a stock market is considered one of the primary measurements of the growth and development of any country's economy.

Foreign Portfolio Investment (FPI) is also a facilitator of economic growth and development which leads to industrialization of the economy in the long run. Foreign portfolio investment means the purchase of shares in a foreign country where the investing party does not seek control over the investment (Janine, Jonathan, & Lynne, 2010; Owo, 2013; Loncan & Caldeira, 2015; Pala & Orgun, 2015).

FPI plays an important role in contributing to economic growth, especially in countries with well-developed financial markets (Alfaroa, Chandab, Ozcanc, & Sayekd, 2004). But, Hefeker (2005) argued that portfolio investments run the risk of sudden reversal if the economic environment or the perception of investors change, giving rise to financial and economic crises. However, studies (Roberto & Paul, 2007; Jalita & Salina, 2009; Egly, Johnk, & Liston, 2010; Osinubi & Amaghionyeodiwe, 2010; Lahiri, 2012; Okpoto, 2015; Gerlach & Yook, 2016) have focused only on the interaction of foreign portfolio investments with other pull factors within the economy without considering the distribution of this investment across the various economic sectors.

Emerging markets such as Nigeria have consistently utilized FPI inflows to bridge the saving-investment gap. The use of this type of investment to fill the saving-investment gap can be adduced to the fact that domestic portfolio investment is not enough to drive the economy to achieve the kind of growth it is set to attain. Also, there is no balance between funds/capital requirements and savings capacity in the Nigerian economy (Eniekezimene, 2013).

Despite the increased inflow of FPI to Nigeria, the stock market is still vulnerable to shocks on its economic activities. The 2016 near collapse of the Nigerian stock market just like the 2008 global financial meltdown raises much concern as to whether the inflow of foreign portfolio investments to the economy has no effect on the performance of the Stock Market. Therefore, there is need for a thorough investigation and in-depth study towards addressing the problem.

Furthermore, FPI has been adduced to have adverse effects on a host country. The potentially damaging aspects of foreign portfolio investments are found in its short term nature and also in its volatility (Knill & Lee, 2014; Yaha, Singh, & Rabanal, 2017). More importantly, Osinubi and Amaghionyeodiwe (2010) opine that Foreign

Portfolio Equity Investment is basically just a change of ownership and may not be a positive investment transfer. Unlike foreign direct investment, foreign portfolio investors ask for faster returns on their investment and this may lead these investors to suddenly enter or leave an economy. Therefore, many countries are worried about the destructive effects of foreign portfolio outflow during a crisis.

In this light, this study examined the sectoral distribution of foreign portfolio investment in Nigeria and the influence of FPIs in equity trading on the performance of the Nigerian stock market. Hence, the study established the outcome of this phenomenon in Nigeria and thereby contributed to existing body of knowledge by testing the following hypotheses empirically:

**Ho1:** There is no significant difference in the distribution of Foreign Portfolio Investment Inflow across economic sectors in Nigeria.

**Ho2:** Foreign Portfolio Equity Investment does not have significant influence on the Volume of Transactions in the Nigerian Stock Market.

**Ho3:** Foreign Portfolio Investment does not granger cause the Nigerian Stock Market Performance.

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## 1. LITERATURE REVIEW

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Goetzmann and Kumar (2008) defined foreign portfolio equity stocks in the US equity market investments as an available passive fund. Also, Chukwuemeka, Stella, Oduh, and Onyema(2012) opined that Foreign Portfolio Equity Investment for the Nigerian stock market involves investment in shares and stocks available in the economy. Gathenya (2015) believes that Foreign Portfolio Equity Investments provide investors with a wide array of assets with varying degree of risk, return and liquidity.

Egly, Johnk and Liston (2010) examined the relationship between net foreign portfolio investment inflows and the US stock market. The results showed that internal country-specific factors may influence foreign portfolio inflows. This finding is in line with that found in the works of Marcin, Robert and Krzysztof (2013), and Yaha, Singh and Rabanal (2017). However, Henry (2000) addressed the issue of foreign portfolio investment volatility and the abnormal market liberalization. The study argued that, with more foreign investments, start-up companies as well as existing companies can raise capital seamlessly. The entrance of foreign investors also increases the liquidity of local market, and makes the base of investors broader, thereby, increasing risk sharing. The study is in consonance with the works of Bekaert and Harvey (2000) and Kim and Singal (2000).

In developing economies however, some countries imposed rules to prevent equity outflows (Kim & Singal, 2000) and consistent with these rules, Stiglitz (1998) argued that in there is more need for capital flow controls

since these countries are more vulnerable to changes in international flows. Also, Loncan and Caldeira (2015) analyzed the effect of foreign portfolio capital flows on stock returns of Brazilian listed firms through a 6-factor APT model, in which an additional risk factor for foreign portfolio capital flows was included. The result showed that foreign portfolio capitals caused increases in returns especially for sectors related to commodities, industry and cyclical consumption. This also agrees with the studies of Mishra and Conteh (2014) and Felman, Gray, Goswami, Jobst, Pradhan, Peiris and Seneviratne (2014).

Ali, Nasir, Zeshan, Mohammad and Tanvir (2012) empirically analyzed the role of foreign portfolio investment in developing host country's stock markets and examined whether they are related or not using macroeconomic variables. The results suggested that FPI along with selected explanatory variables have positive impact on the stock market of Pakistan. This corroborated the study of Anyanochukwu (2012), Dua and Garg (2013), Gumus, Duru and Gungor (2013), Chaudhry, Farooq and Mushtaq (2014), and Lagoarde-Segot and Lucey (2007).

In Nigeria, studies (Ogujiuba & Obiechina, 2012; Ozurumba, 2012; Eniekezimene, 2013; Okpoto, 2015; Elekwa, Aniebo, & Ogu, 2016) suggested that the activities of FPI have impacted favourably in boosting economic activities in the economy. However, a disaggregated data was employed and foreign private investment which is a combination of foreign portfolio investment, foreign direct investment and other cash flows was used to establish the relationship. However, Ekeocha (2008) opined that Foreign Portfolio Investment, though volatile in nature, is an important source of fund to support investment in an economy that has a wide saving-investment gap such as Nigeria. Baghebo and Apere (2014) examined the impact of foreign portfolio investment (FPI) on economic growth and found a positive long-run relationship between the variables. The study by Osinubi and Amaghionyeodiwe (2010) is in consonance with this submission.

The empirical literature reviewed emphasized the importance of foreign portfolio investment in stimulating economic growth of countries in Sub Sahara Africa including Nigeria. Despite the huge presence of FPI in

Nigeria, the growth rate of real per capita GDP has been poor and disappointing. The miserable or discomfort index is on the increase. It means that some variables stimulating FPI and domiciling the benefits of FPI in the economy are not incorporated in their modelling. To further buttress this proposition, the variant flow theory of capital movement by Sachs, Tornell, and Velasco (1996) in Gathenya (2015) is considered appropriate to explain this phenomenon. The theory uses country-specific variables to establish a relationship between capital flows and stock market activities. Also, while the literatures reviewed focused on the relationship between foreign portfolio investments and economic growth, there is a scanty/very rare research into the sectoral distribution of foreign portfolio investment to economies, especially in Nigeria. Therefore, this study filled this gap by investigating the difference in the distribution of foreign portfolio investment inflow across various economic sectors in Nigeria, while examining the effect of foreign portfolio equity investment on the performance of the Nigerian stock market.

## 2. METHODOLOGY

The paper employed time series quarterly data covering 11 years (2007-2017) to estimate the long-run and causal relationships between foreign portfolio investments and stock market performance in Nigeria. The data were sourced from the Nigerian Stock Exchange reports, Central Bank of Nigeria (CBN) statistical Bulletins, World Development Indicators (WDI), National Bureau of statistics, IMF World Economic Outlook, World Investment Report by United Nations Conference on Trade and Development (UNCTAD), and the CBN Journal of Applied Statistics.

The study employed an empirical analysis with Autoregressive Distributed Lag Model (ARDL) test, Kruskal Wallis test, and the one-sample kolmogorov-smirnov test to evaluate the hypotheses with the help of the Econometric View (E-view) Version 8 econometrics package.

Table 1 explains the variables employed in this study, their measurements and the justification for their use.

**Table 1**  
**Table of Variables and Their Measurements**

Variables	Measurement of Variables	Previous Studies
<b>Dependent Variable</b>		
Volume of Transactions in the Nigerian Stock Market	Total volume of transaction of the Nigerian Stock market	Ngerebo-A and Torbira (2014); Adjei (2015)
<b>Independent Variables</b>		
Foreign Portfolio Investment in Equity Stocks	Monthly aggregate foreign portfolio investment in equity stocks	Gathenya, (2015) and Okonkwo (2016)

To be continued

Continued

Variables	Measurement of Variables	Previous Studies
Financial development	Financial Development Measures by the Central Bank of Nigeria (CBN) proxied by $M_2$ /RGDP	Anyanochukwu (2012)
Exchange Rate	Official Rate of exchange as previewed by CBN statistical bulletin	Gumus, Duru and Gungor (2013)
Inflation Rate	Rate of Inflation as previewed by CBN statistical bulletin proxied by CPI	Dua and Garg (2013)
Interest Rate	Official lending rate as previewed by CBN statistical bulletin proxied by prime lending rate	Eniekezimene (2013)

Source: Authors' Model, 2018

### 2.1 Model Specification

The expectation that foreign portfolio investment in equity stocks influence the volume of transactions in the Nigerian stock market can be explained using the variant flow of capital movement as presented by the equation below:

$$VOT = f(PET, FID, EXR, IFR, ITR) \quad (1)$$

Where,

VOT= Volume of Transactions in the Nigerian Stock Market

PET= Foreign Portfolio Investments in Equity Trading

FID= Financial Development as proxied by  $M_2$ /RGDP

EXR= Proxied by Official Rate of exchange as previewed by CBN statistical bulletin

IFR= Rate of Inflation as previewed by the CBN statistical bulletin proxied by CPI

ITR= Official lending rate as previewed by the CBN proxied by prime lending rate

The model in its stochastic form:

$$VOT_t = \beta_0 + \beta_1 PET_t + \beta_2 FID_t + \beta_3 EXR_t + \beta_4 IFR_t + \beta_5 ITR_t + \mu \quad (2)$$

Introducing lag operator and Error Correction Model (ECM) for foreign portfolio investment in equity stocks and stock market performance is:

$$VOT_t = \beta_0 + \beta_1 PET_t + \beta_2 PET_{t-1} + \beta_3 FID_t + \beta_4 FID_{t-1} + \beta_5 EXR_t + \beta_6 EXR_{t-1} + \beta_7 IFR_t + \beta_8 IFR_{t-1} + \beta_9 ITR_t + \beta_{10} ITR_{t-1} + \beta_{11} ECM_{t-1} + \mu_t \quad (3)$$

The equations above are the error correction model with six (6) contemporaneous values (i.e.  $\beta_2, \beta_4, \beta_6, \beta_8, \beta_{10}$ ).

## 3. EMPIRICAL RESULTS

A non-parametric test was conducted to test the first hypothesis of the study: There is no significant difference in the sectoral distribution of Foreign Portfolio Investment Inflow to Nigeria. The study used the Kruskal Wallis Test to achieve this. But, before the analysis was carried out, the study tested for the normality distribution of the variables.

### 3.1 Test for Normality of the Variables Used

Table 2 presents the One-Sample Kolmogorov-Smirnov Test of the distribution of the Foreign Portfolio Investment for all sectors of the Nigerian economy. Normality is

assumed if the probability is greater than 0.05. The result as shown in Table 2 indicates that the significant level is lower than 0.05 implying that the data set does differ significantly from the normal distribution. Consequently, the Kruskal Wallis Test, an equivalent non parametric test for the independent t test was used to determine whether the mean difference was significant at the 5% level.

**Table 2**  
**One-Sample Kolmogorov-Smirnov Test**

	Users Satisfaction	
	Absolute	6.134
Most Extreme Differences	Positive	2.122
	Negative	-5.239
Kolmogorov-Smirnov Z		15.927
Asymp. Sig. (2-tailed)		.000

a. Grouping Variable: Foreign Portfolio Investment

Source: Authors' Computation, 2018

### 3.2 Kruskal Wallis Test Statistic

Table 3 shows the result of the Kruskal Wallis Test that is approximated into a chi-square distribution. The result shows that there is a significant difference between the inflows/distributions of Foreign Portfolio Investment to the different sectors of the Nigerian economy. Thus, we accept that there is a significant difference between the inflows/distributions of FPI to the different economic sectors of Nigeria.

**Table 3**  
**Test Statistics<sup>a</sup> Result**

	Conditions of destination sectors for FPI
Chi-Square	18.730
Df	6
Asymp. Sig.	0.005
Number of Levels in FPI	7
N	42
Observed J-T Statistic	9.492
Asymp. Sig. (2-tailed)	0.000

a. Grouping Variable: Foreign Portfolio Investment type

Source: Authors' Computation, 2018

### 3.3 Summary of Kruskal Wallis Test on the Sectoral Allocation of Foreign Portfolio Investment

The mean rank of the Kruskal Wallis presents the ranking of sectors in descending order in terms of inflows of FPI to the sectors. From Table 4, it can be seen that FPIs to Banking and Finance Sector has the greatest attraction for FPI distribution. This is followed by FPIs to the

Manufacturing Sector with a mean rank of 29.33 then; we have FPIs to Transport, Storage and Communication Sector having a mean rank of 26.50. The sector that has received the least FPI inflow is the Agricultural Sector having a mean rank of 5.17 and the reason is not far-fetched as the agricultural sector has inelastic marginal revenue.

**Table 4**  
**Summary of Kruskal Wallis Test on the Sectoral Allocation of Foreign Portfolio Investment Ranks**

Sectoral Allocation Foreign Portfolio Investments		N	Mean Rank
Foreign Portfolio Investments	FPIs to Banking and Finance Sector	6	29.50
	FPIs to the Manufacturing Sector	6	29.33
	FPIs to Transport, Storage and Communication Sector	6	26.50
	FPIs to Extractive Industry (Oil and Gas)	6	25.50
	FPIs to Constructive Industry	6	17.50
	FPIs to Wholesale & Retail Trade, Catering and Accommodation sector	6	17.00
	FPIs to Agricultural Sector	6	5.17
	Total	42	

Source: Authors' Computation, 2018

### 3.4 Unit Root Test

The study employed Augmented Dickey-Fuller (ADF) test to examine the stationarity of the time series and test the null hypothesis for unit root. It is expected that the series do

not contain unit root in order to find relationship among the variables in the long run. The test is carried out at level, and first difference using 5% Mackinnon Critical value. The levels of statistics of the tests are reported in Table 5.

**Table 5**  
**Augmented Dickey-Fuller (ADF) Unit Root Test Result**

Variable	Method	At Level			At First Difference			Order
		ADF statistics	5% critical value	Prob	ADF statistics	5% critical value	Prob	
EXR	ADF	0.6758	-2.8847	0.9912	-7.7765**	-2.8847	0.0000	I (1)
FID	ADF	-1.2950	-2.8836	0.6307	-10.2150**	-2.8839	0.0000	I (1)
IFR	ADF	-1.8849	-2.8836	0.3386	-12.3401**	-2.8838	0.0000	I (1)
ITR	ADF	-2.7226	-2.8841	0.0730	-9.4569**	-2.8841	0.0000	I (1)
LOG(PET)	ADF	-4.8521**	-2.8847	0.0001	-	-	-	I (0)
LOG(VOT)	ADF	-7.9750**	-2.8870	0.0000	-	-	-	I (0)

Source: Authors' Computation, 2018

Table 5 shows that the Volume of Transactions in the Nigerian Stock Market (VOT) and Foreign Portfolio Investments in Equity Trading (PET) were found to be stationary at levels as their ADF statistics were significant at 5% while it was tested at levels. The test reported Financial Development Measure (FID), Exchange Rate (EXR), Inflation Rate (IFR) and Interest Rate (ITR) to be stationary at first difference. These findings imply that the series are not amenable to Johansen Cointegration test.

### 3.5 Autoregressive Distributed Lag (ARDL) Approach (Bounds) Test for Cointegration

The ARDL was used to test the second hypothesis of the study: Foreign Portfolio Equity Investment does not have significant influence on the Volume of Transactions in the Nigerian Stock Market.

In Table 5, some of the variables were stationary at level others at first difference showing there is a practical difficulty that has to be addressed when we conduct F-test. Exact critical values for the F-test are not available for an

arbitrarily mix of I(0) and I(1) variables. However, Peseran, Shin and Smith (2001) prescribed a technique to investigate the appropriate order in which the variables are cointegrated. They suggested a bound for the critical value for the asymptotic distribution of the F-statistic. Table 6 shows that for the study model estimated, computed F-statistic falls above the 5% upper bound and so we would conclude that the variables are I(1) as in  $9.754 > 3.38$ .

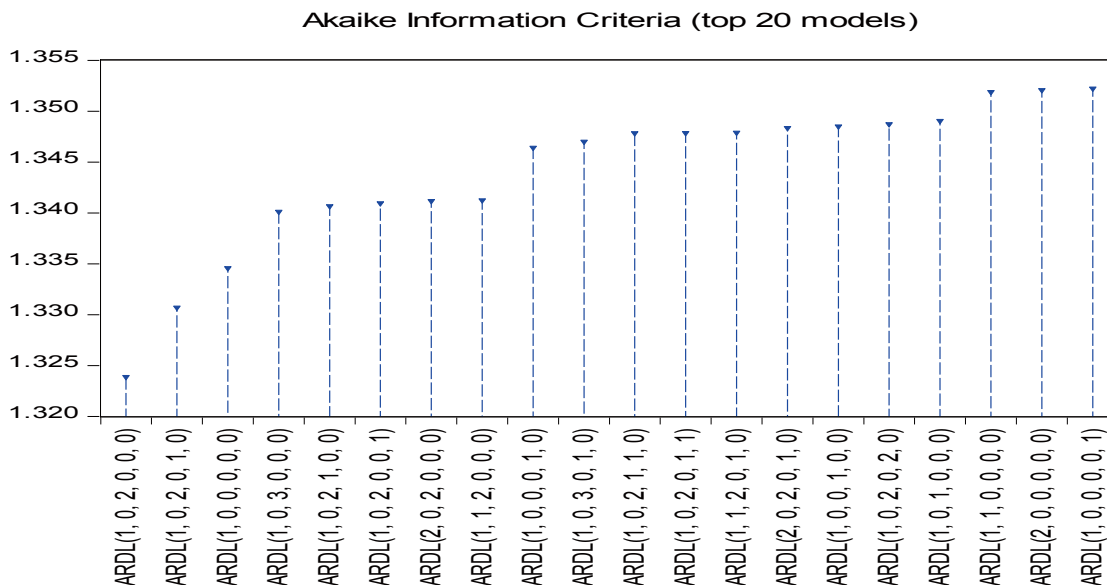
**Table 6**  
**ARDL Bounds Wald Statistic Result**

LOS	Model	
	I(0)	I(1)
10%	2.08	3
5%	2.39	3.38
2.5%	2.7	3.73
1%	3.06	4.15
F-Stat	9.754	
D.F	5	

Source: Researchers' Computation, 2018

In order to examine this hypothesis appropriately, an ARDL (Autoregressive Distributed Lag Model) approach was employed to conduct an empirical analysis using the Foreign Portfolio Investments in Equity Stocks equation earlier stated above. The choice of using ARDL approach is because some of the variables were stationary

at level and others at first difference making it suitable for application of the model. Before the ARDL for co-integration was conducted, it became imperative to test for the optimal lag length criteria for each variable. The Akaike information criterion was used and the result is presented in Figure 1.



**Figure 1**  
**Akaike Information Criterion Lag Length**

The optimal lag length of the ARDL model is selected based on the least Akaike Information Criterion. Figure 1 revealed that the optimal lag length is the order of ARDL (1, 0, 2, 0, 0, 0). The results of the ARDL are presented in Tables 7 and 8.

### 3.6 Autoregressive Distributed Lag (ARDL) Model: Long Run and Short Run Results

From Table 7 shows that in the long run, the coefficient of foreign portfolio investment in equity stock is positive and statistically significant at 5% level. A percentage increase in foreign portfolio investment in equity stocks will cause the volume of stocks traded to increase by 0.74%. This implies that foreign portfolio investment in equity stocks have a positive and significant influence on the volume of stock traded on the Nigerian stock exchange. This is to say that foreign portfolio investment in equity stock is a major driver of the volumes of stock traded in the Nigerian stock market.

The short run results also revealed that foreign portfolio investment in equity stocks has a positive and significant influence on the volume of stock traded on the Nigerian Stock Exchange. A percentage increase in foreign portfolio investment in equity stocks will cause the volume of stocks traded to increase by 12.23%, which shows there exists an elastic relationship between FPI in equity stocks and volume of traded on the Nigerian Stock Exchange in the short run. This implies that there is capital

mobility in the stock market. The results also reveal that in the long run, the coefficient of financial development is positive but insignificant at 5% level while it is negative but insignificant in the short run.

Exchange rate revealed in Table 7 show that, in the long run, the coefficient of exchange rate is negative but insignificant. This means that exchange rate has a negative but insignificant effect on the volume of stocks traded in the stock market. The implication of this is that a percentage increase in exchange rate, on average, will cause the volume of stock traded to decrease by 0.02%. The implication of this is that exchange rate depreciation caused withdrawals and reduction in the volume of stocks traded in the stock exchange during the study period. However, in the short run, exchange rate has a significant positive effect on the volume of stocks traded in the stock market. This could be adduced to the fact that rational investors would be able to acquire more units of stocks for the same amount with depreciation while they also have the opportunity to watch the appropriate time to divest in the long run, especially when there is persistent depreciation.

Results in Table 7 also show a positive and significant relationship between interest rate and the volume of stocks traded in the Nigerian stock market. A percentage increase in interest rate would lead to 0.29% increase in the volume of stocks traded in the stock market. This conforms to the *a priori* expectation as higher interest

rate will encourage investors to invest more with a view to reaping higher returns. However, in the short run, there exists a negative but insignificant relationship between interest rate and the volume of stocks traded in the Nigerian stock market. In both the short run and long run,

inflation rate has a positive and significant effect on the volume of stocks traded in the Nigerian Stock Market. A percentage increase in inflation rate would trigger 0.47% and 0.20% increase in the volume of stocks traded in the short and long runs respectively.

**Table 7**  
**ARDL Long and Short Run Results**  
**Dependent Variable: LOG(VOT)**

Long Run Estimates				Short Run Estimates			
Variable	Coefficient	t-stat	Prob	Variable	Coefficient	t-stat	Prob
LOG(PET)	0.7423**	6.8914	0.0000	C	18.6900**	7.2246	0.0000
FID	15.2225	1.5336	0.1281	LOG(VOT) <sub>t-1</sub>	0.5945**	11.8656	0.0000
EXR	-0.0140	-1.3449	0.1815	LOG(PET)	12.2288**	2.8946	0.0038
IFR	0.2069*	2.4155	0.0174	FID <sub>t-1</sub>	-0.0086	-1.9143	0.0556
ITR	0.2924*	2.6086	0.0104	EXR	0.1567**	3.9789	0.0001
C	23.7023**	17.1699	0.0000	IFR	0.4711**	7.7212	0.0000
				ITR	-0.0197	-0.4657	0.6424
				Δ(FID)	3.1434	0.5882	0.5577
				ΔFID <sub>t-1</sub>	-7.6928	-1.4418	0.1523
				CointEq(-1)*	-0.7885	-8.4959	0.0000

\* Implies significant at 5%      \*\* Implies significant at 1%  
 Source: Authors' Computation, 2018

### 3.7 Statistical Properties and Post Diagnostic Results of the Foreign Portfolio Investments in Equity Stocks Model

Considering the statistical properties of the ARDL result reported in Table 8, the R-squared value of 0.77 indicates that about 77% variation in the volume of stocks traded on the Nigerian stock exchange is explained in the model by the explanatory variables. The F-statistic of 2.63 is statistically significant and this shows that there is a considerable harmony between volumes of stock traded in the stock exchange and the explanatory variables put together. This confirms that all the independent variables jointly have significant influence on the dependent variable. The Durbin-Watson statistic of 2.01 indicates that there is no serial correlation associated with the regression result as this can be approximated as 2. The Akaike Info Criterion (AIC) and the Schwarz Criterion were relatively low and this shows that the model selection best explains the relationship investigated.

The post diagnostic test, the Breusch-Pagan-Godfrey (BPG), checks for the presence of heteroskedasticity in a regression result. The BPG tests the null hypothesis of homoskedasticity against the alternative hypothesis of heteroskedasticity. The BPG probability value obtained was greater than 5% implying absence of

heteroskedasticity in the regression result.

The B-G Serial Correlation Lagrange Multiplier (LM) test is used to test for higher order Autoregressive Moving Average (ARMA) errors and is applicable whether or not there is lagged dependent variable(s). The B-G tests the null hypothesis of no serial correlation against the alternative hypothesis of serial correlation. The result of the B-G Serial Correlation LM probability was 0.58 and this is greater than 5%, hence we could not reject the null hypothesis of no serial correlation implying that the model has no higher order ARMA (*p*) correlation.

The Jarque-Bera statistics test was used to check for the normality distribution of the equation, against the alternative hypothesis. The probability of the Jarque-Bera test concludes that the equation is normally distributed as the probability value is greater than 5%. In the model, the error correction term CointEq<sub>t-1</sub> is well specified and correctly signed. The coefficient of the CointEq<sub>t-1</sub> is approximately -0.79. It means that about 79% departure from long run equilibrium is corrected in the short run. The negative sign in the CointEq<sub>t-1</sub> confirms the existence of co-integrating relationship. Hence, about 79% of the variations in the short run converge towards the long run equilibrium.

**Table 8**  
**Statistical Properties and Post Diagnostic Results of the Foreign Portfolio Investments in Equity Stocks equation**

Statistical Properties of Results		Post Diagnostic Tests Result	
R-squared	0.77	BPG Heteroskedasticity (F-Stat)	0.7766
Adj R-squared	0.60	BPG Heteroskedasticity Prob. F(8,105)	0.6241
F-statistic	2.634	B-G Serial Correlation LM (F-Stat)	0.5506
Prob(F-statistic)	0.011	B-G Serial Correlation LM Prob. F(8,105)	0.5783

To be continued

Continued

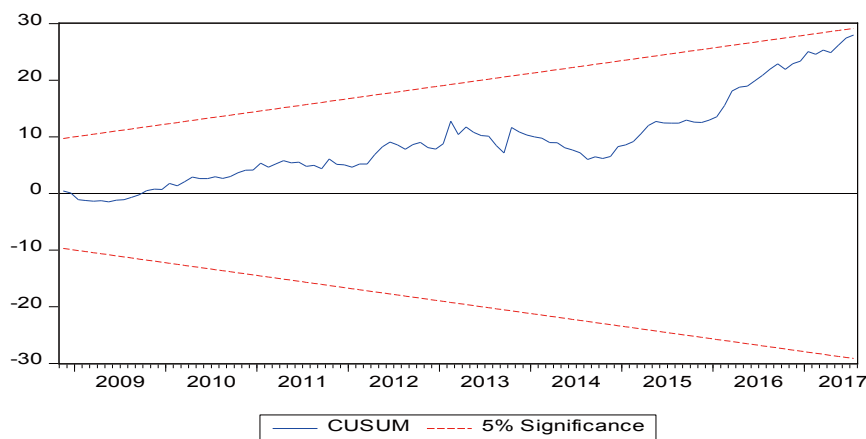
Statistical Properties of Results		Post Diagnostic Tests Result	
Durbin-Watson Stat	2.006	Ramsey RESET (F-Stat)	1.6831
Akaike Info Criterion	1.365	Ramsey RESET Prob	0.1974
Schwarz Criterion	1.581	Jarque-Bera Statistics	423.58
		Jarque-BeraProb	0.0000
		Redundant variable Test (F-stat)	0.7141
		Redundant variable Test (Prob)	0.6142

Source: Authors' Computation, 2018

### 3.8 Cumulative Sum (CUSUM) Stability Test of the ARDL Model

The CUSUM test as presented in Figure 2 was used to examine the stability of the ARDL model. The aim here was to test the null hypothesis for no bias and consistency which produces a zero mean vector for/against the

alternative of specification error. The result revealed that the probability is greater than 5%, hence, we could not reject the null hypothesis; this implies that the model is free from specification error. The CUSUM graph shows the model lies in between the red-dotted lines meaning that the model is stable in the long run.



**Figure 2**  
CUSUM Stability Test of the ARDL Equation

Source: Authors' Construct using study data

### 3.9 Granger Causality Results

The Granger causality approach was used to test the third hypothesis of the study: Foreign Portfolio Investment does not granger cause the Nigerian Stock Market Performance. The results are presented in Table 9. The results reveal that portfolio investment in equity (PET) granger causes volume of transactions (VOT), while interest rate(ITR) granger causes exchange rate (EXR) whereas inflation rate (IFR) granger causes interest rate (ITR). Hence,

hypothesis three could not be accepted. Summarily, there exists a unidirectional causality flow running from foreign portfolio equity investments to stock market performance. However, PET and IFR constitute the transmission channel through which VOT is driven. The implication of this is that inflation rate and foreign portfolio equity investment represent major keys for driving stock market performance in Nigeria.

**Table 9**  
VEC Causality Result

Prob	$\Delta VOT$	$\Delta PET$	$\Delta FID$	$\Delta EXR$	$\Delta IFR$	$\Delta ITR$
$\Delta VOT$	NA	0.0314*	0.1892	0.8386	0.9734	0.6637
$\Delta PET$	0.6694	NA	0.4952	0.3373	0.6716	0.9442
$\Delta FID$	0.2638	0.1160	NA	0.8963	0.8347	0.2850
$\Delta EXR$	0.7324	0.6383	0.6829	NA	0.5595	0.0419*
$\Delta IFR$	0.3199	0.3581	0.3472	0.5066	NA	0.9308
$\Delta ITR$	0.6194	0.4298	0.6613	0.2153	0.0575*	NA

Source: Authors' Computation, 2018



### 3.10 Discussion of Findings

The result from our findings show that the banking and finance sector is the most attractive sector for foreign portfolio investment inflows during the study period. The study carried out by Ajibola and Omotosho (2015) agrees with our finding as the banking and finance sector was seen to be the preferred sector for foreign portfolio investment whereas Doguwa, Tumala and Ajibola (2014) suggested that the manufacturing sector was the preferred sector. The finding of Doguwa *et al* (2014) could be attributed to the liquidity crisis in the banking and finance sector during the period.

The empirical results also show that increase in foreign portfolio investment in equity stocks would significantly increase the volume of transactions in the Nigerian stock market. This finding is supported by empirical literature (e.g. Anyaochukwu, 2012; Chukwuemeka *et al*, 2012; Jacob & Nair, 2012; Eniekezimene, 2013; Shrivastav, 2013; Knill & Lee, 2014; Qian & Steiner, 2014; Gathenya, 2015; Kumar, Gupta & Sharma 2017). This finding is also in line with *a priori* expectation.

However, the this finding contrasts that of Yaha *et al* (2017), who noted that foreign portfolio investment in equity inflows has no significant impact on the stock market of India during the global financial crises of 2008. The result of this study also differs from the finding reported by Ogujiuba *et al* (2012) that foreign portfolio equity investment does not significantly influence the stock market.

Some important macroeconomic variables such as financial development, exchange rate, inflation rate and interest rate were used to buttress the related increase in foreign portfolio investment in equity stocks to the Nigerian capital market. The result showed that all the macroeconomic variables together with foreign portfolio investment in equity stock have a significant influence on the volume of transaction in the stock market, which indicates an improvement in the performance of the Nigerian capital market. The implication of this finding is that there is an increase in the performance of the Nigerian stock market when there is an increased inflow of foreign portfolio investment in equity trading.

### CONCLUSION AND RECOMMENDATIONS

The study has been able to provide meaningful insights into the effect of foreign portfolio equity investment on stock market performance in Nigeria. The study also shows that foreign portfolio investment in equity stocks significantly influence stock market performance in both the short run and long run. Furthermore, the distribution of foreign portfolio investments inflow to Nigeria has been channelled into the banking and finance sector, manufacturing sector, transport, storage and communication sector and the extractive industry sector.

The study concludes that foreign portfolio investment inflow is a major driver of the stock market performance in Nigeria.

In view of the above, the study recommends that the regulatory authorities should deepen the equity stocks of the market and encourage more firms to get listed on the Nigerian Stock Exchange with a view to channelling more investments into the economy thereby fast-tracking industrialisation and economic development.

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