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An Exploratory Investigation of Foreign Portfolio Investment in Money Market Instruments and the Nigerian Stock Market Performance

Dr. Grace O. Iriobe
Lecturer, Department of Financial Studies, Faculty of Management sciences,
Redeemer's University, Ede, Nigeria
Tomola M. Obamuyi
Professor, Department of Economics, School of Management Technology,
Federal University of Technology, Akure, Nigeria
Dr. Muftau A. Abayomi
Lecturer, Department of Economics, School of Management Technology,
Federal University of Technology, Akure, Nigeria

Abstract:
This paper investigated whether foreign portfolio investment in money market instruments have an influence on the performance of the Nigerian stock market. The study employed ex-postfacto research method using monthly time series data for 11 years between 2007 and 2017. The Autoregressive Distributed Lag (ARDL) model was used to specify the influence of foreign portfolio investment in money market instruments on stock market performance. The results of the analysis revealed a significant and positive relationship between foreign portfolio investment in money market instruments and the performance of the Nigerian stock market (t-stat= 2.6110; P= 0.0258<0.05; R² = 0.77). The study concluded that foreign portfolio investment in money market instruments had significantly predicted stock market performance in Nigeria. Hence, the study recommended that policies formulated towards a more developed stock market should consider importance the influence of foreign portfolio investments in the market.

Keywords: Foreign portfolio investment, money market instruments, stock market performance

1. Introduction

A growing interest in Foreign Portfolio Investment (FPI) is shared by stock market practitioners, policy makers, investors and scholars alike. As one of the powerful tools for business investments, foreign portfolio investment can help push the boundaries of existing literatures on foreign investments and develop new ones. FPI is one of the major facilitators of economic growth and development just like Foreign Direct Investment (FDI) (Oloyede & Obamuyi, 2000). Foreign portfolio investment is 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 is a recent phenomenon in Nigeria. As at 1985, Nigeria recorded scanty figure on portfolio investment (inflow or outflow) in her balance of payment account (CBN, 2015). This is attributable to the absence of foreign portfolio investors in the Nigerian economy (Ekeocha, 2008), largely because of the internalization of the country's money and capital markets as well as the non-disclosure of information on the portfolio investments in foreign financial markets (Obadan, 2004). Incidentally, it has grown recently in proportion relative to other types of capital inflow to Nigeria.

Historically, FPI is seen as a source of foreign private capital to every economy. Its role in positioning a country for socioeconomic development cannot be overemphasized (Horioka, Terada-Hagiwara, & Nomoto, (2015)). Since no country is an island on its own, in terms of resources needed to stimulate investment, generate employment and foster economic growth, recourse must be made from time to time to encourage foreign investment to bridge the financial gaps between revenue and planned expenditure, balance of payment differences, terms of trade, and so on (Anyanochukwu, 2012). This type of investment has become a very significant part of the world economy over some decades now, and it serves as an important source of fund to support investment not only in developed world but developing countries as well (Elekwa, Aniebo & Ogu, 2016). The importance of foreign portfolio investment to foreign investors is that the investors can demand better rules and regulations from the local stock markets. These rules primarily concern the information quality and quantity while better disclosure and higher accounting standard are part of regulations (Evans, 2002). Hence, financial markets become more transparent with the participation of foreigners, leading to better allocation of resources and healthier financial markets.

While the stock market is seen as an important medium that provides companies with an invaluable avenue to raise funds for their businesses, the money (stock) market allows companies to broadly solicit and advertise their

securities to the general public, thereby increasing the diversification of potential investors. A critical component of this market is its liquidity which refers to the ease with which investments in financial securities are acquired and disposed (Duasa, & Kassim, 2009; Somuncu & Karan, 2010; Chun-Pin, 2013; Eniekezimene, 2013; Baghebo, & Apere, 2014; Gerlach & Yook, 2016; Kumar, Gupta & Sharma, 2017). The liquidity of this market makes investment in money stocks more attractive compared to other less liquid investments such as real estate. Usually, stock markets are considered one of the primary measurement of growth and the development of any country's economy (Okonkwo, 2016; Iriobe, Obamuyi & Abayomi, 2018a).

The present paper is among the few papers to empirically assess the potential of foreign portfolio investment in money market instruments to significantly influence the performance of the Nigerian stock market. Specifically, we believe that in addition to FPIs in money market instruments, this phenomenon should be investigated along four macroeconomic indices, namely financial development, exchange rate, inflation rate, exchange rate and interest rate. Furthermore, earlier studies (Lahiri, 2012; Dua & Garg, 2013; Humanicki, Kelm & Olszewski, 2013; Chaudry, Farooq & Mushtaq, 2014; Gathenya, 2015; Loncan & Caldeira, 2015; Pala & Orgun, 2015; Kumar, Gupta & Sharma, 2017) have focused effort on foreign portfolio investments in equity trading without recognizing the robustness of other portfolio investment instruments which may influence the performance of the stock markets.

The paper is organised as follows. Section 2 reviews previous studies and present the hypotheses. Section 3 illustrates the methodology. Econometric results are reported in section 4 and the conclusion is provided in section 5.

2. Literature Review and Hypothesis

This paper is not the first to question whether foreign portfolio investment contributes significantly to the performance of the stock market. However, the focus is to investigate in isolation, FPI in money market instruments and its contribution to the overall performance of the Nigerian stock market. This is because most of the previous studies have focused on the foreign portfolio investments in equity and debt stocks while ignoring the investment in money market instruments (Roberto & Paul, 2007; 2009; Egly, Johnk & Liston, 2010; Osinubi & Amaghionyeodiwe, 2010; Lahiri, 2012; Okpoto, 2015; Gerlach & Yook, 2016; Iriobe, Obamuyi & Abayomi, 2018b).

The concepts of foreign portfolio investments play an important role in stock market. They are considered as the driving force in the determination of market sentiments and price trends prevalent in the market (Kumar *et al*, 2017). Knill and Lee (2014) finds that an increased flow of FPI can also improve financing activities of small firms quoted in the stock market through a freeing up of capital when large firms quoted access FPIs directly. This type of investment is a potential source of new investment capital for financially constrained firms listed on the floor of the stock exchange. Goetzmann and Kumar (2008) depicted foreign portfolio equity stocks in the US equity market investments as an available passive fund. Also, Chukwuemeka, Stella, Oduh, and Onyema (2012) opine that Foreign Portfolio Equity Investment for the Nigerian stock market involves investment in shares and stocks available in the economy, while Gathenya (2015) believes that Foreign Portfolio Equity Investments provide investors with a wide array of assets with varying degree of risk, return and liquidity.

However, foreign portfolio investments in money market instruments are regarded as a low-risk investment that is almost as safe as cash (Kacperczyk & Schnabl, 2013). Portfolio investment in money market instruments involves investment in money stocks and mutual funds of foreign businesses and economies. According to Soydemir (2002), foreign portfolio investment in money market instruments influence emerging stock markets and can be different from developed stock markets as they depend on country specific variables in the financial market structure as well as the degree of linkages with international stock markets. Also, Owoye, (2009) believed that foreign portfolio investment in money market instruments has not gotten much attraction in African emerging markets because they have underdeveloped financial sectors, tight regulatory oversights by supervisory authorities, and some of the African economies restrict foreign portfolio investments to banks.

However, this study portrayed foreign portfolio investment in money market instruments as an important proxy for foreign portfolio investment inflow to Nigeria.

Egly, Johnk and Liston (2010) examined the relationship of net foreign portfolio investment inflows, namely corporate bonds and money stocks, to two pull factors; investor risk aversion and the US stock market. Using a vector autoregressive model, they found that positive shocks to the stock market elicit an insignificant response to the net corporate bond inflow and a significant short term positive response to the net corporate stock inflow. The net corporate stock inflow did not respond to risk aversion, while bond inflows did exhibit a significant midterm response to an increase in risk aversion. Their results showed that internal country-specific factors may influence foreign portfolio inflows. This finding was supported by the works of Humanicki, Kelm & Olszewski, (2013) and Yaha, Singh and Rabanal(2017).These studiesagree with the works of Bekaert and Harvey (2000) and Kim and Singal (2000).

Unlike foreign direct investment however, foreign portfolio investors ask for faster returns of their investment. And this may lead these investors to suddenly enter or leave a country. Therefore, many countries are worried about the destructive effect of foreign portfolio outflow during a crisis. For instance, some countries imposed rules to prevent equity outflows (Kim and Singal, 2000) and consistent with these rules, Stiglitz (2000) argued that in developing countries, there is more need for capital flow controls since these countries are more vulnerable to changes in international flows. Also, Loncan and Caldeira (2015) analysed the effect of foreign portfolio capital flows on stock returns of Brazilian listed firms through a 6-factors APT model, in which an additional risk factor for foreign portfolio capital flows was included. Their result showed that foreign portfolio capitals caused increase 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). Overall, the studies provided support to the revaluation effect hypothesis on the relationship between foreign portfolio investment and the performance of stock markets.

- Hypothesis: Foreign portfolio Investment in Money Market Instruments does not have significant effect on the Volume of Transactions in the Nigerian Stock Market.

3. Methodology

3.1. Theoretical Framework

The relationship between foreign portfolio investment and stock market performance in Nigeria was explained using the variant flow theory of capital movement by Gathenya, (2015). The aim of this theory is to use country specific variables to establish a relationship between capital flows and stock market activities.

The model for the variant of flow theory of capital movement adapted by this study is expressed in aggregate functional relationship as:

$KA = Z(r,r^*) + k$ ....(3.1)

Where KA is the stock of capital, Z is the level of capital mobility, r is domestic interest rate, r^* is foreign interest rate and k is capital investment not related or independent of interest rate. Differentiating equation (3.1) totally yields;

$dKA = dr + dr^* + k$ ....(3.2)

That is, an increase in the domestic interest rate will increase the inflow of foreign capital and a decrease in the foreign interest rate relative to domestic one will decrease outflow.

3.2. Model Specification

Two sets of variables entered the analytical model as dependent and independent variables, respectively. The independent variable is Foreign Portfolio Investment in Money Market Instrument (PMI). The dependent variable is the NSE Volume of Transactions (VOT), which is considered appropriate surrogate for Stock Market Performance. Also, macroeconomic variables such as Exchange Rates (EXR), Inflation Rates (IFR) and Interest Rates (ITR) were introduced into the model.

The intuition that foreign portfolio investments in money market instruments influence the volume of transactions in the Nigerian stock market can be explained by the equation below:

VOT= f(PMI, FID, EXR, IFR, ITR). . . . . (3.3)

Where,

PMI= Foreign Portfolio Investments in Money Market Instruments

FID= Financial Development proxied by the ratio of M_2 to GDP.

EXR= Exchange Rate proxied by the nominal exchange rate in Nigeria

IFR= Inflation Rate proxied by the consumer price index.

ITR= Interest Rate proxied by the prime lending rate.

The models in their stochastic forms:

$VOT_t= \beta_0 + \beta_1 PMI_t + \beta_2 FID_t + \beta_3 EXR_t + \beta_4 IFR_t + \beta_5 ITR_t + \mu$ ....(3.4)

Introducing lag operator and ECM, the parsimonious error correction model for foreign portfolio investment in money market instruments is:

$VOT_t= \beta_0 + \beta_1 PMI_t + \beta_2 PMI_{t-1} + \beta_3 FID_t + \beta_4 FID_{t-1} + \beta_5 EXR_t + \beta_6 EXR_{t-1} + \beta_7 IFR_t + \beta_8 IFR_{t-1} + \beta_9 ITR_t + \beta_{10} ITR_{t-1} + \beta_{11} ECM_t-1 + \mu_t$ ....(3.5)

3.3. Estimation Techniques

This study employed time series regression analysis with the help of E-views (9) statistical package. The stochastic variables were analysed with tests such as the Augmented Dickey-Fuller (ADF) stationarity test, Akaike Information Criterion, ARDL bounds test, the Cumulative Sum (CUSUM) Test, and the ARDL Long Run and Short Run test.

4. Results

		At Level			At First Difference			
Variable	Method	ADF statistics	5% critical value	Prob	ADF statistics	5% critical value	Prob	Order
EXR	ADF	0.675763	-2.884665	0.9912	-7.776488**	-2.884665	0.0000	I (1)
FID	ADF	-1.295017	-2.883579	0.6307	-10.21501**	-2.883930	0.0000	I (1)
IFR	ADF	-1.884875	-2.883579	0.3386	-12.34011**	-2.883753	0.0000	I (1)
ITR	ADF	-2.722554	-2.884109	0.0730	-9.456885**	-2.884109	0.0000	I (1)
LOG(PMI)	ADF	-5.907363**	-2.884665	0.0000	-	-	-	I (0)
LOG(VOT)	ADF	-7.974994**	-2.886959	0.0000	-	-	-	I (0)

Table 1 : Augmented Dickey-Fuller (ADF) Unit Root Test Result
* Implies significant at 5% meaning that the variable is stationary at that order
** Implies significant at 1% meaning that the variable is stationary at that order
Source: Researcher's Analysis (2019)

Table 1, the ADF statistics report variables of Volume of Transactions in the Nigerian Stock Market (VOT), Foreign Portfolio Investments in Money Market Instruments (PMI) to be stationary at levels as their ADF statistics were significant at 5%, while the test also indicates Financial Development (FID), Exchange Rate (EXR), Inflation Rate (IFR) and Interest Rate (ITR) to be stationary at first difference. The implication of this finding is that the series in the stationarity test contains no unit root at the level and at first difference; hence, their seasonal variation has been corrected for, making them fit for regression.

4.1. Econometric Result

In order to examine the study model, an ARDL (Autoregressive Distributed Lag Model) approach was employed to conduct an empirical analysis using the Foreign Portfolio Investments in Money Market Instruments equation earlier stated in section three. The choice of using ARDL approach is because some of the variables are stationary at level and some are at first difference making it suitable for application of ARDL. Before the ARDL bound test for co-integration is 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.
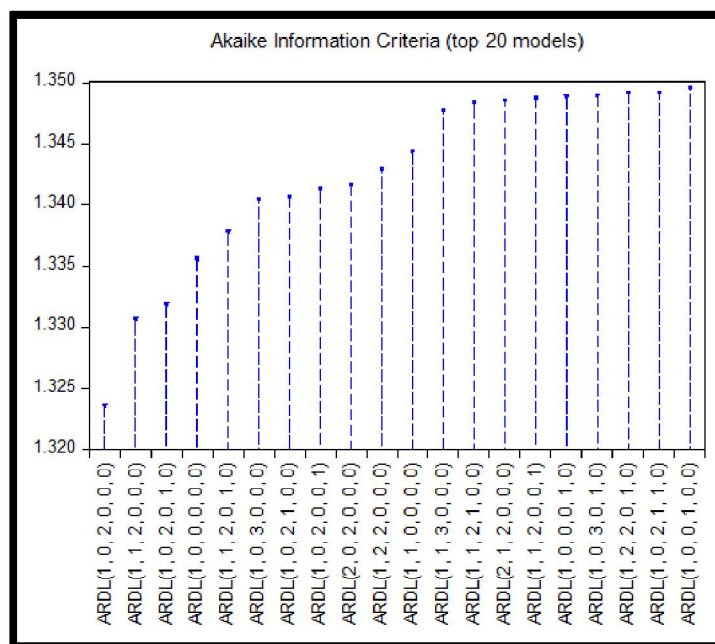

Figure 1: Akaike Information Criterion Lag Length Structure of the ARDL for the Model
Source: Author's Construct Using Data Extracted from CBN Statistical Bulletin

The best fitted ARDL model is selected based on the least Akaike information value. Figure 1 revealed that the optimal lag length is the order of ARDL (1, 0, 2, 0, 0, 0, 0). The results of the ARDL are presented in Tables 3 and 4.

	Model 1	
LOS	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	9.9051	
D.F	5	

Table 2: ARDL Bounds Wald Statistic Result
Source: Researcher's Analysis (2019)

Table 2 shows that for the model estimated, computed F-statistic falls above the 5% upper bound and so we conclude that the variables are I(1) as in 9.9051 > 3.38.

4.2. The ARDL Long and Short Run Result for the Study Model

Long Run Estimates				Short Run Estimates			
Variable	Coefficient	t-stat	Prob	Variable	Coefficient	t-stat	Prob
LOG(PMI)	0.216601*	2.261096	0.0258	C	18.28213**	7.045650	0.0000
FID	0.888134**	5.292240	0.0000	LOG(VOT)$_{t-1}$	0.783399**	8.177883	0.0000
EXR	1.051396**	6.112661	0.0000	LOG(PMI)	0.206669*	2.186991	0.0309
IFR	-0.023960*	-2.056373	0.0421	FID$_{t-1}$	-0.769228	-0.325591	0.7454
ITR	-0.020221	-0.374813	0.7086	EXR	0.446652**	7.211856	0.0000
C	23.33694**	17.52965	0.0000	IFR	-0.012756	-0.587361	0.5582
				ITR	-0.015841	-0.373743	0.7093
				Δ(FID)	3.046777	0.571724	0.5687
				ΔFID$_{t-1}$	-8.083019	-1.526314	0.1299
				CointEq(-1)*	-0.783399**	-8.561429	0.0000

Table 3: ARDL Long and Short Run Result for the Study Model
Dependent Variable: LOG(VOT)
* Implies significant at 5%   ** Implies significant at 1%
Source: Researcher's Analysis (2019)

Table 3 shows that the coefficient of foreign portfolio investment in Money Market Instruments is positive and significant at 5% level. This means that foreign portfolio investment in Money Market Instruments has a positive and significant influence on the performance of the stock market. The implication of this is that a percentage increase in foreign portfolio investment in Money Market Instruments on average will cause the performance of the stock traded to improve by 0.22%. Hence, foreign portfolio investment in Money Market Instruments drives the performance of the Nigerian stock market during the study period.

The result in the short run also revealed a positive and statistically significant relationship between foreign portfolio investment in Money Market Instruments and the performance of the stock market, interestingly, this has the same percentage effect as in the long run. Also, in the long run, the coefficient of financial development is positive. This means that there is a positive impact of financial development on the performance of the stock market. The implication of this is that a percentage increase in financial development on average will cause the performance of stocks traded to increase by 0.88%. As a result, financial development is a major determinant for the performance of the Nigerian stock market during the study period. This result however did not conform in the short run.

The result also revealed that the coefficient of Exchange rate is positive in the long run. This means that there is a positive impact of exchange rate on the performance of the stock market. The implication of this is that a percentage increase in exchange rate on average; will cause the performance of the stock market to improve by 1.05%. This also indicates that exchange rate depreciation has caused a great injection and increase in the performance of stocks traded in the market. The reason for this is that there is relatively a level of change in the value of money stocks whenever exchange rate depreciates. However, interest rate in Table 3 shows that there is a negative and significant impact on the performance of the stock market in the long run, but, this does not conform to *a priori* expectation that higher interest rate will encourage more foreign portfolio investments in money market instruments.

4.3. Statistical Properties and Post Diagnostic Results of the Foreign Portfolio Investments in Money Market Instrument Model

Statistical Properties of Results		Post Diagnostic Tests Result	
R-squared	0.77	BPG Heteroskedasticity (F-Stat)	0.7419
Adj R-squared	0.71	BPG Heteroskedasticity Prob. F(8,105)	0.6543
F-statistic	2.730	B-G Serial Correlation LM (F-Stat)	0.7752
Prob(F-statistic)	0.009	B-G Serial Correlation LM Prob. F(2,103)	0.6543
Durbin-Watson Stat	2.013	Ramsey RESET (F-Stat)	1.4897
Akaike Info Criterion	1.358	Ramsey RESET Prob	0.2250
Schwarz Criterion	1.574	Jarque-Bera Statistics	426.00
		Jarque-Bera Prob	0.0000
		Redundant variable Test (F-stat)	0.8466
		Redundant variable Test (Prob)	0.5198

Table 4: Statistical Properties and Post Diagnostic Results of the Foreign
Portfolio Investments in Money Market Instrument Model
Source: Researcher's Analysis (2019)

Considering the statistical properties of the ARDL result reported in Table 4, the R-squared value of 0.77 indicates that about 77% variation in the performance of the stock market is explained in the model by the explanatory variables. The F-statistics of 2.73 is statistically significant and this shows that there is a considerable harmony between stock market performance 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.

Considering the Post Diagnostic test results, the Breusch-Pagan-Godfrey (BPG) tests for the presence of heteroskedasticity in a regression result; the BPG tests the null hypothesis of no heteroskedasticity against the alternative hypothesis heteroskedasticity. The BPG probability value was greater than 5% implying there is no presence of heteroskedasticity in the regression result.

The B-G Serial Correlation Lagranger 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 0.65 and this 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 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 $CointEq_{t-1}$ is well specified and correctly signed. The coefficient of the $CointEq_{t-1}$ is approximately -0.78. It means that about 78% departure from long run equilibrium is corrected in the short run. The negative sign in the $CointEq_{t-1}$ confirms the existence of co-integrating relationship. Hence, about 78% of the variations in the short run converge.

4.4. CUSUM Stability Test of the ARDL for the Study Model

The Ramsey (Regression Specification Error Test) RESET and the CUSUM test as presented in Figure 2 were used to examine the stability of the ARDL model. The Ramsey RESET tests for specification error in terms of omitted variables, incorrect functional form and correlation between the explanatory variables and the error term. The Ramsey RESET tests the null hypothesis of unbiasedness and consistency which produces a zero mean vector for against the alternative of specification error.
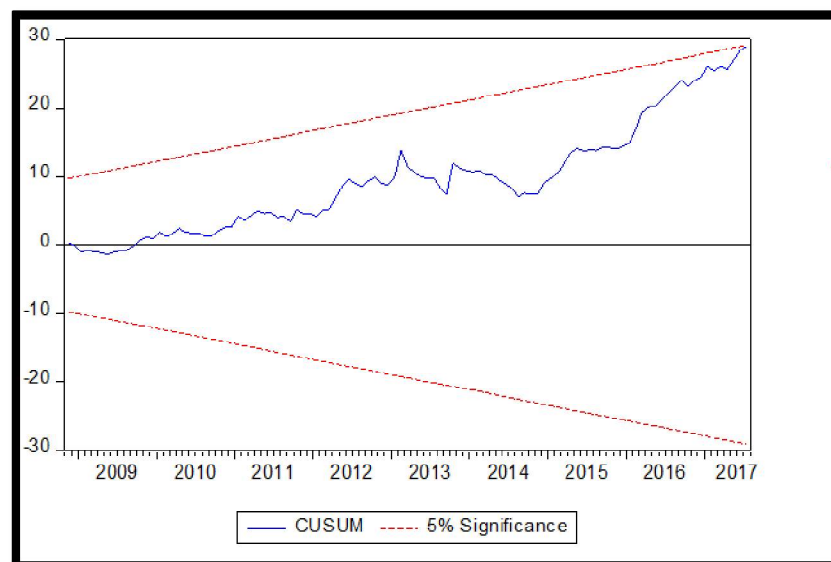

Figure 2: CUSUM Stability Test of the ARDL for the Study Model
Source: Author's Construct using Data extracted from CBN Statistical Bulletin

The result in Figure 2 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 lines meaning that the model is stable in the long run.

4.5. Discussion of Findings

The result of the study hypothesis shows that there is a positive significant relationship between the volume of transactions and foreign portfolio investment in money market instruments. This means that foreign portfolio investment money market instrument will significantly influence the activities of the Nigerian stock market. A unit increase in the flow of foreign portfolio investment in money market instruments will contribute effectively to the improvement in the performance of the Nigerian stock market.

The result of the long run effect of foreign portfolio investments in money market instruments on stock market performance provides evidence of long run positive relationship between these variables at different periods in time. This study corroborates the findings of Owoye (2009) that foreign portfolio investments impacts on stock market activities during the global economic crises in 2008, because, the withdrawal of foreign investments from stock markets, especially in the Nigerian market during the period, resulted in the fall/decrease of stock market activities which in turn resulted in economic recession in the country. By implication, increase in foreign portfolio investment in money market instruments led to increase stock market performance in Nigeria during the study period. This finding is consistent with the *a priori* as

well as the conclusion from the study of Kacperczyk and Schnabl (2013) that the relationship between these two variables is positive and significant and that the increase in the inflow of foreign portfolio investment through money market instruments have a direct effect on the performance of the stock market.

Similarly, macroeconomic variables such as financial development rate, exchange rates, inflation rates and interest rates for the period under study was used to buttress the related increase in foreign portfolio investment in money market instruments to the Nigerian capital market. The result showed that all the macroeconomic variables together with foreign portfolio investment in money market instruments have a significant influence improvement of performance in the Nigerian stock market.

5. Conclusion

The study has been able to provide meaningful insight into the effect of foreign portfolio investments in money market instruments on stock market performance in Nigeria. The study has shown that there is a significant positive influence of FPI in money market instruments on stock market performance in both the short run and long run equilibrium period. Thus, considering the dynamic nature of the variables in the long run and short run, the study concludes that foreign portfolio investment in money market instruments positively influences the performance of the stock market and consequently deepens the market in Nigeria. Hence, the study contributed to existing body of literature by establishing that foreign portfolio investment in money market instruments and other macroeconomic variables in the economy constitute the transmission channel through which the performance of the Nigerian stock market is driven. We therefore recommend that the financial market regulators should be more sensitive to the volatility and the influence of foreign portfolio investments while formulating policies geared towards a more developed stock market in Nigeria.

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