VECTOR AUTOREGRESSION (VAR) ANALYSIS OF THE NEXUS BETWEEN EXCHANGE RATE VOLATILITY AND PRIVATE DOMESTIC CONSUMPTION IN NIGERIA

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ABSTRACT: *This paper models the empirical relationship between exchange rate variations and private domestic consumption in Nigeria using vector auto regression (VAR) method. In addition to exchange rate, household disposable income and recurrent expenditure were introduced in the model as part of the explanatory variables. The study sample spanned from 1990 to 2016 and the data on each of the variables were sourced from the Central Bank of Nigeria Statistical Bulletin. The unit root test results indicate that all the variables are difference stationary with all I(1) order. Additionally, the test for cointegration reveals that variables have long run relationship as evidenced in the outcomes of the trace and maximum eigenvalue tests. This provides basis for rejecting the null hypothesis of no cointegration. The estimated VAR model reveals that exchange rate lagged for one period has significant negative effect on private domestic consumption. 1 percent increase in exchange rate, on the average, increases private domestic consumption by 1.733 percent. The dynamic effects of disposable on private consumption are mixed. From the VAR estimates, lag 2 of disposable income negatively influenced private consumption whereas lag 3 is positively linked to private domestic consumption. Additionally, public recurrent expenditure lagged for 3 periods has significant positive effect on private domestic consumption. This paper, therefore, concludes that increase in the exchange rate is associated with increasing level of private domestic consumption. Owing to the findings, it is recommended that the CBN should ensure that effective exchange rate management system is put in place to maintain a stable rate of exchange and provide pathway for rapid and sustained increase in private domestic consumption.*

KEYWORDS*: Exchange rate, Private domestic consumption, disposable income, VAR and Nigeria.*

INTRODUCTION

One of emerging and widespread discussions in macroeconomics debate is the variation in exchange rate and its perceived implications on aggregate demand, especially private domestic consumption, exports, imports, government purchases and domestic investment. Broadly speaking, exchange rate management systems in most economies have been anchored on fixed, managed floating and free floating regimes. The choice of any of these policy regimes depends on the ultimate objective of monetary policy frameworks and prevailing socio-economic conditions. The fixed exchange rate regime allows government to control the exchange rate and adopts necessary changes to maintain the existing rates. This is anchored on the Bretton Woods system. The emergence of flexible exchange rate followed the breakdown of the Bretton Woods system of

fixed exchange rate regime (Tchokote, Uche & Agboola, 2015). The flexible exchange rate has been described as a reliable exchange rate system given that it is determined by the market forces. The variations in exchange rate tend to determine the pace of economic outlook through changes in aggregate demand. For instance, increase in exchange rate tend to contract aggregate demand via the net exports component while aggregate demand tend to increase due to a decrease in exchange. Exchange rate depreciation increases the global competitiveness of local industries by diverting expenditure from international goods to locally made goods (Kandil, 2004). Aside the net-exports component, exchange rate seems to influence aggregate demand through its effects on private domestic consumption. Private domestic consumption tends to increase as exchange rate rises as households are compelled to look inward. Ricci and MacDonald (2005) posit that increase in productivity and competitiveness of the tradable sector compared to foreign industries reduces pressure on real exchange rates.

Notably, government efforts at boosting aggregate demand through increase in private domestic consumption have focused on exchange rate management. This is built on the assumption that increase in exchange rates tend to divert the attention of private domestic consumers from importation to domestic goods due to higher prices of imports compared to locally made goods. Additionally, exchange rate variations tend to generate spill-over effects on private consumption expenditure due to changes in the relative price of imports. The Marshall-Lerner condition supports the hypothesis that depreciation reduces import due to the availability of higher relative price of imported commodities. Thus, swings in aggregate demand, especially household domestic demand in have been largely blamed on exchange rates variations.

The actualization of a realistic exchange rate to stimulate aggregate demand has remained a major concern in the Nigerian economy. Chang & Tan (2008) posit that the availability of sound and appropriate exchange rate policy is the prerequisites for improved macroeconomic performance. Thus, deviation from the rates of exchange considered appropriate or realistic tend to generate costs on the economy in terms of decline in aggregate demand and drastic fall in overall economic performance. The exchange rate policy in Nigerian has evolved overtime from post-independence era when the Nigerian pound was pegged to the British pounds, through the 1970s when earnings from crude oil sales record an all-time high to the adopt of Structural Adjustment Programme (SAP) in 1986 when the economy witnessed strategic reforms (Akpan & Atan, 2012). In each of these periods, movements in exchange rate are determined by the underlying policy frameworks with varying implications on the level of economic activities.

The second tier foreign exchange market introduced by the SAP in 1986 heralded the depreciation in the exchange rate with attendant implications on aggregate demand. This heightened the variations in exchange rates with greater uncertain and risks in the foreign exchange market. Iyoboyi & Muftau (2013) posit that the guided regulation introduced in 1994 caused exchange rate in Nigeria to depreciate to 21.886 naira against the US dollar. Again, Aliyu (2009) opines that the exchange rate depreciated further to 150.01 naira to a dollar at the end of 2009 due to the adverse implications of the global financial crisis in 2008. Additionally, evidences in various researches indicate that the growth of private domestic consumption in Nigeria has not been very impressive. As a component of aggregate demand, private domestic consumption declined from 102.8 percent

in 2003 to 58.5 percent in 2006 and dropped to 38.3 percent and 31.7 percent in 2008 and 2010 respectively (Adedeji & Adegboye, 2013). The controversies that abound in the Nigerian policy environment with regard to the link between exchange rate variations and aggregate demand have remained a source of worry to relevant stakeholders in the economy. It is against this backdrop that this paper deepens the understanding on the link between exchange rate variations and growth of private domestic consumption in Nigeria.

REVIEW OF RELATED LITERATURE

Monetary Theory of Exchange Rate Variation

The monetarist approach to exchange rate determination posits that monetary policy management in any country is the key determinant of exchange rate. Thus, changes in monetary policy operations directly or indirectly influence exchange rate. According to the monetarists, demand and supply of money in an economy determine the rate of exchange. They equally linked the sensitive of exchange rate to changes in money demand and supply to the responsiveness of stock prices to changes in monetary policies. In the view of the monetarists, the outstanding reason for variations in exchange is that monetary policies of many countries have been unstable (Humphrey, 1977).

The monetary model of exchange rate determination assumes exchange rates involve relative prices of assets determined in highly organized markets that allow for free adjustment in the price level. Zhang, Lowinger & Tang (2007) posit that the key postulation of the monetary model is that the purchasing power parity holds sway over time. Again, Garces-Diaz (2004) describes the monetary model of exchange rate determination as a dominant topic in international economics since the collapse of the Bretton Wood system. This stems from his perception of the credibility of the monetary model in outlining the existence of a long-run equilibrium among relative money supplies, nominal exchange rates and other macroeconomic variables.

Another source of exchange rate variations from the perspective of the monetary model is poor policy coordination in monetary policy management among countries. Evidence of poor policy coordination among countries across the globe tends to reflect in discrepancies in the growth of monetary aggregates. For the monetarists, the persistent poor policy coordination generates cost in the form of global inflation rates differential which are key drivers of exchange rate variations. It follows, therefore, that policy coordination or the lack of it has the capacity of causing exchange rate to fluctuate. Humphrey (1977) argued that stability in exchange rate can be achieved through the adoption of uniform constant growth of monetary aggregate per unit of output trend.

Additionally, Wilson (2009) notes that the quantity theory of money, the Cambridge cash-balance and Keynesian monetary are the fundamental concepts that have shaped the current construct of monetary model of exchange rate determination. The monetary model is also organized into flexible price and sticky price monetary models. The flexible-price monetary model posits that the source of flexible in relative prices is the free adjustment of prices in the money market. The sticky-price monetary model which is credited to Dornbusch (1976) assumes that prices are rigid and only follow a gradual adjustment. Despite its drawbacks, several researches such as Frankel

(1976), Wilson (2009), Garces-Diaz (2014) and more have justified its long-term credibility in explaining the determination of exchange rate.

Overview of Exchange Rate Regimes in Nigeria

The exchange rate regimes in many countries of the world range from fixed arrangements to floating arrangements with a view to achieving exchange rate stability. Like other developing economies, Nigeria has initiated several measures towards ensuring effective management of the exchange rate to engender sound and stable national currency as well as promote stability in the entire financial system. The fixed parity regime (1959-1985) which was associated with the pegging of the Nigeria pound to the British pound sterling served as the first exchange rate system in Nigeria. This followed the establishment of the Central Bank of Nigeria (CBN) in 1958. It is noteworthy that the fixed exchange rate regime lasted till the collapse of the Bretton Wood systems in the early 1970s.

The Exchange Control Act of 1962 conferred on the Minister of Finance with the responsibility of approving foreign exchange transactions. This reserved private sector transactions for the CBN which it undertook through authorized dealers. Fapetu & Oloyede (2014) assert that the 1962 Act witnessed a major change in 1973 following the decimalization and change of the Nigerian currency from pound to naira. This promoted the pegging of the naira to the United States dollar. However, the devaluation of the dollar in 1973 generated a negative spillover effect in the value of the naira due to its depreciation. In response to this, the Nigerian government fixed to naira to a basket of seven countries' currencies comprising the United States, Germany, United Kingdom, Japan, France, the Netherlands and Switzerland.

The rationale for this was to engender stability in the exchange rate given that a fall in value as a result of the devaluation of one currency in the basket tends to be compensated by the appreciation of another in the basket. Again, it was designed to reduce the adverse effects of changes in foreign exchange on domestic prices and balance of payments position. The improvement in the balance of payment position coupled with the difficulty associated with strict exchange rate regulations prompted the reduction of exchange control between 1980 and 1981 (Fapetu & Oloyede, 2014). This seemingly liberal system of exchange rate control was primarily geared towards checking unethical behaviors in international exchange transaction. Advocates of fixed exchange rate system argue that it will enhance orderliness in the Nigerian foreign exchange market and promote certainly in foreign transactions.

The second-tier foreign exchange (1986-1993) was introduced following the adoption of Structural Adjustment Programme (SAP) in 1986 as recommended by the International Monetary Fund (IMF). This resulted to the deregulation of exchange rate which allowed the market forces of demand and supply to determine the rate of exchange under the framework of foreign exchange function system. The fixed official first tier rate and market-driven flexible exchange of the second-tier foreign exchange market (SFEM) produced a dual exchange rate system in Nigeria. While the former was administratively fixed and applied to a few official international organizations, the later was determined by the forces of demand and supply and applied to other transactions.

Furthermore, the autonomous foreign exchange market (1995-1999) was introduced as a form of guided regulations in the Nigerian foreign exchange market. Thus, the prevailing autonomous foreign exchange market (AFEM) rate was allowed for all sorts of international exchange transactions. This led to the abolishment of the dual exchange rate system. The continuous instability in the naira exchange rate prompted the introduction of Inter-Bank Foreign Exchange Market (IFEM) in 1999 which -replaced the AFEM. The IFEM allowed oil companies to sell foreign exchange to commercial banks without passing through the CBN.

The CBN exercised a reasonable control in the foreign exchange market in terms of determining the exchange rate. The desire to promote sound and stable value of the naira necessitated the adoption of the wholesale Dutch System (WDAS) in 2006. Consequently, the CBN therefore licensed more Bureau de Change operators to help in meeting the growing demand for foreign exchange. The DAS arrangement allowed the exchange rate to be determined by bids made by commercial banks on behalf of their customers. The quest for more flexibility in the foreign exchange market prompted the monetary policy committee (MPC) to adopt greater flexibility in the inter-bank foreign exchange market as announced by the CBN Governor, Mr. Godwin Emefieli on 24th May, 2016. The depletion of the external reserve coupled with distortion in the foreign exchange earnings due to shock in the global oil market informed the MPC's decision to introduce greater flexibility in the foreign exchange market.

Empirical Literature
Research related to exchange rate management still remains of interest to economists, especially in developing countries; despite a relatively enormous body of literature in the area. This is largely because the exchange rate in whatever conceptualization is not only an important relative price which connects domestic and world markets for goods and assets, it influences domestic prices through their effects on aggregate supply and demand.

Adedeji & Adegboye (2013) examined the determinants of private consumption expenditure in Nigeria between 1981 and 2010. An Error Correction Mechanism (ECM) was utilized as the analytical approach and the result revealed that GDP per capita and disposable income have a positive and significant effect on private consumption spending while variations in exchange rate was found to exert a negative effect on private consumption expenditure. The study recommended for the adoption of measures capable of promoting real effective exchange rate depreciation and enhances disposable income.

Ezeji & Ajudua (2015) assessed the determinants of aggregate consumption expenditure in Nigeria. The study included income, interest rate, inflation rate and exchange rate as the explanatory variables while aggregate consumption expenditure serve as the dependent variable. A combination of stationary and co-integration tests were adopted to determine the order of integration and existence of long-run relationship respectively. Evidences from the results show that consumption expenditure and income are positively linked. Again, the findings reveal that exchange rate, interest rate and inflation significant affect consumption expenditure in Nigeria. Based on the findings, the study recommended for the adoption of policies that will curtail inflation, generate employment and prevent frequent depreciation of the naira.

Bahmani-Oskooee & Xi (2012) examined the role of exchange rate volatility on domestic consumption in Japan. The study incorporated real income, interest rate, the exchange rate and a GARCH-based measure of exchange rate volatility in the consumption function. Bounds testing approach that distinguishes the short run from the long run was utilized for the empirical analysis of the time series data. The result indicated that exchange rate volatility leads to lower consumption in Canada, and higher consumption in the U.S. and Japan. Based on the findings, the study recommended for better exchange rate management that with not hurt consumers.

In related study, Bahmani-Oskooee, Kutan & Xi (2015) examined the effects of exchange rate volatility on domestic consumption in sample of 12 countries. They developed and estimated multivariate regression analysis and the result showed that exchange rate volatility has short run effects on domestic consumption in all the 12 countries. The result also revealed that the short-run effects exchange on consumption is passed on to the long-run effects only in six countries. The study however, suggested that exchange rate policy should be consistent with the policy aimed at boosting aggregate consumption expenditure.

MATERIALS AND METHODS

Model Specification

The model employed in this paper followed the work of Adedeji & Adegboye (2013) with modification due to the introduction of public recurrent expenditure as part of the explanatory variables. The functional specification of the model is provided as:

$$PDC = f(EXC, DPY, PRX) \tag{1}$$

Where: PDC = private domestic consumption, EXC = official exchange rate, DPY = disposable income and PRX = public recurrent expenditure.

The vector autoregression form of the model based on the notations of the variables in equation (1) is as follows:

$$PDC_t = b_1 + \sum_{i=1}^{P} \pi_{11}^1 PDC_{t-i} + \sum_{i=1}^{P} \pi_{12}^2 EXC_{t-i} + \sum_{i=1}^{P} \pi_{13}^3 DPY_{t-i} + \sum_{i=1}^{P} \pi_{14}^4 PRX_{t-i} + e_{1t} \tag{2.1}$$

$$EXC_t = b_2 + \sum_{i=1}^{P} \pi_{21}^1 PDC_{t-i} + \sum_{i=1}^{P} \pi_{22}^2 EXC_{t-i} + \sum_{i=1}^{P} \pi_{23}^3 DPY_{t-i} + \sum_{i=1}^{P} \pi_{24}^4 PRX_{t-i} + e_{2t} \tag{2.2}$$

$$DPY_t = b_3 + \sum_{i=1}^{P} \pi_{31}^1 PDC_{t-i} + \sum_{i=1}^{P} \pi_{32}^2 EXC_{t-i} + \sum_{i=1}^{P} \pi_{33}^3 DPY_{t-i} + \sum_{i=1}^{P} \pi_{34}^4 PRX_{t-i} + e_{3t} \tag{2.3}$$

$$PRX_t = b_4 + \sum_{i=1}^{P} \pi_{41}^1 PDC_{t-i} + \sum_{i=1}^{P} \pi_{42}^2 EXC_{t-i} + \sum_{i=1}^{P} \pi_{43}^3 DPY_{t-i} + \sum_{i=1}^{P} \pi_{44}^4 PRX_{t-i} + e_{4t} \quad (2.4)$$

Compactly, the VAR (P) model in equations (2.1) – (2.4) is configured in a matrix form as:

$$\begin{bmatrix} PDC_t \\ EXC_{2t} \\ DPY_{3t} \\ PRX_{4t} \end{bmatrix} = \begin{bmatrix} b_1 \\ b_2 \\ b_3 \\ b_4 \end{bmatrix} + \sum_{i=1}^{P} \begin{bmatrix} \pi_{11}^1 & \pi_{12}^2 & \pi_{13}^3 & \pi_{14}^4 \\ \pi_{21}^1 & \pi_{22}^2 & \pi_{23}^3 & \pi_{24}^4 \\ \pi_{31}^1 & \pi_{32}^2 & \pi_{33}^3 & \pi_{34}^4 \\ \pi_{41}^1 & \pi_{42}^2 & \pi_{43}^3 & \pi_{44}^4 \end{bmatrix} \begin{bmatrix} PDC_{t-i} \\ EXC_{2t-i} \\ DPY_{3t-i} \\ PRX_{4t-i} \end{bmatrix} \begin{bmatrix} e_{1t} \\ e_{2t} \\ e_{3t} \\ e_{4t} \end{bmatrix} \quad (2.5)$$

Where: b_i (i =1-4) denotes an (n x 1) vector of intercepts

$\pi_{11} - \pi_{44} =$ (n x n) coefficient matrices

ei (i=1, 2, ---, k) represents an (n x 1) vector of white noise error process

Source of Data
The data required for each of the variables were sourced from the CBN Statistical Bulletin. The observations spanned from 1981 to 2016.

Data Analysis Techniques
The VAR technique forms basis for estimating the long term effects of the regressors on private domestic consumption. The VAR framework involves the extension of the univariate autoregressive model to dynamic multivariate time series analysis. Hung & Pfau (2008) and Biljanovska & Meyer-Cirkel (2016) are of the view that VAR has emerged as a robust and reliable method for the analysis of transmission mechanisms and the description of dynamic relationships in economic and financial time series and forecasting. Apart from its robustness in data description and forecasting, the VAR model is equally useful for structural inference and policy analysis. In addition to VAR, this paper applied some diagnostics tests as discussed below:
i. Unit Root Test

The Phillips & Perron (1988) method was employed to determine the order of integration of the series. The general specification of the Phillips-Perron unit root test model is of the form:

$$\Delta Q_t = \propto_0 + \propto_1 Q_{t-1} + \sum_{i=1}^{K} \beta_i \Delta Q_{t-i} + \lambda_t \quad (3)$$

Where: Q_t = variables included in the model, $\propto_1$ and β_i = parameter estimates, K = length of lag,

Δ = First difference operator and λ_t = Random disturbance term.

ii. Cointegration Test

This test is utilized to determine whether or not the underlying economic time series are cointegrated or not. Considering its robustness in testing for cointegration in a multivariate model, the Johansen & Juselius, (1990) procedure to co-integration test is applied to ascertain whether or not long-run relationship exists among the underlying series. Specifically, the null hypothesis of no cointegration is tested against the alternative hypothesis of cointegration at 5 percent level. The general specification of Johansen-Juselius cointegration model based on trace and maximum Eigenvalue statistics is provided as follows:

$$8\lambda_{trace}(r) = -T \sum_{i=r+1}^{n} In\left(1 - \hat{\lambda}_i\right) \tag{4.1}$$

$$\lambda_{max}(r, r+1) = -T \; In\left(1 - \hat{\lambda} \, r + 1\right) \tag{4.2}$$

Where $\hat{\lambda}$ implies the estimated values of the characteristic roots and T denotes the number of observations while In represents natural long notation.

Variable Description

The variables in the model are described in table 1.

Table 1: Description of the dependent and independent variables

Variable	Description
Private domestic consumption (PDC)	This encompasses household expenditure on final goods and services produced domestically. It is mainly concerned with household spending on domestically made final commodities. The annual private consumption expenditures over the study period will be utilized for this study.
Exchange rate (EXC)	This is the value of a particular currency with respect to another currency often determined in the foreign exchange market. This study will use real exchange rate which measure the purchasing power of a particular

	currency. Increase in exchange rate is expected to increase household demand for domestically made goods as they tend to look inward due to increase in cost of importation.
Disposable income (DPY)	This entails income available to the household for meeting consumption expenditures or savings decisions after payment of required taxes on income earned. Based on theoretical expectation, an increase in disposable income is expected to increase private domestic consumption.
Public recurrent expenditure (PRX)	It consists mainly of expenditure on wages and salaries as well as overhead payments

Source: Authors' compilation

RESULTS AND DISCUSSION

Unit Root Test Results

The Phillips-Perron test for unit root was applied in this paper to check for the stationarity status of the variables. The results are summarized in table 2

Table 2: Phillips-Perron unit root test results

Variable	ADF test at levels		ADF test at First difference		Order of Integration
	Adjusted t-stat.	P-value	Adjusted t-stat.	P-value	
LOG(PDC)	-1.317	0.8606	-7.434	0.0000	I(1)
LOG(EXC)	-1.537	0.7899	-6.336	0.0001	I(1)
LOG(DPY)	-1.782	0.6838	-5.279	0.0013	I(1)
LOG(PRX)	-1.841	0.6555	-8.679	0.0000	I(1)

Source: Authors' computation with data from CBN Statistical Bulletin

The unit root test result reveals that all the variables are nonstationary at levels. For this reason the null hypothesis of unit root is accepted. In view of the nonstationary of the series, they were subjected to first difference test and they results indicate that they all integrated of order one. Thus, they were subjected to cointegration test to determine if their linear combinations can lead to long run equilibrium relationship.

Cointegration Test Result
The result of the Johansen-Juselius cointegration test is reported in table 3.
Table 3: Summary of the cointegrtaion test results

Series: LOG(PDC) LOG(EXC) LOG(DPY) LOG(PRX)				
Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.842939	91.11238	47.85613	0.0000
At most 1 *	0.655681	48.53657	29.79707	0.0001
At most 2 *	0.511633	24.01425	15.49471	0.0021
At most 3 *	0.279212	7.530423	3.841466	0.0061
Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.842939	42.57581	27.58434	0.0003
At most 1 *	0.655681	24.52232	21.13162	0.0160
At most 2 *	0.511633	16.48383	14.26460	0.0219
At most 3 *	0.279212	7.530423	3.841466	0.0061

Source: Authors' computation with data from CBN Statistical Bulletin

 * denotes rejection of the hypothesis at the 0.05 level

The cointegration test result is very insightful as it reveals that the variables are cointegrated. Both trace and maximum eigenvalue test results show evidence of four cointegrating vectors. The evidence cointegration in the series is very welcoming. It, therefore, follows that the variables have long run relationship. Overall, the null hypothesis of no cointegration is rejected.

Model Estimation
Prior to the estimation of the VAR model, the optimal lag order was determined automatically using various lag selection criteria as showed in table 4.
Table 4: VAR lag order selection criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-80.19995	NA	0.013106	7.016662	7.213005	7.068752
1	-2.952363	122.3087	8.16e-05	1.912697	2.894408	2.173145
2	13.24940	20.25220	9.13e-05	1.895883	3.662964	2.364690
3	56.74547	39.87140*	1.33e-05*	-0.395456*	2.156994*	0.281710*

Source: Authors' computation with data from CBN Statistical Bulletin

 * indicates lag order selected by the criterion

The result reveals that lag 3 is accepted as the optimal lag for the VAR model. All the criteria such as Final prediction error (FPE), Akaike information criterion (AIC), Schwarz information criterion (SC) and Hannan-Quinn information criterion (HQ) all identified lag 3 as the appropriate lag order. This forms basis for the estimation of the VAR model.

Table 5: VAR Estimates

Dependent variable: LOG(PDC)			
Explanatory variable	Coefficient	Standard error	t-stat.
LOG(PDC(-1))	0.843	0.169	4.977
LOG(PDC(-2))	-0.492	0.194	-2.527
LOG(PDC(-3))	0.373	0.165	2.263
LOG(EXC(-1))	1.733	0.458	3.783
LOG(EXC(-2))	-0.738	0.436	-1.694
LOG(EXC(-3))	-0.658	0.368	-1.788
LOG(DPY(-1))	-0.859	0.515	-1.669
LOG(DPY(-2))	-2.485	0.588	-4.223
LOG(DPY(-3))	1.919	0.519	3.699
LOG(PRX(-1))	-0.142	0.344	-0.412
LOG(PRX(-2))	0.377	0.335	1.123
LOG(PRX(-3))	1.092	0.409	2.669
C	10.572	2.839	3.724
R-squared	0.945	F-statistic	16.371

Source: Authors' computation with data from CBN Statistical Bulletin

As observed from the VAR estimates, lagged values of private domestic consumption significantly influenced its current value. This indicates that previous of private domestic consumption can be relied upon in predicting its current value. It was found that exchange rate lagged for one period has significant negative effect on private domestic consumption. 1 percent increase in exchange rate, on the average, increases private domestic consumption by 1.733 percent. This finding aligns with the theoretical a priori expectation, but deviates from the result of Adedeji & Adegboye (2013). The dynamic effects of disposable on private consumption are mixed. From the VAR estimates, lag 2 of disposable income negatively influenced private consumption whereas lag 3 is positively linked to private domestic consumption. The positive effect of disposable income on private domestic consumption corroborates with the results of Ezeji & Ajudua (2015); Adedeji & Adegboye (2013). Additionally, public recurrent expenditure lagged for 3 periods has significant

positive effect on private domestic consumption. This finding attests to the effectiveness of fiscal policy in boosting household consumption. The F-statistic (16.371) indicates that all the regressors are jointly significant in influencing changes in the private consumption expenditure over the study period. Again, the coefficient of determination (0.945) reveals that regressors jointly possesses high explanatory power as they collectively account for 94.5 percent of the overall systematic variations in private domestic consumption. This provides appreciable empirical evidence that the model is well fitted. The stability test for the model is provided in figure 1.
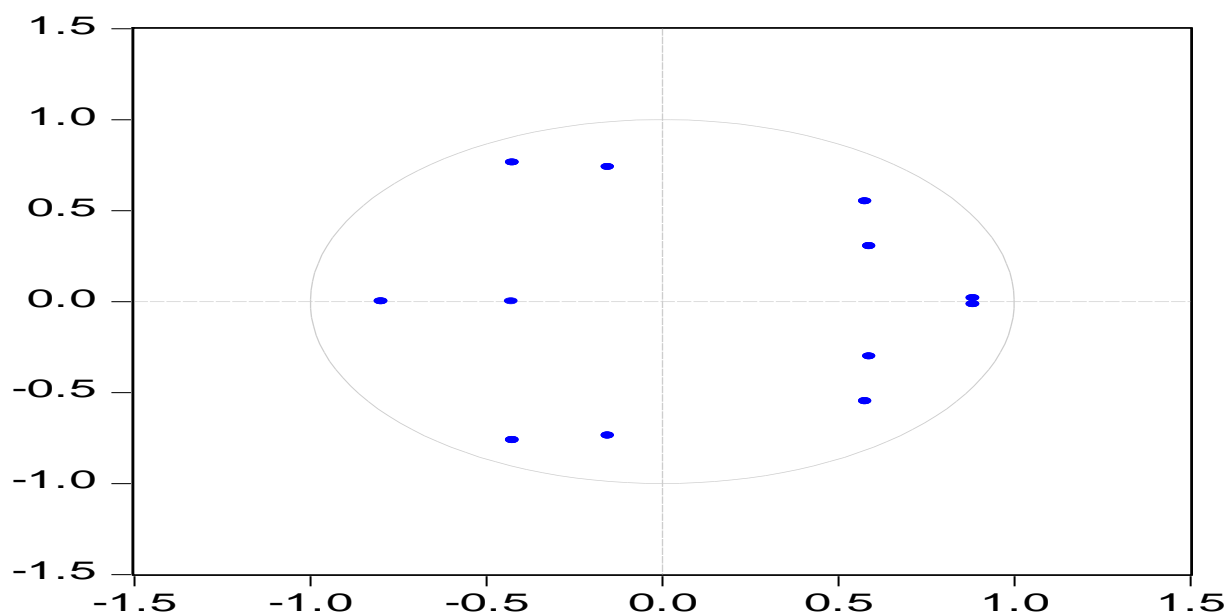

Figure 1: Plot of stability test

As observed from figure 1 all the scatter points are within the circle. This indicates that the coefficients are stable over the study sample. This finding is very impressive as it shows that the model can be relied upon for long tern forecast and policy purposes.

Variance Decomposition of LOG(PDC)
The forecast error variance decomposition for LOG(PDC) over a 10-year period is summarized in table 6.

Table 6: Summary of Variance Decomposition of LOG(PDC)

Period	S.E.	LOG(PDC)	LOG(EXC)	LOG(DPY)	LOG(PRX)
1	0.353650	100.0000	0.000000	0.000000	0.000000
2	0.632938	77.42184	16.78825	5.697986	0.091916
3	0.818568	55.35067	10.78852	33.78534	0.075469
4	0.829127	54.26490	10.78951	34.57519	0.370400
5	0.834020	53.75644	11.31988	34.25486	0.668815
6	0.841540	52.80451	12.16300	34.34874	0.683756
7	0.846268	52.40335	12.82205	33.99222	0.782375
8	0.869571	50.05603	14.48545	34.64296	0.815561
9	0.896918	47.15941	17.17158	34.74853	0.920484
10	0.911043	45.89534	18.19921	34.84651	1.058943

Source: Authors' computation with data from CBN Statistical Bulletin

The variance decomposition in period one reveals that 100 percent shocks in private domestic consumption are explained by itself. In periods two and three, private domestic consumption accounts for 77.42 and 55.35 percent in its own shock while exchange rate explains 16.788 and 10.79 percent of the shocks in private domestic consumption. Additionally, 33.78 and 34.58 percent of the shocks in private domestic consumption are explained by disposable income in periods 2 and 3. The shares of exchange rate, disposable income and public recurrent expenditure of the shocks in private domestic consumption in period five are 11.319, 34.255 and 0.6688 percent respectively. The result further reveal that in period ten, exchange rate account for 18.199 percent of the shocks in private domestic consumption while disposable income and public recurrent expenditure respectively explain 34.84 and 1.059 percent of the total shocks in private domestic consumption. On balance, the variance decomposition reveals that the explanatory variables have predictive power for private domestic consumption over the study period.

CONCLUSION

Exchange rate fluctuations have remained at the center of macroeconomic debate considering the perceived implications on the economy wide aggregate and key components of the aggregate demand. This paper offers insights into the link between exchange rate variation and private domestic consumption in Nigeria. The VAR estimation technique is relied upon for the analysis of the time series data. The finding indicates that exchange rate impacts positively on private domestic consumption. This is indicative that household tends to look inward as exchange rate increases due to the associated increase in the cost of imported commodities. Thus, increase in the rate of foreign exchange tends to reduce the consumption complex syndrome often displayed by households in Nigeria. In view of the findings, it is concluded that increase in the exchange rate is associated with increasing level of private domestic consumption. Another conclusion drawn from the findings is that rising level of disposable income and fiscal policy initiative in the form of recurrent spending are helpful in boosting private domestic consumption. Given the findings, it is recommended that the CBN should ensure that effective exchange rate management system is put

in place to maintain a stable rate of exchange and provide pathway for rapid and sustained increase in private domestic consumption.

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