Exchange Rate Volatility and Foreign Portfolio Investment in Nigeria

Arotiba, Kehinde[1] and Osemene, Olubunmi Florence[2]

[1] University of Ilorin, Nigeria

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Abstract

needed for economic growth and bridging the gap between savings and investment in Nigeria. This study investigates the effects of exchange rate volatility on foreign portfolio investment in Nigeria. The effects of volatility of exchange rate on foreign portfolio investment inflows to Nigeria were captured through the official exchange rate and bureau-de change rate. A monthly time series data were sourced from Central Bank of Nigeria covering a period of 10years from 2007-2016.This study employed General Autoregressive Conditional Heteroskedasticity GARCH (1,1) model to test for volatility in both official and BDC rate. A twostage least square (TSLS) method was used to test the relationship between the volatility and foreign portfolio investment in Nigeria. The results revealed that volatility in the official rate exerted positive significant impact of 8.119872 on foreign portfolio investment inflow into Nigeria, while the BDC volatility showed a negative significant impact of -5.961654 on foreign portfolio investment inflow into Nigeria within the study period. The study concluded that the official exchange rate volatility has a significant and positive effect on foreign portfolio investment in Nigeria, while the bureau-de change volatility has a significant and negative relationship with foreign portfolio investment in Nigeria. Hence, the study recommended that monetary authority should formulate such policies that will stabilize exchange rate so as to boost the investors? confidence.

Index terms— exchange rate volatility, foreign portfolio investment, bureau - de change rate

1 Introduction

apital is a vital ingredient for economic growth, but since most nations cannot meet their total capital requirements from internal resources alone, they turn to foreign investors to supply capital. Idowu (2015) stated that it is a known fact that no country can stand as an island which requires no capital from other countries of the world. Both the developed and the developing countries do strategize for more capital importation into their countries to stimulate investment, generate employment, improve production and bridge the gap between savings and investment. In this decade, international capital flows, especially portfolio investment flows, increase rapidly along with advances in globalization, financial deregulation, and advancement in information technology in the world economy **??**Erik,2006;Omorokunwa & Ikponmwosa, 2014).

United Nations Conference on Trade and Development (UNCTAD 2016) reported that global foreign investment flows jumped by 38 percent to $1.76 trillion in 2015, the highest level since the global economic and financial crisis of 2008-2009 while Foreign investment flows to Africa fell to $54 billion in 2015, a decrease of 7 percent over the previous year. This is a result of the upturn in foreign investment flow to North Africa and low price of commodity goods from the west and central Africa region. **??**eaman (2003) identified two forms of foreign capital flows which are public and private investment flows. The private investment flows comprise foreign direct investment and foreign portfolio investment. UNCTAD (1999) described foreign portfolio investment as an investment by a resident entity in one country in the equity and debt securities of an enterprise resident in another country which seeks primarily capital gains and does not necessarily reflect a significant and lasting interest in the enterprise. The category includes investments in bonds, notes, money market instruments and financial derivatives other than those included under direct investment, or in other words, investments which are both below the ten percent rule and do not involve affiliates.

Prior to 1986, there was no record of any foreign portfolio investment in Nigeria (Eniekezimene, 2013). Obadan (2004) opined this was mainly as a result of the non-internalization of the country's money and capital markets as well as the non-disclosure of information on the portfolio investment in foreign capital or money markets. Ekeocha (2008) reported that a total of N151.6 million foreign capital inflows were recorded in 1986. From that little inflow recorded in 1986, each successive administration has made deliberate effort to bridge the gap between saving and investment in Nigeria. Eniekezimene (2013) observed that since the return to democracy in 1999 which marked the beginning of a political stability, liberalization of the economy and the reforms in the capital market, there has been an improvement in foreign portfolio investment in Nigeria. The foreign portfolio investment in Nigeria has rose to N703.6 billion in 2007 it highest since 1986 when it was first reported. The foreign portfolio investment in Nigeria experienced a decline to $1,009.13 million in the third quarter of 2015, $920.32 million in the third quarter of 2016 and a further decline to $284.22 million in the last quarter of 2016. (National Bureau Statistics (NBS), 2017). The movement of foreign portfolio investment in Nigeria has been up and down since 1986 when it was officially reported by Central Bank of Nigeria. Despite the increase in foreign portfolio inflows to Nigeria since 1999, instability in the exchange rate and other macroeconomic factors may have been a problem in attracting more foreign portfolio investment into the country. Foreign investors come into the domestic economy with expectations of positive returns; despite the various types of risks they are exposed to which include instability in exchange rate, inflation rate, interest rate, political, and legal risks (Teddy, 2015). Exchange rate volatility makes international trade and investment decisions more difficult because volatility increases exchange rate uncertainty and risk (Kalu, 2016). Exchange rate volatility generates an air of uncertainty as the variance of expected profits rises and its net present value falls. This could cause investors to hesitate about committing significant resources to foreign investment because of the risk associated with the volatility.

The Nigeria exchange rate system has witnessed so much volatility both in the official and bureau-de change market after the deregulation of the foreign market **??**Olowe,2009;Abayomi &Olaronke, 2015 andKalu, 2016). Sanusi (2002) (as cited in Udeh ,2010) also observed that the exchange rate policy in Nigeria has been moving in a circular form, starting from a fixed exchange rate system from 1986-1993, a temporary halt deregulation in 1994 when the official exchange rate was pegged and reversal of the policy in 1995 with the guided deregulation of the foreign exchange market. Kalu (2016) affirmed that despite these policy efforts by the Nigeria monetary authority to maintain exchange rate stability, the Naira continues to fluctuate widely against the US dollar. Although, numerous studies have been carried out on foreign direct investment and its relationship with exchange rate volatility established; yet, there are scanty literature on foreign portfolio investment in Nigeria. More so, the few studies that exist have focused on the official rate when considering volatility. This study considers the volatility of bureaux-de change rate on foreign portfolio investment which is missing in previous studies. It is against this backdrop that this study examined the relationship between exchange rate volatility and foreign portfolio investment.

The objective of this study is to examine the effect of exchange rate volatility of both the official and the bureaux-de change rate on foreign portfolio investment in Nigeria. This study contributes to knowledge because it focuses on the effect exchange rate volatility have on foreign portfolio investment in Nigeria which has not received much attention in literature. This study will be helpful to policy makers, investors, international traders and those in finance related disciplines. The result obtained will provide information that will assist on how to manage the volatility in exchange rate so as to improve the inflow of foreign portfolio investment in Nigeria. The remainder of the paper is organised as follows: Section 2 literature review. Section 3 provides the methodology. Section 4 presents the empirical results, and Section 5 provides conclusions and recommendations.

2 II.

3 Literature Review a) Empirical Discussion

Chonnikara (2010) carried out a research on the effect of exchange rate volatility on foreign direct investment and portfolio flows to Thailand with the use of panel data based on monthly data. It covered 2005 to 2009.The result revealed that the relationship between exchange rate risk and foreign portfolio investment is negative indicating that high exchange rate risk lowers each firm -specific foreign portfolio flow to Thailand. Ekeocha (2008) looked at modeling the longrun determinants of foreign portfolio investment in an emerging market (Nigeria) within 1986-2006 with the use of time series data, Johansen co-integration and the error correction mechanism estimation test and the study found that there is a negative relation between real exchange rate and foreign portfolio investment in Nigeria. Teddy (2015) investigated the effect of exchange volatility on private capital inflows in Zambia. This was carried out with the use of GARCH model to estimate volatility in the exchange rate and Johansen maximum likelihood for cointegration and error correction model. The study found out that the volatility of the nominal exchange rate exerted significant negative impact on the flow of foreign portfolio investment in Zambia.

Pami and Reetika (2013) carried out a study on foreign portfolio investment flow to India: determinants and analysis. The study covered 1995 to 2011 and made use of autoregressive distributed lag (ARDL).The study found a negative significant relationship between exchange rate volatility and foreign portfolio investment. **??**rick (2006) in his study on exchange rate risk from a portfolio investment point of view used daily data from January-December 2005 and ATP model to estimate result. It was established that exchange rate volatility increases the risk of an investor and reduced her return.

Nwosa and Amassona (2014) carried out a study on capital inflows and exchange rate in Nigeria which covered 1986 to 2011 with the use of both granger causality and error correction modeling techniques. The study found that foreign portfolio inflows had little positive impact on exchange rate. Idowu (2015) in her study on foreign portfolio investment determinants in Nigeria with the use of time series data between 1970-2010 using the Granger causality test, Johansen co-integration and the error correction mechanism estimation test concluded that change in real exchange rate had no effect on the inflow of foreign portfolio investment in this period Marcin, Robort and Krzystof (2013) examined foreign direct investment and foreign portfolio investment in the contemporary globalized world and concluded that exchange rate and its volatility has no effect on foreign portfolio investment.

Omororunwa and Ikponnwosa (2014) researched on exchange rate volatility and foreign portfolio investment in Nigeria between 1980-2011.They employed Augmented Dickey-Fuller (ADF) test for stationarity, Engle and Granger two-step cointegration procedure and error correction model (ECM).The study found that exchange rate volatility has a very weak effect on FPI in short run and a strong positive effect on the long run analysis. Ololade and Ekperiware (2015) researched on foreign portfolio investment and Nigeria bond market with the use of primary data and multiple regression analysis. They found out that exchange rate was statistically significant and positively related to foreign portfolio investment in Nigeria. Guglielmo, Faek, and Nicola (2013) examined the impact of exchange rate uncertainty on different components of portfolio flows. They studied Australia, Japan, Uk,Canada and Sweden over a period of 1988 to 2011.They employed GARCH-BEKK model and observed negative relationship in some countries and positive relationship between exchange rate volatility and portfolio investment.

Soyoung, Sunghyum, and Yoonseok (2013) carried out a research on the determinants of international capital flow in Korea: Push vs Pull factors. The study covered1980-2010, they employed time series data using Generalized Method Moment (GMM) for estimation of relationship among the variables. They observed a positive relationship between exchange rate volatility and foreign portfolio investment in Korea.

4 b) Theoretical Framework

The direction of private capital flows is explained by two classes of theories, namely; push factor and pull factor theories. These theories were propounded by **??**verett (1966) in relation to labour migration across the globe. In the mid-1990s researchers in the field of finance adopted these theories in international investment strategy. Pull factor theory, traces the causes of capital flows to such domestic factors as autonomous increases in the domestic money demand function, stability exchange rate, increases in the domestic productivity of capital (Uihaque, Mathieson and Sharma, 1997), increasing integration of domestic capital markets with global capital markets (Agenor & Montiel, 1999), improvement in external creditor relations, adoption of sound fiscal and monetary policies and neighborhood externalities. This study is underpinned by this theory to examine the effect of exchange rate volatility which is internal factor influencing portfolio investment III.

5 Methodology

The data used for this study was a monthly time series data of foreign portfolio investment and exchange rate. The data were secondary in nature and are sourced from Central Bank of Nigeria (CBN) data bank and National Bureau of Statistics (NBS).The study covered a period of 10 years (2007-2016) .The estimate techniques used for this study are Generalised Autoregressive Conditional Heteroskedasticity (GARCH 1.1) to test for volatility in the variables which is the most appropriate method to assess the presence of volatility in variables (Gujarati and Dawn, 2009).Unit root test was carried out to test for the presence of stationarity of the variables and two stage least square (TSLS) regression analysis was employed to test the relationship between the variables.

The model for this study is based on the theoretical framework and the objective of the study which is to examine the effect of exchange rate fluctuations on the foreign portfolio investment into Nigeria. The model is specified as follows:FPI = ?(VXrate t ,Vbdcxrate t ,)**(i)**

Where Where: B O = the intercept of the FPI B 1 to B 2 = the coefficients of the variables to be estimated in the FPI e t = the random variable or error term. The a priori expectations are: B 1 <0, B 2 <0.

IV.

6 Results and Discussion

The descriptive statistics show positive skewness in official (1.351167) and bureaux de change **??**1.563610) rates, which indicate that depreciation in the Naira/US$ exchange rate occurs more often than it appreciates. The kurtosis are positive,having a return series of the official rates (5.660731) and bureaux de change rates (5.231307), thus points out that the returns distribution are leptokurtic. The Jarque-Bera statistic indicates that only lnFPI is normally distributed. In generating the volatility series from lnOFFICIAL rate and lnBDC rate, the first step was to estimate an AR(1) model for both series. Secondly, Autoregressive Conditional Heteroskedasticity (ARCH-LM) test was performed to determine whether the series are heteroskedastic (volatile). Lastly, a Generalised Autoregressive Conditional Heteroskedasticity (GARCH) model was built for each series and estimated with the Maximum Likelihood Estimator under the assumption of Student's t distribution with fixed parameter. The predicted (fitted) values are obtained for the estimated GARCH model as the volatility series. Table 2 reports the results of the ARCH-LM test for both series. From Table 2, it can be seen that the hypothesis of no heteroskedasticity is rejected for both series at lags 1 and 2 and this implies the presence of volatility clustering in both series. Therefore, a GARCH (1,1) model can be built to determine the persistence of volatility in both series. The model was estimated using the Two-Stage Least Squares (TSLS) method. This method overcomes the problem of simultaneity bias and causality inverse because it uses instrumental variables (IVs). Table **??**.5 presents the results of the TSLS regression. V.

7 Discussion of Findings

Table 5 shows that the one-period lagged value of volatility of official exchange rate is positively and significantly related to foreign portfolio investment while the one-period lagged value of volatility of BDC exchange rate has a significant negative relationship with foreign portfolio investment. The F-statistic is statistically significant, thus indicating that the model is significant. This further implies that the instrumental variables (IVs) used are not weak The J-statistic accepts the null hypothesis of valid over identifying restrictions, thus implying that the 7 IVs used are valid and the model has not been wrongly specified.

The volatility of the official rate is significant at 1% with a positive coefficient of 8.119872. This implies that a unit increase in the volatility of the official rate will lead to increase in foreign portfolio investment in Nigeria by $8.119872 unit on monthly basis. This positive relationship between volatility in official exchange rate and foreign portfolio investment in Nigeria concurs with the findings of Udeh (2010), Guglielmo,Fack and Nicola(2013) and Omorurunwa & Ikponnwosa (2014).The positive relationship between the official exchange rate volatility and foreign portfolio investment may be as a of result arbitrage behaviour of international investors (Omorurunwa and Ikponnwosa,2014). The high return in investment and the growth in gross domestic products (GDP) may also be part of the factors responsible for this within the study period.

The volatility in the BDC rate is negatively significant at 1% with a coefficient of -5.961654. This implies that unit increase in the volatility of BDC rate will lead to decrease in FPI in Nigeria by $5.961654 unit on a monthly basis. The negative relationship between volatility in BDC rate and FPI in Nigeria is as a result of high risk associated with the market and less string entregulation from the monetary authority. The negative relationship aligns with the findings of Chonnikarn (2010), Reetika (2013) and Teddy (2015) on effects of exchange rate volatility on foreign portfolio investment. The findings from this study concur with pull factors theory and return on investment model, high return on investment and relative stability in the the economy within the studied period (internal factors) might have influenced positive inflow of foreign portfolio investment into Nigeria despite the risk posed by exchange rate volatility. And the dwelling inflow of portfolio investment since 2014 till date (2017) might also be as a result of low return in investment, poor credit rating by international agencies, economic recession and instability in exchange rate. These are negative pull factors affecting inflow of portfolio investment to Nigeria.

8 VI. Conclusion and Recommendations a) Conclusion

This study examined the effects of exchange rate volatility on foreign portfolio investment in Nigeria using Arch and Garch model. The result shows that there is a high level of volatility in both official and the BDC rate. The result obtained shows persistence and explosive volatility in the examined exchange rates. The regression shows a positive significant relationship of the official rate volatility with the FPI, while the BDC rate volatility shows a negative but significant relationship with FPI. The result suggests important implications for investors and policy makers in Nigeria. A major implication is that volatility is present in the exchange rate market, both at the official and BDC market and it has effect on foreign portfolio investment in Nigeria. The level of volatility must be managed to avoid misalignment of exchange rate system Nigeria.

9 b) Recommendations

Volatility is mostly associated with risk which is non-diversifiable and scares away investors therefore: 1. The monetary authority should formulate good policy to ensure stable exchange rate to avoid misalignment of the exchange rate market. 2. The government should ensure there is good monetary and fiscal policy to grow the economy and woo more investors. [1] [2]

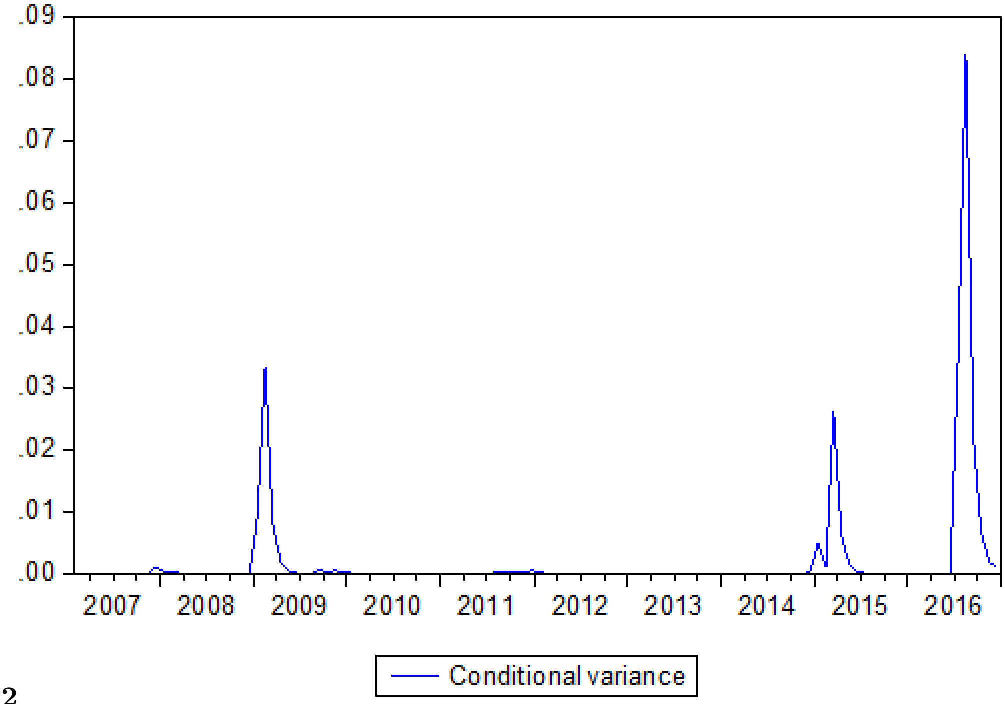

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Figure 1: Global)Fig. 1 :Fig. 2 :

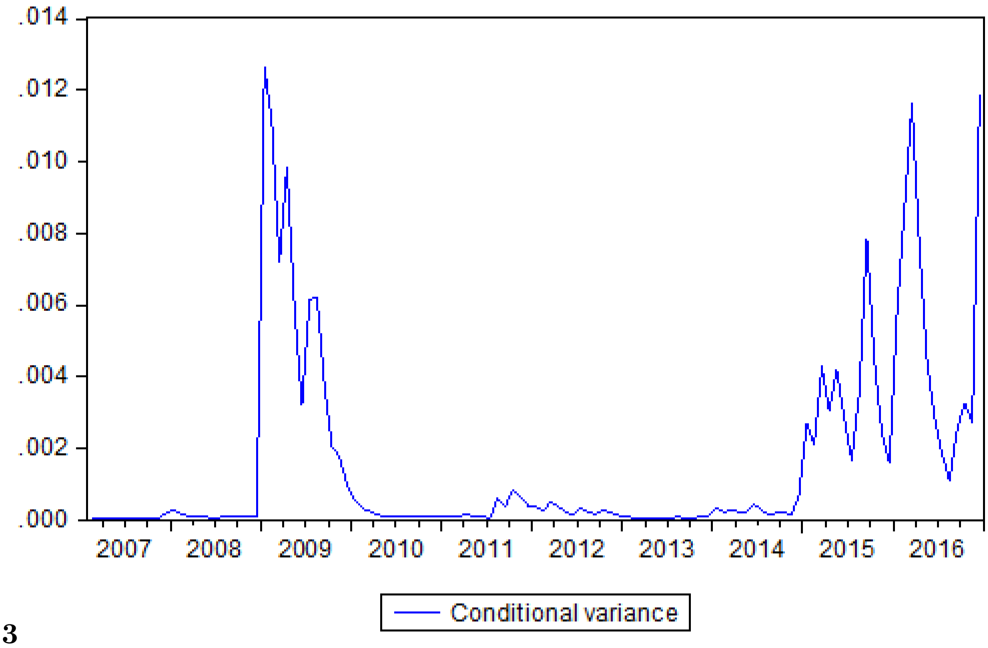

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Figure 2: 3 .

1

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presents the descriptive statistics of
the natural logarithm (ln) of foreign portfolio

Figure 3: Table 1

1

Statistic	lnFPI	InOFFICIALrate	lnBDCrate
Mean	19.70349	5.062866	5.145352
Maximum	21.59003	5.735701	6.135630
Minimum	16.78006	4.768309	4.776599
Standard Deviation	1.066857	0.209391	0.306094
Skewness	-0.320769	1.351167	1.563610
Kurtosis	2.769677	5.660731	5.231307
Jarque-Bera (JB)	2.323096	71.91047	73.79116
JB p-value	0.313001	0.000000*	0.000000*
Observations	120	120	120

Source: Author's computation, (2017)

Note: * denotes rejection of null hypothesis of normal distribution at 1% significance level.

Figure 4: Table 1 :

2

Lag	LnOFFICIALrate	lnBDCrate
1	12.94611 [0.0005]*	6.245311 [0.0139]**
2	7.078580 [0.0013]*	3.240978 [0.0428]**

Source: Author's computation, (2017)

*[Note: Notes: * and ** indicates the rejection of null hypothesis of no heteroskedasticity at 1% and 5% significance level respectively. Also, F-statistic reported for ARCH-LM test and p-values in parentheses.]*

Figure 5: Table 2 :

3

	Coefficient	p-value
Mean Equation		
Constant	-0.133573	0.0000*
lnOFFICIAL t-1	1.026386	0.0000*
Variance Equation		
Constant	1.60×10^{-8}	0.4705
ARCH t-1	1.438105	0.0000*
GARCH t-1	0.233925	0.0000*
		Source: Author's computation, (2017)

Note: * indicates statistically significant at 1% significance level.

Figure 6: Table 3 :

3

Figure 7: Table 3

5

Variable	Coefficient	t-statistic	p-value
Constant	9.325066	0.705720	0.4818
Vol(lnOFFICIALrate) t-1	8.119872	3.629119	0.0004*
Vol(lnBDCrate) t-1	- 5.961654	- 2.944795	0.0039*

R^2 = 0.232592 F-statistic (p-value)=14.00716(0.000004)* J-statistic(p-value)=7.545577(0.109716) Instrume
Note: * denotes statistically significant at 1% significance level.

Source: Author's computation, (2017)

Figure 8: Table 5 :

Source: Author's computation, ??2017) The official rate was stable between 2007 and 2008, and an upward movement was experienced in 2009. From 2010 to 2014 the official exchange rate was highly stable while in 2015 and 2016 an erratic and upward movement was experienced. From Table ??, it can be inferred that the coefficients of the ARCH and GARCH terms are significant at 1% significance level. The sum of the coefficients of the ARCH and GARCH terms is greater than unity, thus implying that BDC exchange rate is extremely volatile. regulation because their activities are important to inflow of foreign capital to the country.

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