EXCHANGE RATE REGIMES AND SHORT-TERM VOLATILITY OF THE REAL EFFECTIVE EXCHANGE RATE IN NIGERIA: A COMPARATIVE ANALYSIS

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Abstract
Using a time series data of the variables over the period 1970 to 2014, this paper seeks to analyse the relationship between exchange rate regimes and short-term volatility of the effective real exchange rate in Nigeria. Methodologically, this study models a standard real effective exchange rate function and employed the use of ADF - Fisher Chi-square test statistic to test for the unit root, and using the Generalized Linear Model (GLM) method to make a comparative study of the fixed and floating exchange rate regime periods in Nigeria. The results show that thedomestic currency faced real depreciation during the flexible exchange rate regime than the fixed exchange rate regime.This study has shown that exchange market pressures are significant in explaining the stochastic trend in real effective exchange rate in Nigeria.The study recommends and concludes that developing countries like Nigeria should consider an open guided exchange rate system in order to minimize the extent of real effective exchange rate volatility.

Keywords: Exchange Rate Regimes, Real Effective Exchange Rate, Comparative Analysis

Introduction

It is not an overstatement to say that real effective exchange rate behaviour now occupies a central role in policy evaluation and design. A country's real effective exchange rate is an important determinant of the growth of its cross-border trading and serves as a measure of international competitiveness (OriavwoteandOyovwi, 2012).The analysis of the dynamic effects of the exchange rate regimes on real effective exchange rate (REER) needs to differentiate between developed and developing countries. Real effective exchange rate is often presented in policy debates as the result of a monetary operation but various studies have tried to estimate the equilibrium REERbased on a standard theory which says that the equilibrium REER is a function of observable macroeconomic variables (macroeconomic fundamentals), and that the actual exchange rate approaches the equilibrium rate over time (Maxwell, 2009).

When the exchange rate regime is flexible, real appreciation of the exchange rate is due to appreciation of the nominal exchange rate. When the exchange rate is fixed, real appreciation is due to a rise in inflation after the money supply increases. Appreciation of the real effective exchange rate undermines competitiveness, widens the current account deficit, and increases vulnerability to a financial crisis. Significant appreciation could lead to a sudden drying up of capital flows, causing an abrupt adjustment of the current account. Beyond its negative effect on investment, significant appreciation of the real effective exchange rate could create major problems for macroeconomic management (Edwards,1998; Agenor, 1998 andLartey, 2008).

Exchange rate management, or 'getting the exchange rate right', is a challenging macroeconomic policy issue. There has been a broad consensus in policy circles in developing countries that the overriding objective of exchange rate policy should be to avoid persistence in misalignment, which is a common problem in most developing countries. However, in order to manage misalignments it is necessary to successfully identify what constitutes the equilibrium real effective exchange rate, and this continues to pose a fundamental difficulty in the modern literature on the real effective exchange rate

In the bid to achieve macroeconomic stability, Nigeria's monetary authorities have

adopted various exchange rate arrangements over the years. It shifted from a fixed regime in the 1960s to a pegged arrangement between the 1970s and the mid-1980s, and finally, to the various types of the floating regime since 1986, following the adoption of the Structural Adjustment Programme (SAP). The fixed exchange rate regime induced an overvaluation of the naira and was supported by exchange control regulations that engendered significant distortions in the economy. That gave vent to massive importation of finished goods with the adverse consequences for domestic production, balance of payments position and the nation's external reserves level. Moreover, the period was bedevilled by sharp practices perpetrated by dealers and end-users of foreign exchange. These and many other problems informed the adoption of a more floating exchange rate regime in the context of the SAP, adopted in 1986. A regime of managed float has been the predominant characteristic of the floating regime in Nigeria since 1986.

In line with the above statements, the research questions that necessitate and steer this study are; (1)How does real effective exchange rate stability compare with the fixed exchange rate regime episodes (1970 – 1985)? (2) Does real effective exchange rate experience a significant real appreciation/depreciation/ stability since the adoption of floatingexchanges rate regime and the inflow episode to Nigeria? (3) How have other macroeconomics fundamentals impacted on REER stability since the adoption offloating exchanges rate regime in Nigeria? This study attempts to provide answers to these questions by examining the exchange rate regimes and other factors from a long and static perspective on the real effective exchange ratestability.

Ascribing from the research questions, the primary objective of the study is to empirically analyse and compares the responses of real effective exchange rate(short run) to the different exchange rate regimes in Nigeria. Also, the study attempts to make comparative analysis of other factors influencing the real exchange stability within different exchange rate regimes.

The justification for this study is based on the fact that it adds to the body of comparative evidence available on the role of exchange rate regimes on countries at various levels of development. The study therefore is conceived to contribute to the search for an appropriate exchange rate regime to address REER instability in Nigeria.

This study is organised into 7 sections. Section 1 is the introduction. Section 2centres on the literature review, both the theoretical and empirical. Section 3 is the quantitative and model specification framework. Section 4is the estimation techniques, while 5 is the analysis of empirical result of the study. Section 6 and 7, give the policy implication of findings and recommendations and conclusion of the study, respectively.

Literature Review

This section provides theoretical and empirical comparative reviews of the effects of flexible exchange rate regime on short term fluctuations of the real effective exchange rate. The real effective exchange rate, in particular, defined as the relative price of foreign goods in terms of domestic goods, is of greater significance, as it is an important relative price signalling inter-sectoral growth in the long run and acts as a measure of international competitiveness. In other words, the real effective exchange rate plays a crucial role in guiding the broad allocation of production and spending in the domestic economy between foreign and domestic goods. According to Kipici and Kesriyeli (1997), the real effective exchange rate can be defined as the nominal exchange rate that takes the inflation differentials among the countries into account. Its importance stems from the fact that it can be used as an indicator of competitiveness in the foreign trade of a country.

In the view of Ickes (2004), the real effective exchange rate is the critical variable (along with the rate of interest) in determining the capital account. This is because the real effective exchange rate is the relative price of goods across countries. Hence, changes in the real effective exchange rate affect the competitiveness of traded goods. The nominal exchange rate refers to the dollar price of foreign exchange. The study tries to distinguish between the nominal and real exchange rates. The real effective exchange rate measures the cost of foreign goods relative to domestic goods. It gives a measure of competitiveness, and it is a useful variable for explaining trade behaviour and national income. When the actual real effective exchange rate deviates from the 'ideal' rate, the exchange rate has misaligned. Real effective exchange rate misalignment can lead to inadequate resource allocation which in turn affects the economic structure of the economy.

The exchange-rate regime plays an important role in enabling economies to take the maximum advantage of the increasing openness

and depth of international capital markets. Under a fixed exchange rate system, capital inflows will in the absence of sterilisation potentially conflict with inflation goals to the extent that a peg discourages hedging, there is a risk that agents build up unbalanced portfolios. A degree of exchange-rate flexibility would raise the exchange-rate risk premium (driving a wedge between the interest-rate differential), helping to dampen interest-sensitive capital flows. But problems of capital inflows do not vanish under floating exchange-rate systems. Persistent capital inflows put upward pressure on the exchange rate, potentially weakening competitiveness more rapidly than under a fixed regime, and widening external current account deficits and external sustainability could increase the vulnerability of the country to wide swings in capital inflows.

The relation between the real effective exchange rate and capital inflows can be seen as depending on the choice of the exchange rate system. In the 1 970s the academic debate on this issue focused exclusively on a binary choice between floating or fixed exchange rates. Although such a duality has analytic convenience, the reality today is much more complex, as suggested by the distinction between de jure and de facto classifications, which expands the number of regime categories(Combes, 2011).

With a fixed exchange rate, capital inflows potentially increase inflation. The scope of these pressures depends on whether inflows are driven by autonomous factors or by an increase in domestic money demand and also on the policy response to the inflows. In a number of countries, a surge in capital flows led to a credit boom when monetary authorities failed to sterilize them. There higher money supply and inflationary pressures spread within the economy, contributing to an increase in the relative prices of non-tradables. A sterilization policy can dampen real appreciation, but recognition of the perils of sterilization (Calvo, 1991) led to doubt about its long-term sustainability. Indeed, when the exchange rate is fixed, a sterilization policy leads to higher interest rates and to additional capital inflows. Moreover, holding foreign assets with lower interest rates than domestic ones generates quasi-fiscal losses for central banks, leading them to give up the policy in the medium or long term.

With a floating exchange rate, capital inflows lead to an appreciation of the nominal exchange rate, enhancing a fall in the relative prices of imported goods and a shift away from the consumption of nontradables. Exchange rate flexibility ensures that monetary policy is somewhat independent of capital inflows. By introducing uncertainty, a more flexible exchange rate could discourage short-term speculative flows and reduce financial system vulnerability, particularly when supervision and regulation are poor (Lopez-Mejia, 1999). Hence, a flexible exchange rate regime would penalize the capital flows that generate the most real appreciation. However, a pure flexible exchange rate could be a problem if the rate resulting from all types of capital inflows differs from the long-term equilibrium rate. Appreciation of the nominal exchange rate may have a significant impact on the real sector, necessitating Central Bank interventions to limit perverse effects and costly reallocations of productive resources within the economy.

Although some monetary instruments might prevent the undesired real economic effects of a nominal appreciation of the exchange rate with a managed floating exchange rate system, it is difficult to go against market forces for long. That is also true for a fixed system, the efficiency of which is conditional on the possibility that the monetary authorities will neutralize inflows of external assets. Intermediate regimes could offer some flexibility. In countries with an intermediate exchange rate regime, authorities aim for a specific level of nominal exchange rate and monetary aggregate. Reserve accumulation then becomes a policy instrument. Holding to a specified nominal exchange rate with intervention by accumulating more reserves lowers the pressure on the nominal exchange rate and may raise inflation. By contrast, small-scale interventions, with authorities accumulating fewer reserves, can raise pressure on the nominal exchange rate and lower inflation.

Mouhamadou(2012) proposes theoretical and empirical analysis of the effect of capital controls and alternative exchange rate regimes on the patterns of speculative capital. He argues that the exchange rate regime and its interaction with the monetary regime can explain the patterns of speculative capital around the world and showed that speculative capitals are more likely to flow into countries in which there is a contradiction between the monetary and the exchange regimes, e.g. more likely in countries with managed exchange rates. He modeled exchange-rate as a jump process in a stochastic dynamic portfolio optimization. Through this approach, the influence of the frequency and the size of “jumps”

in the exchange rate on the allocation of speculative capital can be determined. It will also allow inflows to be endogenous. By linking the jumps to the frequency of exchange rate movements, this paper determines the effectiveness of different exchange rate regimes in fending off "hot money" for a given monetary regime. On the empirical side, he uses a newly constructed data set to verify the theoretical predictions of the determinants and the patterns of speculative capital. Capital controls do not affect speculative capital.

3.Quantitative Frame work and Model Specification

Theoretically, the real effective exchange rate that prevails in an economy at any point in time is perceived as a short run phenomenon. The REER may change if the economy is shocked by dynamic forces that affect the short run equilibrium, thereby leading to disequilibrium in the long-run. The real effective exchange rate is defined as the relative price of traded to non-traded goods. In a small open economy, this is approximated as the following;

$$REER = InNEER\left(\frac{P^F}{P^D}\right) \qquad (1)$$

where, REER is the real effective exchange rate, NEER is the nominal effective exchange rate defined as ratio of domestic currency to foreign currency. P^F and P^D are the foreign and domestic price indices respectivelyorP^F is U.S. CPI and $P^D$is Nigerian CPI. Using this definition, an increase in REER implies real effective exchange rate depreciation and a decline indicates a real effective exchange rate appreciation.The real effective exchange rate of the naira, measured in foreign currency terms, thus an increase in this variable indicates an appreciation of the naira.

The measure of flexibility is crucial. The spectrum of exchange rate regime (ERR) choices is much more complex than suggested by the de jure classification. We approximate the flexibility of the exchange rate using an index based on the idea of exchange market pressure (EMP). The degree of exchange market pressure (EMP1) is derived from a relationship between the nominal exchange rate and relative foreign reserves:

$$EMP_1 = \frac{\%\Delta e_t}{(\%\Delta e_t + \%\Delta f_t)} \qquad (2)$$

where:

$$\Delta e_t = abs\left(\frac{er_t - er_{t-1}}{er_{t-1}}\right) \qquad (3)$$

$er_{it,}$ is the nominal exchange rate of a country currency with the US dollar during year *t; abs* denotes the absolute value; and $\%\Delta e_t$ is the relative variation of the nominal exchange rate

Δe_t expres sed as a percentage

$$\Delta f_t = \frac{abs(RES_t - RES_{t-1})}{MB_{t-1}} \qquad (4)$$

RES_t represents reserve assets, and

MB_{t-1} the monetary base in a countryduring year t.

In the hypothetical case of a pure floating system with no intervention on reserves $(\Delta f = 0)$, the EMP index is equal to 1, reflecting maximum flexibility, with the exchange rate allowed to float freely. Changes in the EMP index reflect only changes in the nominal exchange rate. With a hard peg, the exchange rate is constant $(\Delta e = 0)$ and the EMP index is equal to 0. Changes in the index reflect only changes in reserves through monetary authorities 'interventions. Intermediate cases indicate less exchange rate flexibility or more intervention in the foreign exchange market. More volatility of foreign reserves reduces the EMP. This suggests that the monetary authorities are using foreign reserves to limit variation in the nominal exchange rate. An alternative measure of the EMP index (EMP_2) is to subtract the change of foreign exchange reserves from the change in nominal exchange rate as follows:

$$EMP_2 = \Delta e_t - \Delta f_t \qquad (5)$$

In the study the measure of flexibility of spectrum of exchange rate regimes (ERR) is captured by the EMP(Combes, et al, 2011)

Various studies have attempted to estimate the determinants of the real effective exchange rate and the effects of its misalignment in both developed and developing countries. White and Wignaraja (1992), Younger (1992), Olofsgard and Olausson (1993) and Opoku-Afari et al.(2004) have all provided support for the hypothesis about real effective exchange rate appreciation.

The study is modelled in a Generalized Linear Models (GLM). Generalized linear models are a remarkable synthesis and extension of familiar regression models such as the linear models. GLMs offer a common framework in which we may place all of these specification, facilitating development of broadly applicable tools for estimation and inference. In addition, the GLM framework encourages the relaxation of distributional

assumptions associated with these models, motivating development of robust quasi-maximum likelihood (QML) estimators and robust covariance estimators for use in these settings. A wide range of familiar models may be cast in the form of a GLM by choosing an appropriate distribution and link function.

3.1 The Structure of Generalized Linear Models

The canonical treatment of GLMs is Nelder and Wedderburn (1972), and this review closely follows their notation and approach. Begin by considering the familiar linear regression model, $Y_i = X_i^{'}\beta + \varepsilon_i$ where, $i = 1,...,N$, Y_i is a dependent variable, X_i is a vector of *K* explanatory variables or predictors, β is a *K*-by-1 vector of unknown parameters and the ε_i are zero-mean stochastic disturbances. Typically, the ε_i are assumed to be independent across observations with constant variance σ^2, and distributed normal. That is, the normal linear regression model is characterized by the following features:

a) A random component or stochastic component: specifying the conditional distribution of the response variable, *Yi* (for the ith of n independently sampled observations), given the values of the explanatory variables in the model. The *Yi* are usually assumed to have independent normal distributions with $\mathrm{E}(Y_i) = \mu_i$, with constant variance σ^2,or $Y_i \sim^{iid} N(\mu_i, \sigma^2)$

b) A linear predictor or systematic component: the covariates *Xi* combine linearly with the coefficients to form the linear predictor $\eta_i = X_i^{'}\beta$. That is a linear function of regressors

$$\eta_i = \alpha + \beta_1 X_{i1} + \beta_2 X_{i2} + ... + \beta_k X_{ik} \qquad (6)$$

c) A smooth and invertible linearizing link function g(.), which transforms the expectation of the response variable, $\mu_i \equiv E(Y_i)$ to the linear predictor. That is the link between the random and systematic components: the linear predictor $X_i\beta = \eta_i$ is a function of the mean parameter μ_i via a link function. $g(\mu_i)$Note that for the normal linear model, g is an identity.

$$g(\mu_i) = \eta_i = \alpha + \beta_1 X_{i1} + \beta_2 X_{i2} + ... + \beta_k X_{ik} \qquad (7)$$

After a minor modification of the above stated studies and looking at the general form, the short-run empirical model adopted in this study in its stochastic formis thus expressed as;

$$D\log REER_t = \delta_1 DEMP_t + \delta_2 \log DNEER_t + \delta_3 D\log CAI_t + \delta_4 D\log GOVE_t + \delta_5 D\log EXMG_t + \delta_6 D\log TOT_t + \delta_7 D\log OPEN_t + \delta_8 D\log INV_t + \delta_9 D\log TEP_t + u_t \qquad (8)$$

Equation (8) is the short-term relationship between the real effective exchange rate and exchange rate regimes by the degree of exchange market pressure (EMP)and other macroeconomic fundamentals, where REER is the dependent variable, the real effective exchange rate index (as defined below). An increase (decrease) in REERindicates real depreciation (appreciation).

The independent variables, with the signs expected for the regression coefficients in parentheses are given as thus: EMP (+) exchange market pressure is variables is the counterpart slope variable for fixed and floating or flexible exchange rate regime (ERR);NEER (+) Change in nominal effective bilateral exchange rate against the US dollar; CAI (-) the ratio of FDI to the GDP; GOVE(-) the ratio of government consumption to the GDP; EXMG (-) Excess money growth; TOT (+) the ratio of exports price to import prices; OPEN (+) the ratio of the sum of imports and exports of goods and services to GDP; INV (+)the ratio of gross capital formation to GDP; TEP (-) the ratio of realRGDP to working population; These interaction terms to test the magnitude of each regression coefficient from the fixed and floating exchange rate regimes differs significantly from the estimate of the overall sample.

4. Estimation Techniques

The first step is the comparative unit root test for the fixed (1970-1985) and floating exchange rate regimes (1986-2014), which involves the determination of the order of integration, using the ADF - Fisher Chi-square test statistic. The second aspect is the impact relationship between the dependent and the independent variables which is run over the sample period 1970-1985, for the fixed exchange rate regimes and 1986-2014, for the floating exchange rate regime, using the Generalized Linear Model (GLM).The third and final test is for Specification Errors which is carried out using the Ramsey Regression Equation Specification Error Test (RESET) and is meant for the comparative analysis of fixed and floating exchange rate regimes.

The data set for this paper consists of annual time series from 1970 – 2014 which were obtained from

the Central Bank of Nigeria Statistical Bulletin(CBN, 2005, 2009, 2012 and 2014),Central Bank of Nigeria Statement of Account, various issues and External Sector Development Report (2012).

5.Presentation and Analysis of Result

Table 1 presents the summary of the unit root tests on the REER and other fundamental variables. That is the results of the intermediate Augmented Dickey-Fuller (ADF) tests for the order of integration of the variables under investigation using the Im, Pesaran and Shin W-stat method.

From the unit root test result in Table 1, the tests confirm that all variables are non stationary at level and first difference, that is all could not be considered as integrated of order one I(1) or they were not stationary at first difference by comparing the variables first difference t-static values with the various probabilities and the T-bar critical values. Some variables were statistically significant 10% critical values in first difference. The result shows that all the series are stationary at second difference. Therefore the null hypothesis (p = 1) is accepted at levels and the null hypothesis (p = 1) that the series are non-stationary after the first difference is rejected for some of the series.

Table 1: Fixed Exchange Rate Regime Unit Root Result

Method			Statistic	Prob.**
	Im, Pesaran and Shin W-stat		-16.3279	0.0000
	Im, Pesaran and Shin t-bar		-5.83219	
	Sample: 1970 1985			
T-bar critical values ***:		1% level	-4.886426	
		5% level	-3.828975	
		10% level	-3.362984	
	** Probabilities are Computed assuming Asymptotic Normality			
	Intermediate ADF test results			

Variable	1st Difference-Stat	Probability	2nd Difference-Stat Probability	Probability	Order of integration
D(LOGREER)	-3.1504	0.1334	-5.1695	0.0066	I(2)
D(EMP)**	-5.6864	0.0026	-6.1813	0.0016	I(1)
D(LOGNEER)*	-3.7820	0.0507	-5.9193	0.0023	I(1)
D(LOGCAI)	-4.6412	0.0145	-4.4413	0.0220	I(1)
D(LOGGOVE)*	-3.8390	0.0464	-5.4504	0.0044	I(1)
D(LOGEXMG)*	-3.7653	0.0552	-4.1933	0.0084	I(1)
D(LOGTOT)*	-3.6929	0.0584	-4.1410	0.0341	I(1)
D(LOGOPEN)**	-3.1656	0.1334	-4.2861	0.0143	I(2)
D(LOGINV)*	-3.4206	0.0890	-4.6528	0.0019	I(1)
D(LOGTEP)**	-1.7889	0.6552	-3.2637	0.0059	I(2)

Source: Authors' Computation

Note: * implies stationary at first difference at 10% level, ** implies stationary at second difference

From the unit root test result in Table 2, the tests confirm that all variables are nonstationary at level and could be considered as integrated of order one I(1) or they were stationary at first difference by comparing the variables first difference t-static values with the various probabilities and the T-bar critical values. All the variables were statistically significant at 1%, 5% and 10% critical values in first difference. This implies that all the series are non-stationary at levels. Therefore the null hypothesis (p = 1) is accepted at levels and the null hypothesis (p = 1) that the series are non-stationary after the first difference is rejected for all the series.

Table 2: Floating Exchange Rate Regime Unit Root Result

Method		Statistic	Prob.**
Im, Pesaran and Shin W-stat		-16.3279	0.0000
Im, Pesaran and Shin t-bar		-5.83219	
Sample: 1986 2014			
T-bar critical values ***:	1% level	-4.374307	
	5% level	-3.603202	
	10% level	-3.238054	
** Probabilities are Computed assuming Asymptotic Normality			
Intermediate ADF test results			
Variable	1st Difference-Stat	Probability	Order of integration
D(LOGREER)	-5.2357	0.0015	I(1)
D(EMP)	-6.6583	0.0001	I(1)
D(LOGNEER)	-8.4813	0.0000	I(1)
D(LOGCAI)	-4.7650	0.0042	I(1)
D(LOGGOVE)	-5.6631	0.0006	I(1)
D(LOGEXMG)	-6.5049	0.0001	I(1)
D(LOGTOT)*	-3.6348	0.0470	I(1)
D(LOGOPEN)	-6.1941	0.0002	I(1)
D(LOGINV)	-8.8298	0.0000	I(1)
D(LOGTEP)	-6.2385	0.0002	I(1)

Source: Authors' Computation

Note: * implies stationary at first difference at 5% and 10% level

In terms of stationary test, the comparative unit root test results shows that floating exchange rate regimes is more stationary than the fixed exchange rate regimes. Looking at Table 2 (Floating Exchange Rate Regime Unit Root Result) all the variables arestationary at first difference.

5.1 Comparative Analysis of Fixed and Floating Exchange Rate Regimes

In this study the estimation of real effective exchange rate and fixed and flexible exchange rate regimes model takes place during a period whenNigeria initiated a host of structural reforms in the mid-1980s; in which there are large fluctuations in capital flows, introduction of structural reforms, and a change in the exchange rate regime.Including financial liberalization, reforms to the foreign investment and the tax codes, privatization, deregulation of internal trade, and price and exchange rate liberalizations' that could have offset any effect that trade liberalization alone may have on the real exchange responsiveness; thus creating an identification problem in the econometric analysis of the data.

Table 3: Estimated Summary Results

Dependent Variable: D(LOGREER)									
Method: Generalized Linear Model									
Family: Normal									
	Fixed Exchange Rate Regime				Floating Exchange Rate Regime				
Variable	Coefficient	Std. Error	t-Stat	Prob.	Coefficient	Std. Error	t-Stat	Prob.	Impact Difference
C	27.36677	3.226692	8.48137	0.0000	128.8200	114.0950	1.129059	0.2589	101.4532
D(EMP)	-0.107925	0.042744	2.524946	0.0116	0.129167	0.096694	1.335833	0.1816	0.127985
D(LOGNEER)	-0.326235	0.156037	-2.090756	0.0365	-0.081783	0.061971	-1.319694	0.1869	0.244452
D(LOGCAI)	0.149924	0.028333	5.291421	0.0000	0.033319	0.103386	0.322273	0.7472	-0.11661
D(LOGGOVE)	-0.218730	0.027856	-7.852087	0.0000	1.515631	0.394519	3.841719	0.0001	1.734361
D(LOGEXMG)	0.498405	0.255526	1.950507	0.0511	0.213155	0.688837	0.309441	0.7570	-0.28525
D(LOGTOT)	0.047075	0.039333	1.196839	0.2314	0.320548	0.233966	1.370064	0.1707	0.273473
D(LOGOPEN)	-3.182617	1.424749	-2.233809	0.0255	0.107747	0.827754	0.130168	0.8964	3.290364
D(LOGINV)	0.019817	0.105380	0.188054	0.8508	0.193457	0.566594	0.341438	0.7328	0.17364
D(LOGTEP)	-1.232236	0.628880	-1.959414	0.0501	-6.921418	7.113346	-0.973019	0.3305	-5.68918

Source: Authors' Computation

Table 3 draw some conclusions about the impact differences of the fixed and floating exchange rate regimes and the different impacts of the explanatory variables on the real effective exchange rate. The fixed exchange rate regime parameters estimated was based onsample period of 1970 to 1985, while the floating exchange rate regime parametersestimated was based on the period 1986 to 2014.The estimated impact parameters that emerged from the short run modelwas used to calculate the magnitude of the differences between the fixed and floating exchange rate regimes.

Given the hypothesis, the prediction is that the real effective exchange rate would exhibit more variability during periods of floating or flexible exchange rate regime. Using the index of exchange rate flexibility based on EMP, the study shows that a more flexible exchange rate helps to dampen REER appreciation stemming from capital inflows. In other words the results confirm that exchange rate flexibility reduces real appreciation due to capital inflows. That is, naira faced real depreciation during the flexible exchange rate regime than the fixed theexchange rate regime, with a positive impact difference of 13.8% given the EMP.Also, the result in Table 3 shows that the constant term was higher during the floating regime compared to the fixed exchange rate regime withimpact difference of 101.45%. In principle, floating exchange rate regime may attract larger volumes of capital inflows compared to fixed exchange rate regime.

The outcome of the regression showing the impact differences between the two periods indicate that the government consumption, external terms of trade, trade openness, capital formation and the change in nominal effective bilateral exchange rate against the US dollar led to real depreciations of the naira.What this implies is that the relationship between the real effective exchange rate and the exchange rate regime is largely explained by differences in the amount of impact differences of the explanatory variables received in the economy under different degrees of exchange rate flexibility.

5.2 Further Diagnostic Test(RESET)

The study used Ramsey's (1969) Regression Specification Error Test (RESET) as a General Test for Functional Form Misspecification for the linear regression model. RESET has proven to be useful in this regard that is detecting neglected nonlinearities in estimated models. More specifically, it tests whether non-linear combinations of the fitted values help explain the response variable. The intuition behind the test is that if non-linear combinations of the explanatory variables have any power in explaining the response variable, the model is mis-specified. Ramsey's suggestion is to include powers of the predicted values of the dependent variable (which are, of course, linear combinations of powers and cross-product terms of the explanatory variables).

The study used the RESET test as a general test for the following types of specification errors: (1) Omitted variables; the explanatory variablesD(EMP) D(LOGNEER) D(LOGCAI) D(LOGGOVE) D(LOGEXMG) D(LOGTOT) D(LOGOPEN) D(LOGINV) D(LOGTEP) do not include all relevant variables. (2) Incorrect functional form; some or all of the variables in model should be transformed to logs, powers, reciprocals, or in some other way. (3) Correlation between explanatory variables and the error term , which may be caused, among other things, by measurement error in explanatory variables , simultaneity, or the non-presence of lagged real effective exchange rate (REER) values and serially correlated disturbances.

Table 4: Regression Specification Error Test Resultfor Fixed Exchange Rate Regime

Ramsey RESET Test				
Specification: D(LOGREER) C D(EMP)D(LOGNEER)D(LOGCAI)D(LOGGOVE)D(LOGEXMG)D(LOGTOT) D(LOGOPEN) D(LOGINV)D(LOGTEP)				
Omitted Variables: Squares of fitted values				
	Value	df	Probability	
t-statistic	2.249120	5	0.0669	
F-statistic	5.560300	(1, 5)	0.0669	
Likelihood ratio	6.560300	1	0.2116	
F-test summary:				
	Sum of Sq.	df	Mean Squares	
Test Deviance	0.005694	1	0.005694	
Restricted Deviance	0.023941	6	0.003990	
Unrestricted Deviance	0.018247	5	0.003649	
Dispersion SSR	0.018247	5	0.003649	
LR test summary:				
	Value	df		
Restricted Deviance	0.023941	6		
Unrestricted Deviance	0.018247	5		
Dispersion	0.003649			

Source: Authors' Computation

Table 5: Regression Specification Error Test Result for FloatingExchange Rate Reg ime

Ramsey RESET Test					
Specification: D(LOGREER) C D(EMP)D(LOGNEER)D(LOGCAI)D(LOGGOVE)D(LOGEXMG)D(LOGTOT) D(LOGOPEN) D(LOGINV)D(LOGTEP)					
Omitted Variables: Squares of fitted values					
	Value	df		Probability	
t-statistic	2.682205	16		0.0164	
F-statistic	7.194225	(1, 16)		0.0164	
Likelihood ratio	7.194225	1		0.0073	
F-test summary:					
	Sum of Sq.	df		Mean Squares	
Test Deviance	0.742958	1		0.742958	
Restricted Deviance	2.395300	17		0.140900	
Unrestricted Deviance	1.652342	16		0.103271	
Dispersion SSR	1.652342	16		0.103271	
LR test summary:					
	Value	df			
Restricted Deviance	2.395300	17			
Unrestricted Deviance	1.652342	16			
Dispersion	0.103271				

Source: Authors' Computation

The result in Tables 4 and 5 show that the Ramsey RESET test used the powers of the fitted values of real effective exchange rate as we assumed that all explanatory variables are exogenous and the test are likelihood ratio based tests. The top portion of the outputs shows the test settings, and the test summaries. Looking at the F-statistic, likelihood and probability value, the results show evidence of linearity with no case of omitted variables, incorrect functional form and correlation between explanatory variables and the error term.

The dispersion row shows that fixed exchange rate regime had a lesser value ofdispersioncompared to the floatingexchange rate regime in Nigeria as response by real effective exchange rate

6. Policy Implication and Recommendations

The estimates results show that the volatility of real effective exchange rate is more sensitive to change in exchange rate regime as well some other macroeconomic fundamentalsmentioned in this

study. To minimize the extent of real effective exchange rate misalignment, international finance literature in recent time has been emphasizing 'flexible exchange rate system'. This can be done by reducing the rate of government intervention in foreign exchange market. However, due to the underdeveloped nature of Nigeria's financial market, the extent of flexibility cannot be absolute. Government still need to intervene in the running of the market but all her actions must be done with sincerity of purpose. That is, government should act according to the dictate of the market. The paper belief that by doing this, real exchange rate volatility may be reduce, thus reducing the likelihood of currency crisis.

Our findings also suggest that lack of real effective exchange rate flexibility may make the economy more vulnerable to reversals in capital inflows, as credit expansions are more significant in economies with less flexible exchange regimes. From a policy perspective, it suggests that relatively inflexible exchange rate regimes may need to be 'counteracted' by carefully designed macro-prudential policies. The findings also suggest that the most relevant tools to counteract lack of real effective exchange rate flexibility (apart from the obvious implication of allowing for greater exchange rate flexibility) should target banks' external funding and incentives to lend/borrow in foreign currency.

7. Conclusion

The main thrust of this study is to empirically examine the response ofreal effective exchange rate to the changes in exchange rate regimes. For the different exchange rate regimes the period is divided into two non-overlapping sub-periods to examine the issues in details. The first sub-period covers the period from 1970 to 1985 and the second sub-period – a period during which large foreign capital inflows surge to Nigeria –spans from 1986 to 2014.This study employs the techniques of unit root test(uses the Im, Pesaran and Shin W-stat method),the Generalized Linear Model (GLM) method (normal and identity) and Specification Errors to make a comparative analysis of the Nigerian fixed and floating exchange rate regimes.

To minimize the extent of real effective exchange rate misalignment, international finance literature in recent time has been emphasizing 'flexible exchange rate system'. This can be done by reducing the rate of government intervention in foreign exchange market.In all; the study has shownthat exchange market pressure are important contributors to real effective exchange rate stability. This explains the over devaluation of the naira associated with decreased foreign investment in recent years, developing countries should consider that a significant real effective exchange rate appreciation might destabilize macroeconomic management.With respect to other macroeconomic fundamentals, the results show that the estimated coefficient of capital inflow, government consumption, trade openness and gross capital formation have the expected signs, while excess money growth did not conform to a prior expectation, the ratio of exports price to import prices, technological progress nominal effective exchange rate are significant, the expected sign are also statistically significant in the expected direction.

Finally, using the index of exchange rate flexibility based on exchange market pressure and given the comparative test result of the different regimes which was based on the index of exchange rate flexibility based (exchange market pressure), the result shows that a more flexible exchange rate helps to dampen real effective exchange rate appreciation stemming from capital inflows. In other words the results confirm that exchange rate flexibility reduces real appreciation due to capital inflows. The real effective exchange rate is a measure of the international competitiveness of an economy and an overvalued real exchange rate increases the price of domestic goods abroad, leading to lower demand for exports,this deteriorates the trade balance. In Nigeria, nominal effective exchange rate increased either by the activity of the government (during the fixed exchange rate regime) or a combination of government intervention and market forces, that is, in the period of managed floating exchange rate regime which took off in 1986.

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