

The nexus between exchange rate fluctuations and macroeconomic variables in Nigeria

Olufemi S. Adegboyo

Department of Economics, Faculty of Social Science,
Federal University Oye-Ekiti, Nigeria

Correspondence author email: Olufemi.adegboyo@fuoye.edu.ng

Abstract

This study examined the nexus between exchange rate fluctuations and macroeconomic variables in Nigeria using annual time series data spanning from 1986 to 2017. The study employed ECMARDL and granger causality to ascertain both dynamics and directional relationship among the variables under consideration. The results showed that FDI and RGDP had positive significant effect on exchange rate fluctuations, while TOT has a positive insignificant impact on exchange rate fluctuations. Furthermore, CPI, GSPGDP, TFRESV and WCOP had negative significant impact on exchange rate fluctuations. The error correction model coefficient which is -0.704469 means that nearly 70.45 percent of any disequilibrium in exchange rate fluctuation is corrected by the selected variable within one period (one year). The findings further revealed that there is causal relationship between exchange rate and the TOT, FDI, CPI and WCOP. The implication of this is that there are directional and equilibrium relationship between exchange rate fluctuations and macroeconomic variables in Nigeria. The study therefore recommend that Government and policy makers should intensify domestic policies that accommodate or tolerate some level of (mild) inflation in order to encourage producers to expand production of goods and services, also the government should diversify the economy so that whenever there is a shock in the oil price, the shock will be less felt by the economy, and Government consumption expenditure should be carried out in a manner that it will encourage and promote investment, and increase domestic demand.

Keywords: *Marshall-Lerner condition, ARDL, Exchange rates, Macro-economic, Balassa-Samuelson effect*

JEL Classification: C22, F31, A10

INTRODUCTION

In the past few decades researchers and policy makers have often debate the issue of exchange rate fluctuations and management in developing and developed countries due to its important on their economy Eбайдall (2013), Insah and Bangniyel (2014), Kadil (2006). The issue became a topical issue for discuss globally in 1971 following the collapse of the Bretton Woods system. Prior to this collapse United State of America fixed the price of her currency (US Dollar) in term of gold while all other convertible currencies were pegged to the Dollar. This collapse compelled countries to exchange their currencies among themselves at the determined rate and since then exchange rate management has been a source of worry for various government of the world.

In Nigeria the issue of exchange rate management came into being in September 1986 when the flexible exchange rate regime was put in place following the government adoption of the Structural Adjustment Programme. The objectives of exchange rate policy under SAP were: to preserve the value of Naira, maintaining external and internal balance as well as achieving the macroeconomic goals. Since the adoption of exchange rate deregulation, the value of Naira has been fluctuating and the government has been formulating different policies to ensure that the Naira is stable. Sanusi (2004), noted that maintaining a stable exchange rate for the Naira is very sacrosanct, given the structure of the economy, and the need to minimize distortions in production and consumption, increase the inflow of non-oil export receipts and attract foreign direct investment. Having identified exchange rate as an important variable that ensure both internal and external balances as well as economic growth (Obadan (2006), Nwude (2012), Mordi (2006) and Odusola (2006)) government has formulated different policies such as adoptions of Second tier Eoreign Exchange Market, Inter- bank Foreign Exchange Market, Autonomous Foreign Exchange Market, Dutch Auction System, Wholesale Dutch Auction System to ensure its stability. However, the currency keep depreciating, thereby causing the gap between official rate and parallel market rate to keep increasing. In curbing this free fall of Naira the government devalue Naira in 2015 with the hope that it would relieve pressure on the balance of payment. Unfortunately, this was not achieve because Marshall-Lerner Condition for a favorable balance of payment adjustment was not met by Nigeria's trade structure. Marshall-Lerner Condition states that an exchange rate devaluation or depreciation will only cause a balance of trade improvement if the absolute sum of the long run export and import demand elasticity is greater than unity.

Despite all these measure and policies from 1986 till date to ensure that the naira is stabilizes, Naira could not be said to have been stable. Rasaq (2013) noted that the continuous depreciation of Naira has adverse effect on the economy both internally and externally. He further said that at the international level, the nation's Balance of Payment (BOP) have continued to record deficit, declining foreign exchange inflow with increasing foreign exchange outflow, and at the home front, inflation has continued in galloping, interest rate is increasing in a disturbing proportion thereby discouraging investment, unemployment has been growing at a disturbing rate and so on. On the other hand, Obadan (2006) argued that some factors and policies such as inadequate foreign capital inflow, fluctuations in crude oil earnings, expansionary monetary and fiscal policies, et al led to the instability of the Naira So, the need to know which one ganger cause the other between exchange rate fluctuation and macroeconomic variables.

Also, there is conflicting empirical evidence among researchers on the relationship between exchange rate fluctuation and macroeconomic variables. Scholars like Hondroyianis, Swamy and Ulan (2005), Vo et al(2000), Osigwe (2015), Akpan (2008), Adeniran, Yusuf and Adeyemi (2014), Akinbobola and Oyetayo (2010) all said there is positive relationship between exchange rate fluctuation and some of the macroeconomic variables they examined, while researchers like Bini – Snachi (1991), Havva (2012), Arize et al (2000), Bosworth, Collins and Yuchin (1995) all said that there is negative relationship between exchange rate fluctuation and some of the macroeconomic variables they examined. Others like Berument et al (2012), Nwude (2012), Dada and Oyeranti (2012), said there is no relationship between exchange rate fluctuation and some of the macroeconomic variables they examined. Given such contradiction, the debate on exchange rate fluctuation and macroeconomic variable remains inconclusive so the need to investigate further.

Researchers and policy makers have identified exchange rate as a crucial macroeconomic variables that helps in formulating economic policies to ensure the achievement of the macroeconomics objective Tamunonimim and Reginald (2013), Havva, Mohammed and Teimour (2012). These objectives are: balance of payment equilibrium, full employment, economic growth and employment, price stability and even distribution of income. This assertion was corroborated by Ajakaiye (2001) who noted that exchange rate also directly affect all the macroeconomic variables such as: inflation, profitability of traded goods and services, allocation of resources and investment decision, which explains why the government and private sectors seek stability in these variables. In ensuring a stable exchange rate Nigerian government introduced various policies because exchange rate has been identified as an important variable that ensure an internal and external balance and economy growth.

The Structural Adjustment Programme (SAP) that was adopted in 1986 marked the end of an era and the beginning of a new dispensation in exchange rate policy. Before September 26, 1986 when CBN deregulated Nigeria currency, fixed exchange rate regime was what was used to manage the currency. Under the fixed exchange rate regime international businesses were subjected to expensive exchange and trade control regulations.

In solving the problem associated with fixed exchange rate regime the exchange rate was deregulated. Consequently, second-tier Foreign Exchange Market (SFEM) was established to achieve a realistic and sustainable market determined exchange rate for the Nigeria currency and to be determined through competitive bidding with the prices settling at points. To achieve these, government operated a “dual exchange rate” system policy i.e the policy allowed for two different exchange rates and the operational framework of the policy was the Dutch Auction System (DAS).

Due to problems like multiplicity of rates that characterized DAS and which resulted in the further depreciation of the Naira a unified exchange rate that unifies both the first-tie exchange rate market and second-tie exchange rate market was introduced and named Foreign Exchange Market (FEM) in July 1987. The system was designed to achieve balance of payment stability. The objective was to be achieved through the adoption of realistic exchange rate policy coupled with the liberalization of the external trade and payment system (CBN, 1993).

However, FEM was characterized by sharp practices such as round tripping of funds and this led to the persistent instability of the exchange rate. Therefore in 1989 FEM and the inter-bank were merged to form an enlarged Inter-bank Foreign Exchange Market (IFEM).

The continuous fall in Naira made the federal government in 1994 to formally abandon some of its liberalization policies and re-introduced fixed exchange rate system and pegged the official exchange rate at ₦21. 1960/ \$1.00 in order to stabilize the currency. However, this policy cannot be sustained, consequently dual exchange rate policy was re-introduced in 1995 with the aim of addressing the substantial depreciation of the naira exchange rate in the parallel market and achieving efficient allocation and utilization of resources. However AFEM could not achieve the objectives for which it was formulated.

In 1999 the AFEM was replaced by the Inter-bank Foreign Exchange Market (IFEM). IFEM allowed other players, such as, bank, oil companies, non-bank financial institutions, parastatals, bureau de change and private companies in the market. Consequently, the Central Bank of Nigeria was dissuaded from participating as the major

supplier of foreign exchange market but could only intervene in the buying and selling of foreign exchange market as and when necessary.

The multiple malpractices that characterized IFEM made it not to meet the policy expectation consequently DAS was re-introduced in 2002. The introduction of DAS was to ensure a stable exchange rate and this is to be achieved through enhancement of transparency in the management of foreign exchange market as well as reduction of speculative demand for foreign exchange market. Wholesale Dutch Auction System (WDAS) was introduced on 20th February 2006 to ensure a realistic exchange rate of the Naira.

In 2015, the value of Nigeria currency experienced a free fall mainly due to shortage of external reserves, speculator activities and reduction in crude oil price which pushes pressure on balance of payment. In curbing this economic menace different policies were formulated. Some of these policies are: Banning of the usage of debit cards abroad; The apex bank barred 41 items from access to foreign exchange (www.cbn.gov.ng); Central bank of Nigeria directed that as from August 1 2015, all foreign exchange transactions in any Bureau de change must have Bank Verification Number (BVN) of applicants; The apex bank released a circular in support of commercial banks that are not allowing foreign cash deposit into customer's domiciliary account.

Aside this introductory section, the rest of the paper is structured into four sections. The next section focuses on literature review which is made up of Literature review and theoretical framework. The third section deals with methodology and data; section four presents empirical analysis and interpretations. While section five discusses conclusion and policy recommendation.

LITERATURE REVIEW

Chi-Wei-Su (2012) investigated the relationship between exchange rate and macroeconomic variables in China between 1994 and 2010. The result revealed that ratio of government expenditure to GDP, real money supply, degree of openness and relative productive activity differential all had a negative and significant impact on equilibrium of RBM exchange rate.

Edwards (1989) investigated the determinants of exchange rate in 12 developing countries with the model he built for the purpose. The study covered between 1962 and 1985. The study revealed that lag of capital flow and ratio of government expenditure to GDP had negative impact on exchange rate while output growth and ratio of investment-GDP had positive impact on exchange rate. The study also showed that term of trade no impact on exchange rate

Ojo and Alege (2014) examined exchange rate fluctuations and macroeconomic performance in sub-Saharan Africa. The research work cut across 40 sub-Saharan Africa (SSA) countries and it spanned between 1995 and 2007. There is a long term relationship between the variables of the model. Panel granger causality test confirmed that there are bidirectional relationship between exchange rate on one hand and consuming price index, degree of openness and international rate on the other. The results further showed that there is a strict exogeneity between exchange rate on one hand and real GDP, government expenditure and FDI on the other.

Ebaidalla (2013), examined the impact of exchange rate volatility on macroeconomic performance in Sudan between 1979 and 2009 using 2SLS. The study revealed that exchange rate volatility has negative effect on foreign direct investment and economic growth. Robert and Samuel (2007) investigated the determinant of the real exchange rate in Sierra Leone from 1970 to 2005 using Error Correction model. The study

revealed that capital accumulation, increase in the price level, trade restrictions and capital inflow has positive effect on exchange rate while output has negative effect. Rasaan (2013) analyzed the impact of exchange rate volatility on Macroeconomic variables in Nigeria between the period of 1980 and 2010. The research made use of Ordinary Least Square (OLS) and Granger Causality test. The findings of the study showed that exchange rate volatility has a positive influence on Gross Domestic Product, Foreign Direct Investment and Trade Openness, but with negative influence on the inflationary rate in the country.

Azeez, Kolapo and Ajayi (2012) examined the effect of exchange volatility on macroeconomic performance in Nigeria from 1986 to 2010. They employed the Ordinary least square (OLS) and Johnson co-integration estimation techniques. The result confirmed from both short run and long run analysis that there is a negative relationship between GDP and BOP. Oil revenue is significant in both long-run and short run while BOP and INF are significant in the long run but insignificant in the short-run study. It has been observed in this study that exchange rate volatility is significant and has positive relationship with macro- economic performance both in the long and short run.

Adeniran, Yusuf and Adeyemi (2014) examined the impact of exchange rate fluctuation on the Nigeria economic growth from 1986 to 2013. The estimation technique the authors used was Ordinary least square (OLS). The result revealed that exchange rate, interest rate and inflation rate had no significant impact on economic growth.

Osigwe (2015) examined exchange rate fluctuation oil prices and economic performance between from 1960 to 2010. The study showed that real exchange rate has a negative effect on the oil price and positive effect on the economic performance. The author used Error correction model as the technique.

Ebiringa and Anyaogu (2014) examined the long run relationship between exchange rate, interest rate and inflation between 1971 and 2010. Autoregressive distributed lag (ARDL) co-integration analysis was used to analysis the data. The result shows that there is a significant short-run and long run positive relationship between inflation and exchange rate. While interest rate had a negative relationship, though insignificant.

Nguyen and kalirajan (2006) examines the impact of nominal effective exchange rate on inflation in Vietnam between 1991 and 1999. Vector Autoregressive approach was used to analysis the data. The result shows that nominal devaluation had positive impact on inflation.

Dada and Oyeranti (2012) examined exchange rate and macroeconomic aggregate in Nigeria from 1970 to 2009. These results shows that there is no strong direct relationship between exchange rate and GDP growth.

Uguru (2015) investigated the relationship between oil prices and exchange rate in Nigeria between 1970 and 2014. The study revealed that crude oil price had negative impact on exchange rate. Tamunonimim and Reginald (2013) investigated the causal relationship between exchange rate, balance of payment, external debt, external reserves, gross domestic product growth rate and inflation rate in Nigeria between 1987 and 2011. The result shows that there is a long-run equilibrium relationship among the indicators. The Granger causality test shows that there is unidirectional causality from exchange rate to BOP, external reserves and gross domestic product growth rate.

THEORETICAL FRAMEWORK

Balassa-Samuelson

The model was development by Bela Balassa (1964) and Paul Samuelson (1964). They split the economy into two sectors: tradable sector and non-tradable sector. The model has the following assumptions: the principle of demand and supply are applicable

in both sectors; tradable prices are equals in the two countries, in the productive sector wages are linked to the level of productivity; labour productivity is higher in the tradable sector compare to the non-tradable sector and wages tend to equalize between the two sectors. However, the developing country have lower productivity level in the open sector compare to the developed country. For the developing country to catch-up with the developed economy, productivity must be increased in the open sector, so that wage could be increased in tradable sector without any inflationary effect.

The Mundell-Fleming model

This theory was developed in the early 1960's by Fleming and Mundell. This model is an extension of the IS-LM model to the case of an open economy. Unlike the IS-LM model which considers three markets: goods, money and asset markets, and is used to analyze the impacts of monetary policy and fiscal policy, Mundell-Fleming helps in determining exchange rate. Under this model, the balance of international payments is considered another equilibrium condition in addition to the money market and goods market. One of the most important issues addressed by the model is the trilemma, which states that perfect capital mobility, monetary policy independence and a fixed exchange rate regime cannot be achieved simultaneously. Specifically, it argues that a country cannot sustain monetary policy independence in a fixed exchange rate regime with perfect capital mobility.

METHODS

Model specification

Guided by empirical finding reviewed in this study and sequent to its logical structure as observed in the theoretical framework, the model specification therefore followed the models of Ojo and Alege (2014) with modification.

$EXR = f(RGDPGR, CPI, TOT, FDI, TFRESV, GSPGDP, WCOP)_t$

$$EXR = \beta_0 + \beta_1 RGDPGR + \beta_2 CPI + \beta_3 TOT + \beta_4 FDI + \beta_5 RTFRESV + \beta_6 GSPGDP + \beta_7 WCOP + \mu_t \quad (1)$$

Where the following notation has been used:

EXR= exchange rate fluctuations

RGDPGR = real gross domestic product growth rate

CPI = consumer price index

TOT = terms of trade

FDI = foreign direct investment.

GSPGDP = the ratio of government spending (fiscal policy) to GDP

WCOP = world crude oil price.Price per barrel in US Dollar

TFRESV= total foreign reserve. Figure in US Dollar

μ_t = error term.

Equation 1 is written in an econometrics form as seen in equation (2) below:

$$(EXR)_t = \beta_0 + \beta_1 (RGDPGR)_t + \beta_2 (CPI)_t + \beta_3 (TOT)_t + \beta_4 (FDI)_t + \beta_5 (TFRESV)_t + \beta_6 (GSPGDP)_t + \beta_7 (WCOP)_t + \mu_t \quad (2)$$

For an appropriate coefficient for the EXR with respect to the explanatory variables to be produce I would transform the model equation (2) on log-linear econometrics form as seen below. Variable with negative value cannot be log so RGDPGR was not log which made the model to be log-linear.

$$\ln EXR_t = \beta_0 + \beta_1(RGDPGR)_t + \ln\beta_2(CPI)_t + \ln\beta_3(TOT)_t + \ln\beta_4(FDI)_t + \ln\beta_5(INTR)_t + \ln\beta_6(GSPGDP)_t + \ln\beta_7(WCOP)_t + \mu_t \tag{3}$$

Operational definition

EXR = exchange rate fluctuations. This study made use of nominal exchange rate.

TOT = It reflects the capacity of any given amount of exports to pay for a quantity of import. It is measured by (export/import) X 100.

Data and source

The study employs annual data covering the period 1986-2010. This period is chosen as it corresponds to the period where uniform and consistent data on the relevant variables are available. And more importantly that is the period when exchange rate fluctuation came into been in Nigeria. Data for the work are collected from Central Bank of Nigeria (CBN) statistical Bulletins and World Bank Data Base.

RESULT AND DISCUSSION

Unit root test

Unit root test can also be called a stationary test and it used to test if a time series variable is stationary or not. It is important to check the stationarity a variable because the stationarity or otherwise of variable usually influence the behavior and properties of the variable strongly. In the literature, most time series variables are non-stationary and using non-stationary variable in model estimation might lend to spurious or nonsense regression results (Granger and Newbold, 1994).

Table 1. Unit root test

Variable	At Levels			1st Difference			Level of integration
	ADF-Test	1% C.V	5% C.V	ADF-Test	1% C.V	5% C.V	
LN(EXCHR)	1.969	-2.642	-1.952	-4.687	-2.644	-1.953	I(1)
LN(FDI)	0.833	-2.642	-1.952	-7.304	-2.644	-1.953	I(1)
LN(TOT)	-0.577	-2.647	-1.953	-6.935	-2.647	-1.953	I(1)
LN(GSPGDP)	-0.845	-2.642	-1.952	-7.303	-2.644	-1.953	I(1)
RGDP	-3.318	-2.642	-1.952	-9.059	-2.644	-1.953	I(0)
LN(TFRESV)	0.780	-2.642	-1.952	-7.079	-2.644	-1.953	I(1)
LN(WCOP)	2.649	-2.642	-1.952	-5.150	-2.644	-1.953	I(1)
LN(CPI)	-0.585	-2.642	-1.952	-6.359	-2.644	-1.953	I(1)

The result shown in table 1 examines the statistical properties of all the variables. The ADF tests for unit root were conducted for the variables in the model. The results of the test at levels and first difference are presented above. The null hypothesis states that there is a unit root in each of the series that is each variable is non stationary. The rule of thumb is that the null hypothesis should be accepted if the absolute value of ADF statistic is greater than the critical value at any chosen level of significance. The ADF result in Table 1 indicates that variables like EXCHR, FDI, TOT, GSPGDP, TFRESV, WCOP and CPI are integrated of order one, I(1), while variable RGDPGR is stationary at level. Based on the ADF test the condition for Johansen cointegration test is not met. This kind of conflict between the outcomes of the two tests is common in practice (Rahman, 2012). Consequently, this research would employ the ARDL – Bound testing method of co-integration analysis rather than the Johansen method.

Co-integration test

Co-integration test is used to detect or check for the presence of long-run equilibrium between or among series. Since it has been established that some variables

are not stationary at level, there is need to check whether there is existence of similar trend properties between or among the series as a regression model on co-integrated series is said to be super consistent. Thus, given the unit root test result above, the most appropriate co-integration test is the Pesaran Bounds test since the test allows combination of fractionally integrated variables i.e. combines variables of different orders of integration. The Bounds Cointegration test result is provided thus:

Table 2. ARDL Bounds test

Test Statistic	Value	k
F-statistic	14.01629	7
Critical Value Bounds		
Significance	I(0) Bound	I(1) Bound
10%	1.92	2.89
5%	2.17	3.21
2.50%	2.43	3.51
1%	2.73	3.90

Using the ARDL bounds test, the result above shows that with the assumption of weak exogeneity on EXCHR, FDI, TOT, GSPGDP, TFRESV, WCOP, RGDPGR and CPI, the hypothesis of no long run relationship can be rejected at 5% significant levels as the F-statistic for the model is greater than 5% of both I (0) and I (1) bounds of 2.17 and 3.21 respectively. Thus, this shows existence of long-run relationship between EXCHR, FDI, TOT, GSPGDP, TFRESV, WCOP, RGDPGR and CPI.

ARDL analysis

This subsection presents the result obtained from estimating the ARDL unrestricted error correction (short run or dynamic) model and the ARDL long-run (static) model in equation. Following this result, this study examines and estimates both short-run dynamics and the long-run relationships between exchange rate, consumer price index, foreign direct investment, government expenditure, real gross domestic product growth rate, term of trade and world crude oil price.

Table 3. Long run multiplier coefficient of ARDL

Variables	Coefficient	Std. Error	t-Statistic	Prob.*
LN(CPI)	-1.957	0.223	-8.758	0.001
LN(FDI)	1.777	0.241	7.378	0.002
LN(GSPGDP)	-1.721	0.341	-5.052	0.007
RGDPGR	0.0503	0.016	3.076	0.037
LN(TFRESV)	-0.328	0.191	-1.714	0.162
LN(TOT)	-0.138	0.416	-0.333	0.756
LN(WCOP)	-1.738	0.339	-5.121	0.007
C	9.139	2.491	3.669	0.021

Long-run ARDL model analysis

It is confirmed from the result that there is a positive relationship between EXR and FDI and RGDPGR. While CPI, GSPGDP, TFRESV, TOT, WCOP had a negative relationship with EXR. Also, all the variables were significant aside TFRESV and TOT. The co integration equation is:

$$LN(EXR) = 9.138859 - 1.957362LN(CPI) + 1.776902LN(FDI) - 1.720811LN(GSPGDP) + 0.050268RGDPGR - 0.327732LN(TFRESV) - 0.138364LN(TOT) - 1.737981LN(WCOP).$$

Engle-Granger Theorem establishes that when co-integration exist the encompassing power of the error correction mechanism over other forms of dynamic specifications. Therefore the short run analysis is presented below using ECM.

ARDL ECM

Sequent to the existence of cointegration relationships among the variables as evident in the ARDL Bound test, Auto-Regressive Distributed Lag Error Correction Model estimation technique would be used to determine the short-run behavior of the variables. The Error Correction Model captures the short run dynamics of the system and its coefficient measures the speed of adjustment to obtain equilibrium in the event of shock to the system. The below table shows the result of the short run dynamics of equation.

Table 4. ARDL ECM

Variables	Coefficient	Std. Error	t-Statistic	Prob.*
DLN(EXR(-1))	0.176	0.059	2.970	0.041
DLN(CPI)	-0.865	0.051	-16.923	0.001
DLN(FDI)	0.530	0.063	8.477	0.001
DLN(GSPGDP)	-0.850	0.089	-9.513	0.007
D(RGDPGR)	0.007	0.003	2.536	0.064
DLN(TFRESV)	-0.452	0.050	-8.959	0.001
DLN(TOT)	1.130	0.077	14.706	0.000
DLN(WCOP)	-0.722	0.075	-9.614	0.001
CointEq(-1)*	-0.704	0.036	-19.454	0.000
R-squared	0.979	Mean dependent var		0.133
Adjusted R-squared	0.954	S.D. dependent var		0.288
S.E. of regression	0.062	Akaike info criterion		-2.427
Sum squared resid	0.046	Schwarz criterion		-1.666
Log likelihood	49.977	Hannan-Quinn criter.		-2.194
Durbin-Watson stat	2.975			

Short-run (dynamic) ARDL model analysis

The Table 4 above shows the short run (dynamics) results. The optimal lag combination for the models is obtained via Schwartz Information criterion (SIC). The result in table 4 is the Error Correction Mechanism.

It can be observed that there is a positive relationship between EXCHR and FDI, RGDPGR and TOT but a negative relationship with CPI, GSPGDP, TFRESV and WCOP. The results shows that foreign direct investment has a positive significant effecton exchange rate fluctuations. This implies that as FDI increases exchange rate fluctuations increases i.e exchange rate depreciates. This does not conform to the apriori expectation. This is in line with the findings of Rasaan (2013).

However, Consumer price index was found to have negative significant effect on exchange rate fluctuations. The result implies that as consumer price index increases exchange rate fluctuations decreases i.e. exchange rate appreciates (stabilized). This does not conform to the apriori expectation. This is in line with the findings of Rasaan (2013), Edet, Sunday, Daniel and Inimfon (2012) and Tamunonimim and Reginald (2013).

Government expenditure showed that it had a negative significant relationship with exchange rate fluctuations. The result implies that as government spending increases exchange rate fluctuations decreases i.e exchange rate appreciates. This conformed to the apriori expectation and was in line with the findings of Chi-Wei-Su (2012) and Omijimite and Oriavwote (2012).

In the same vein, total foreign reserve was found to have a negative and significant relationship with exchange rate fluctuations. This implies that as total external reserves increases exchange rate fluctuations decreases i.e exchange rate appreciates. This conformed to the apriori expectation and was in line with the findings of Edet, Sunday, Daniel and Inimfon (2012).

Furthermore, real gross domestic product growth rate was found to have a positive but not significant relationship with exchange rate fluctuations. This is in contraction with the apriori expectation but conformed to the work of Adeniran, Yusuf and Adeyemi (2014) and Edwards (1989).

However, term of trade showed that there is positive and statistically significant relationship with exchange rate fluctuations. This conformed to the apriori expectation. Lastly, world crude oil price was found to have a negative significant relationship with exchange rate fluctuations. The result implies that as world crude oil price increase exchange rate fluctuations decreases i.e exchange rate appreciates. This conformed to the apriori expectation and was in line with the findings of Uguru (2015), Ogunidipe, Ogegag and Ogunidipe (2014) and Osigwe (2015).

The coefficient of most importance is the ECM coefficient. From the result the ECM term is well defined, that is negative and statistically significant at 5% level. The coefficient is -0.704469 which indicates approximately 70.45 percent of the previous year's disequilibrium in exchange rate fluctuations is been corrected by CPI, FDI, GSPGDP, RGDPGR, TFRESV, TOT and WCOP. This also showed the speed at which the model converges to equilibrium. The magnitude of this coefficient implies that nearly 70.45 percent of any disequilibrium in exchange rate fluctuations is corrected by the some of the selected variable within one period (one year). The implication is that the present value of exchange rate fluctuation will adjust to changes in CPI, FDI, GSPGDP, RGDPGR, TFRESV, TOT and WCOP.

Test for causal relationship

Granger causality test is use to investigate causal relationship between two variables in a time series. The method is a probabilistic account of causality; it use empirical data sets to find patterns of correlation. A variable X is causal to variable Y if X is cause of Y. Two test would be obtain from each analysis, the first examines the null hypothesis that the variable Y does not Granger-cause variable X and the second test examines the null hypothesis that the X does not Granger-cause Y. If we fail to reject the former null hypothesis and reject the latter, then we conclude that Y changes are Granger-caused by a change in X. The null hypothesis is rejected if the probability value is more than 5% otherwise do not reject the null hypothesis if the probability value is less than 5%. Unidirectional causality will occur between two variables if either of the null hypothesis is rejected. Bidirectional causality exists if both null hypotheses are rejected and no causality exists if neither of the null hypothesis is rejected.

The Pairwise causality test in table 5 suggests the following: a) There is a uni-directional causality from TOT to EXR significant at 5%level, i.e term of trade affects exchange rate fluctuations; b) There is a uni-directional causality from WCOP to EXCHR significant at 5%level, i.e world crude oil price affects exchange rate fluctuations; c) There is a bi-directional causality between CPI to EXR significant at 5%level, i.e consumer price index affects exchange rate and exchange rate also affect consumer price index; d) There is a uni-directional causality from EXR to FDI significant at 5%level, exchange rate fluctuations affects foreign direct investments.

Table 5. Pairwise Granger causality test

Null Hypothesis:	Obs	F-Statistic	Prob.
LN(FDI) does not Granger Cause LN(EXR)	30	0.900	0.419
LN(EXR) does not Granger Cause LN(FDI)		2.594	0.025
LN(CPI) does not Granger Cause LN(EXR)	30	2.897	0.024
LN(EXR) does not Granger Cause LN(CPI)		2.774	0.042
LN(GSPGDP) does not Granger Cause LN(EXR)	30	0.169	0.845
LN(EXR) does not Granger Cause LN(GSPGDP)		1.684	0.206
LN(TOT) does not Granger Cause LN(EXR)	30	5.516	0.010
LN(EXR) does not Granger Cause LN(TOT)		0.156	0.856
LN(WCOP) does not Granger Cause LN(EXR)	30	3.819	0.036
LN(EXR) does not Granger Cause LN(WCOP)		2.507	0.102
RGDPGR does not Granger Cause LN(EXR)	30	0.102	0.904
LN(EXR) does not Granger Cause RGDPGR		0.246	0.784

CONCLUSION AND RECOMMENDATIONS

Conclusion

This paper investigated the nexus between exchange rate fluctuations and macroeconomic variables in Nigeria using annual data for the period 1986 to 2017. Empirically, it is broadly concluded based on our results and discussion of finding that there existed long-run and short-run relationship between exchange rate and macroeconomic performance in Nigeria.

It is also concluded from the result that, foreign direct investment and term of trade had and real gross domestic growth rate have positive and statistically significant impact on exchange rate fluctuations. The result also found that consumer price index, government spending and world crude oil price have negative and statistically significant impact on exchange rate fluctuations while total foreign reserve had a positive and statistically insignificant impact on exchange rate fluctuations. Moreover, it is concluded that Bound test confirmed that the variables cointegrated.

Granger causality shows that there is uni-directional causality test from $\log(\text{tot})$, $\log(\text{wcop})$ to exchange rate, while there is uni-directional causality test from $\log(\text{exr})$ to $\log(\text{fdi})$ and lastly, there is birectional relationship between exchange rate and consumer price index.

Recommendations

I recommend the appropriate policies that will show the way forward out of this predicament as revealed in this study, as follow: a) Since, world crude oil price affects real exchange rate, something should be done to diversify the economy so that whenever there is a shock in the oil sector, the shock will be less felt by the economy; b) The monetary authority should establish mechanism that would lead to the stability in Naira since exchange rate fluctuations had impact on macroeconomic variables; c) The policy makers should intensify domestic policies that accommodate or tolerate some level of (slight) inflation in order to encourage producers to expand production of goods and services. This will eventually lead to exchange rate appreciation; d) Government consumption expenditure should be carried out in a manner that it will encourage and promote investment, and increase domestic demand. Consequently, it would lead to exchange rate appreciation; e) To maintain stable exchange rate, government should

increase the holding of foreign asset in order to maintain surplus or stability in the current account; f) There is need for government to monitor how foreign investor operate in the country and to encourage foreign investors to not be repatriate all profit on their business to their home country; g) Government and policy makers should employ policies that would increase productivity in all sectors of the economy, through the creation of an enabling environment and provision of subsidies so that businesses can grow. This in turn would lead to exchange rate appreciation.

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