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Oil Price Shocks and Real Exchange Rate Movement in Nigeria

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Abstract

This paper investigated the relationship between oil price and real exchange rate movement in Nigeria. Crude oil exports account for over 90 per cent of Nigeria's foreign exchange earnings hence, the economy may be vulnerable to instability in international oil prices, which the country as a small open economy, cannot influence. Using monthly data covering the period 2000 to 2013, this study employs GARCH process to test the relationship between oil price and exchange rate volatility in Nigeria. The results of GARCH (1,1) and EGARCH (1,1) suggest the persistence of volatility between real oil prices and the real exchange rate. The Smooth Transition Regression (STR) results also show the expected reaction from the exchange rate following changes in oil prices. Thus, we conclude that oil price fluctuations lead exchange rates movement in Nigeria.

Keywords: Oil Price Shock, Exchange Rate Movement

JEL Classification: *F31, Q43*

I. Introduction

The persistence of swings in global oil prices over the past few years, has reignited the long-standing policy discussion about the role of oil prices in determining external balances and the wider macroeconomic consequences of oil price shocks. From an open economy perspective, it is of interest for monetary policy to identify how oil price shocks affect the real exchange rate. These issues arerelevant, particularly for Nigeria being highly dependent on oil exports for both foreign exchange earnings and government revenue. While positive shocks impacted positively on the country's foreign exchange earnings, the reverse was the case during episodes of plummeting oil prices in periods of glut.

The changes in international oil prices have asymmetric impact on the exchange rate. Anecdotal evidence indicated a direct correlation between oil receipts and government revenue, accumulation of external reserves and exchange rate fluctuations, which underpins the assertion that the economy is fundamentally vulnerable to developments in the oil market. However, there is no conclusive evidence that when international oil price drop the exchange rate will fluctuate.

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In light of the above, this paper addressed two issues: namely, whether oil prices are a leading indicator of exchange rate movement in Nigeria or whether crude oil prices and exchange rate co-move at a low or high level of crude oil prices. Crude oil accounts for over 90.0 per cent of the foreign exchange earnings in Nigeria, making the economy vulnerable to international oil price fluctuations. Again, Nigeria is a small open economy that is essentially a price taker, such that changes in crude oil prices could be termed exogenous terms of trade shocks to the economy.

As an oil dependent economy, high oil prices favour the country by way of increased revenue to government, leading to increased government spending and provide justification for increased subsidy on a number of economic commodities/services. Besides, high oil revenue also encourages increased spending on importation of refined petroleum products because of insufficient domestic refining capacity. The reverse occurs when oil prices drop and the fiscal deficit increases due to revenue falls. This leads to reserves drawdown and implies reduction in the supply of foreign exchange to the market.

Oil price increase also affects the naira exchange rate leading to a "false appreciation", as the rising value of the currency is not as a resultof increased production activity in the real economy, which is expected to boost exports in relation to imports. The exchange rate appreciation erodes the country's competiveness in terms of real exports by making real goods and services more expensive, and bringing up undue pressure. Thus, investors and other speculators monitor movements in oil prices vis-à-vis the reserve level to determine when to exit the economy.

he main thrust of this paper, therefore, is to determine whether crude oil prices are a leading driver of movement in the exchange rate in Nigeria. The paper proceeds as follows: Section 2 reviews the extant theoretical and empirical literature in the oil price-exchange rate nexus. Section 3 presents stylized facts on the exchange rate and oil price movements in Nigeria. Section 4 focuses on the methodology, while the empirical results are presented in Section 5. Section 6 concludes the paper.

II. Review of Theoretical and Empirical Literature

The theoretical expositions on the potential importance of oil prices for exchange rate movements have been well espoused in the literature (Krugman, 1983a, 1983b; and Rogoff, 1991). The inter-temporal models of exchange rate determination have suggested that a fall/rise in oil prices should be accompanied by a real appreciation/depreciation of oil exporters' exchange rates. This conclusion has been derived from three strands of theoretical literature: the terms of trade channel; the balance of payments and international portfolio choices; and the wealth effects (Bodenstein et al., 2011).

The terms of trade channel focuses on oil as a major determinant of the terms of trade. In a two-sector model comprising tradable and non-tradable goods, as proposed in Amano and van Norden (1998), each sector uses both a tradable input (oil) and a non-tradable one (labour). The model assumed that inputs are mobile between the sectors and that both sectors do not make economic profits, with an additional assumption of constant returns to scale technology. The output price of the tradable sector is fixed internationally; hence the real exchange rate corresponds to the output price in the non-tradable sector. A rise in oil price leads to a decrease in the price of labour so as to meet the competitiveness requirement of the tradable sector. If the non-tradable sector is more energy intensive than the tradable one, its output price rises and real exchange rate appreciates. The opposite applies if the non-tradable sector is less energy intensive than the tradable one.

Thus, a negative terms of trade shock, i.e., a fall in oil prices for an oil exporter, drives down the price of non-traded goods in the domestic economy and thereby, the real exchange rate, which is defined as the relative price of a basket of traded and non-traded goods between the domestic and the foreign economy. As prices of non-traded goods may be sticky, the adjustment of the real exchange rate could require nominal exchange rate depreciation too.

A second strand of the literature as espoused in Krugman, (1983a, 1983b) focused on the balance of payments and international portfolio choices. In a three-country world model of Europe, America and OPEC countries, higher oil prices would transfer wealth from the oil importers (America and Europe) to oil exporters (OPEC). The real exchange rate equilibrium in the long-run would depend on the geographic distribution of OPEC imports, but no longer on OPEC portfolio choices. Assuming that oil-exporting countries have a strong preference for dollar-denominated assets but not for US goods, an oil price hike will cause the dollar to appreciate in the short run but not in the long run. In particular, Krugman (1983 a,b) posited that if America is a relatively small share of OPEC's export market, but has a large share of OPEC's import market, then the transfer of wealth from the industrial countries to OPEC would tend to improve the US trade balance.

For the wealth effects, a negative oil price shock transfers wealth from oil exporters to oil importers, leading to large shifts in current account balances and portfolio reallocation (Kilian 2008). In order to restore the external net financial sustainability of oil (exporters), the real exchange rate has to appreciate following a negative shock to the oil price, in order to improve the non-oil trade balance.

The theory, thus, suggests that oil exporters' currencies should depreciate in the wake of negative oil price shocks (and vice versa for positive shocks), There could however, in practice, exist counter-balancing forces that may negate the theoretical channels of the transmission of shocks and effects outlined above. For instance, the monetary authorities may dislike large swings in the nominal exchange rate, and therefore, act to counter exchange rate pressures through the accumulation or reduction of foreign exchange reserves. Another factor is the possibility of the international risk-sharing channel providing an automatic stabiliser through currency exposure. Given that oil exporters have accumulated a large pool of foreign exchange reserves and tend to be 'net long' in foreign currency, a decline in oil price accompanied by a depreciation produces a positive valuation effect – a net gain relative to domestic GDP, thereby, playing a stabilising role. In other words, the exchange rate does not need to depreciate much to ensure external sustainability.

While some studies exploring the apparent relationship between oil price and movement in the exchange rate suggested that oil prices are a leading indicator of exchange rate movement, others could not produce conclusive evidence to validate this hypothesis. Thus, Ferraro et al., (2011) using monthly and quarterly data, investigated the forecasting power of oil prices on the Canadian/US dollar nominal exchange rate and reported slight systematic relationship between the price of oil and movement in exchange rate.The paper found the existence of a very short term robust relationship using daily data. However, the forecasting power of the latter is short-lived after adjusting for instabilities.

Turhan et al., (2012) considered the link between oil prices and exchange rate movement in the emerging economies using daily data. They found that increase in oil price tend to produce considerable appreciation in the currencies of emerging market economies against the US dollar. They also concluded that oil price dynamics have changed significantly in the sample period and the relation between oil prices and exchange rates has become more pertinent after the economic and financial crisis of 2007/2008.

Nikbakht (2009) conducted a panel estimation of seven OPEC countries with monthly series spanning between 2000M1 and 2007M12 to examine the long run relationship between oil prices and exchange rates. It was revealed that real oil prices may have been the dominant source of real exchange rate movements in these countries. Also, the results showed that there was a long-run linkage between real oil prices and real exchange rates.

Basher et al., (2010), using the structural vector autoregression methodology, established a relationship between price of oil, exchange rate and the stock markets of Emerging economies. Their results supportedthe claim that positive shocks to oil prices tend to lower emerging market stock prices and US dollar exchange rates in the short run.

Omojimite (2011) in his paper "the price of oil and exchange rate determination in Nigeria" using cointegration found that the price of oil and the openness of the economy explains the level of exchange rate in Nigeria. Adeniyi et al., (2012) in their study on the relationship between oil price and exchange rate in Nigeria deployed a Generalized Autoregressive conditional heteroscedasticity (GARCH) and Exponential GARCH (EGARCH) to investigate the impact of oil price on the nominal exchange rate. They found that an increase in the price of oil results in an appreciation of the naira against the US dollar. They also found an asymmetric effect with regards to the magnitude, of positive and negative oil price shocks on exchange rate instability.

Muhammad and Suleiman (2011), while investigating the nexus between oil price and exchange rate for Nigeria from 2007 to 2010, using GARCH and Exponential GARCH, found a direct relationship between oil price and naira depreciation. This could be due to the increased demand for the dollar as a result of the rise in the level of money supply, used to attack the exchange rate.

Englama et al., (2010), investigated oil prices and exchange rate volatility in Nigeria. He found that a 1.0 per cent permanent increase in oil price results in a 0.54 per cent change in the exchange rate in the long-run, and in the short-run by 0.02 per cent. He also found that a permanent 1.0 per cent increase in demand for foreign exchange results in exchange rate volatility by 14.8 per cent. The study corroborated the notion that there exist a direct relationship between demand for foreign exchange and oil price volatility with movement in the naira exchange rate.

Empirical investigation on the effects of oil price shock and exchange rate volatility on economic growth in Nigeria conducted by Aliyu (2009), showed that a unidirectional causation runs from oil price to real GDP and that a bi-directional causation exists between real exchange rate and real GDP. The result also indicated that oil price shock and exchange rate appreciation tend to impact positively on Nigeria's economic growth.

The empirical literature, however, fails to show the existence of consensus on the nature of the effect and direction of the causality oil price shocks have on exchange rate movement in Nigeria. This paper, therefore, attempts to fill this gap in the literature.

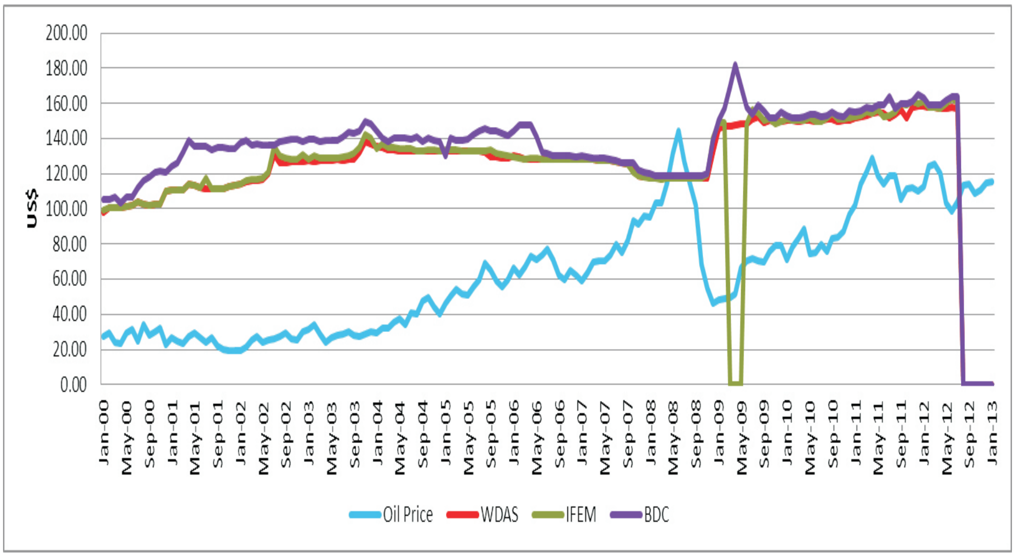
III. Oil Price and Exchange Rate Movement in Nigeria: Some Stylised Facts

Oil prices have shown both co-movement and an inverse relationship with the nominal exchange rate in Nigeria over time. In 2000, exchange rate in the 3 segments of the foreign exchange market moved in tandem with international oil prices. This could be partly as a result of the countries' craze for foreign goods which probably led to more import of foreign goods as shown in increased demand for foreign exchange. However, between November 2003 and November 2008, the naira exchange rate at the official window (wDAS) and at the interbank (IFEM) appreciated as oil prices rose in the same period. At the parallel market (BDC), there was some level of fluctuations between November 2003 and April 2006, probably as a result of policy changes. However, the BDC rate appreciated along with the wDAS and IFEM up to November 2008.

Oil prices rose steadily from US$23.84 in April 2003 and peaked at US$144.27 in June 2008 before crashing to an almost 4-year low of US$46.41 in December 2008. The period coincided with the global economic and financial crisis that started in the US and spread to other parts of the world. During the period, global productive capacity was at its lowest level, banks were distressed and global equities market crumbled. As oil prices crashed in the period, the naira exchange rate in all segments of the market depreciated. When oil prices crashed to a 4-year low, the exchange rate depreciated with the BDC rate moving from N119 in October 2008 to N182 in April 2009. IFEM and w-DAS moved from N117.75 and N117.79 in October, 2008 to N150.04 and N147.36 in September and April, 2009, respectively. The CBN allowed the naira exchange rate to depreciate in order to protect external reserves.

Oil prices rose above US$75 per barrel after August 2010 to another high of US$ 128.71 per barrel in April 2011, and traded around US$112.30 per barrel in January 2013. The naira exchange rate at the official window as at January 2013 was around N157.30,

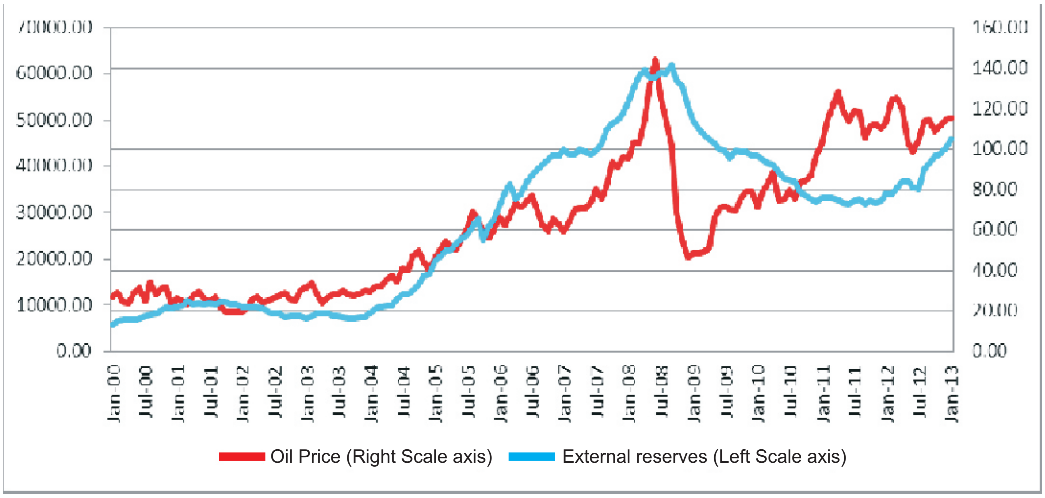
Figure1: Oil Price and Exchange Rate Movements in Nigeria 2000-2013



Source: Data from Reuters and CBN

Oil prices and external reserves moved concomitantly and peaked at US$144.27 per barrel and US$62.08 billion in June 2008 and September 2008, respectively. The period of the global financial crisis resulted in the decline in both the oil price and the reserves. The figure showed that oil price increase since 2010 has had little or no impact on reserves. While oil price rose above US$100, reserve fell to a three year low of US$31.74 billion in September 2011, rising to a new peak of US$45.82 billion in January 2013.

Figure 2: Oil Price and External Reserves Movement 2000-2013



Source: Data from Reuters and CBN

IV. Methodology

IV.1 Data

Monthly data spanning 2000 to 2013 from the Central Bank of Nigeria Statistical bulletins were used for the paper. The series were transformed and subjected to the Augmented Dickey-Fuller (ADF) and Phillips-Perron unit root tests in line with the requirements for a standard regression and the smooth transition regression (STR) model (Jawadi, et al., 2014). Consequently, the oil price and the nominal exchange rate were included in the model in their first difference. For, the volatility models, real exchange rate and real oil price were arrived at by dividing the oil price and nominal exchange rate, respectively.

IV.2 Techniques of Analysis

In the literature, three distinct types of oil price non-linear transformation are recognised. The first is the asymmetric specification which treats increases or decreases in oil price as separate variables, different from the underlining oil price series itself. The second is the scaled specification which takes volatility into account (Lee et al., 1995). The third is the net specification method adopted by Hamilton (1996). We have chosen to apply the scaled specification to enable us study the effect of oil price volatility on the real exchange rate (RER) movement in Nigeria. Secondly, we use the STR to demonstrate the asymmetric role the oil price play in the evolution of the nominal exchange rate.

As in Ghosh (2011), we characterise the linkage between oil prices and exchange rate with the aid of GARCH (p,q) and EGARCH (p,q) models. The mean equation is given by

$$RER_t \quad C \quad ROP_t \quad V_t \tag{1}$$

Where V_t is the white noise residuals N (0, σ_t^2), RER_t is real exchange rate, and ROP_t is real oil price. In terms of the second moment, the conditional variance equation for the GARCH (p, q) is of the form

$$ {}_t^2 \qquad {}_{i\ 1}^{\ p} \ i \ {}^2_{t\ 1} \qquad {}_{i\ 1}^{\ q} \ i \ {}_{t\ j}^{2} \tag{2}$$

Where the conditions θ >0, φi < 1 and (1 – □i - φi) > 1 hold in the case of a GARCH (1, 1) model. Equation 2 states the conditional variance as a linear expression of p lagged squared disturbances and q lagged conditional variances. In other words, current volatility depends on the volatilities for the past q periods and on the squared residual for the past p. GARCH models with limited values of p and q produce good estimate of volatility with the $p \quad q \quad 1$ case usually sufficient (Ghosh, 2011). In a similar vein, the EGARCH model which allow for oscillation in the conditional variance can be written as:

$$Log \ {}_t^2 \qquad {}_{j\ 1}^{\ q} \ {}_j\log \ {}_{t\ j}^2 \qquad {}_{i\ 1}^{\ p} \ {}_i\left|\frac{{}_{t\ i}}{{}_{t\ i}}\right| \qquad {}_{k\ 1}^{\ r} \ {}_k\frac{{}_{t\ k}}{{}_{t\ k}} \tag{3}$$

The parameters of equation 3, include the mean of the volatility equation, the size effect which is suggestive of the magnitude of the increase in volatility regardless of the direction of shock. The estimate captures the persistence of shocks and is the sign effect.

To determine effectively whether the movement in oil prices is a leading indicator of the exchange rate is akin to identifying whether what happens to oil prices can translate into movement in the exchange rate. Thus, we use the Logistic Smooth Transition Regression (LSTR) developed by Terasvirta (1994), which has been variously applied in the analysis of optimal inflation and pass-through effects (Espinoza et al., 2010; Mohanty et al., 2011; and Mendoza, 2004). The fact that oil prices and exchange rate are susceptible to regime switching, smooth transition regression captures these breaks and asymmetric dynamics effectively. The standard LSTR model incorporates a logistic smooth function which captures both smooth and continuous transition between two regimes, low and high oil price regimes and estimate the impact of same on exchange rate. It is thus, possible to evaluate whether there is co-movement and if full or partial effects exist. The model also allows identification from the data, the threshold parameter (c) at which the transition occurs as well as the speed of transition (γ). The model is specified as follows:

$$y_t = \beta' z_t + \theta' z_t G(S_t, \gamma, c) + \varepsilon_t, \qquad \varepsilon_t \sim (0, \sigma^2) \qquad (4)$$

Where y_t, is the exchange rate, $z_t = (w_t', x_t')'$ is an ((m + 1) x 1) vector of explanatory variables with $w_t' = (y_{t-1}, \ldots, y_{t-d})'$ and $x_t' = (x_{1t}, \ldots, x_{kt})'$, while $\beta = (\beta_0, \beta_1, \ldots, \beta_m)'$ and $\theta = (\theta_0, \theta_1, \ldots, \theta_m)'$, refer to a set of parameters in the linear and nonlinear aspects of the model, respectively. In this study, the explanatory variables included the predetermined level of the nominal exchange rate, as a measure of persistence and the contemporaneous as well as the one and two- period lag of oil prices.

$G(S_t, \gamma, c)$ give the transition relationship, normalised to an interval of 0 and 1, γ tells us how quickly the transition takes place, c is the level of the oil price at which the regime switches from a depreciation to an appreciation or vice versa. A peculiar characteristic of this model is to show that a very large γ produces a steep shape for the transition function G(.) around its threshold value 'c'. Thus, given this behaviour, the transition relationship follows a logistic specification, thus,

$$G(S_t, \gamma, K) = (1 + \exp[-\gamma(\pi_t - c)])^{-1}, \gamma > 0$$

Thus, the parameters $\beta + \theta G(S_t, \gamma, c)]$ change monotonically with the transition variable S_t (one period lag of oil price) due to the fact that the function G (.) is a smooth and continuous increasing function of S_t. Equation (5) is estimated using the nonlinear least squares method. In order to execute the non-linear optimisation procedure, starting values are generated via a grid search that is linear in 'c' and log linear in 'γ'. The values of 'c' and γ that minimize the residual sum of squares are used as starting values.

V. Presentation and Discussion of Results

V.1 Pre-estimation Analysis

The behavior and time-series properties of data series employed in the subsequent estimations were undertaken. The results are indicated in what follows:

V.1.1 Summary Statistics

Table 1 indicates the summary statistics of the variables involved in the estimation and subsequent analysis. The tableindicated that the statistics associated with Skewness, Kurtosis and Jarque-Beraestablished the non-normality of the variables. The kurtosis statistics showed fat tails (leptokurtic). This suggested that the mean equation should be subjected to autoregressive conditional heteroscedasticity (ARCH) test.

Table 1: Summary Statistics of variables used

Descriptive stat.	Exchange rate	Headline inflation	Oil price	Real exchrate	Real oil price
Mean	132.9048	12.71739	64.07026	12.60686	6.364248
Median	130.29	12.4	61.29	11.74	5.39
Maximum	158.39	28.2	138.74	46.64	25.04
Minimum	101.2	2.17	18.65	4.72	1.06
Std. Dev.	15.77571	4.960233	33.30854	6.70302	4.747837
Skewness	0.040934	0.50748	0.418568	2.209576	1.147745
Kurtosis	2.020963	3.400076	1.966387	9.783122	4.216942
Jarque-Bera	6.153247	7.587546	11.27835	417.8152	43.03265
Probability	0.046115	0.022511	0.003556	0.0000	0.0000
Sum	20334.43	1945.76	9802.75	1928.85	973.73
Sum Sq. Dev.	37828.71	3739.794	168637.7	6829.432	3426.378
Observations	153	153	153	153	153

V.1.2 Unit Roots Tests

The knowledge of the time series properties of the variables of interest is important in order to obviate the possibilities of spurious regression. This was implemented using the conventional – augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) - Kwiatkowski-Phillips-Schmidt-Shin (KPSS) tests.

Table 2: Unit Root Tests Using ADF Test Statistic

Variable		Unit Root		ADF test statistic	Conclusion
		1%	5%		
Oil Price	1st Diff	-3.473967	-2.880591	-8.319946	1(1)
Nominal Exchange Rate	1st Diff	-3.473967	-2.880591	-9.613445	1(1)
Real Exchange Rate	level	-4.019561	-3.439658	-6.802564	1(0)
Real Oil Price	level	-4.019561	-3.439658	-4.130847	1(0)

Table 3: Unit Root Tests Using Phillips-Perron Test Statistic

Variable		Unit Root		ADF test statistic	Conclusion
		1%	5%		
Oil Price	1st Diff	-3.473967	-2.880591	-8.366864	1(1)
Nominal Exchange Rate	1st Diff	-3.473967	-2.880591	-9.576904	1(1)
Real Exchange Rate	level	-4.019561	-3.439658	-7.039868	1(0)
Real Oil Price	level	-4.019561	-3.439658	-4.130847	1(0)

Results from Table 2 and Table 3, summarise that series of interest (Oil price and Nominal exchange rate) are mean reverting. This gives an indication of the existence of a long-run association between oil price and the exchange rate.

V.1.3 Causality Tests

Implicit in the theoretical proposition concerning the oil-price/ exchange rate nexus is that oil-price causes variations in the exchange rate, and not the other way. A test of this assumption was undertaken, utilising the procedure of Granger causality tests.

Table 4: Pair wise Granger Causality Tests

Null Hypothesis	Obs	F-Statistic	Prob.
Oil Price does not Granger Cause Exchange Rate	151	2.73388	0.0683
Exchange Rate does not Granger Cause Oil Price		3.33796	0.0382

Results in Table 4 confirm the existence of a unidirectional causation running from oil-price to the exchange rate as expected.

V.2 Volatility Analysis

Figures 3 and 4 reflecting the volatility in oil prices and the Naira exchange rates in Nigeria from 2000 to 2013 derive from the volatility models. It could be seen from the figure that the effect of sharp increase in oil price in the June 2006 was reflected in sharp appreciation in exchange rate during the period. The movements of the two variables in the chart are in line with a priori expectations.

Figure 3: Real Oil Price Volatility 2000-2013

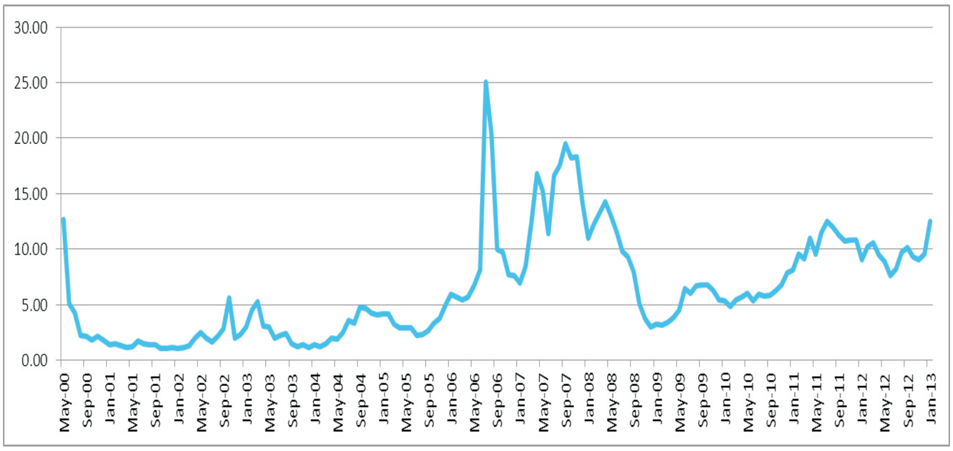


Figure 4: Real Exchange Rate Volatility 2000-2013

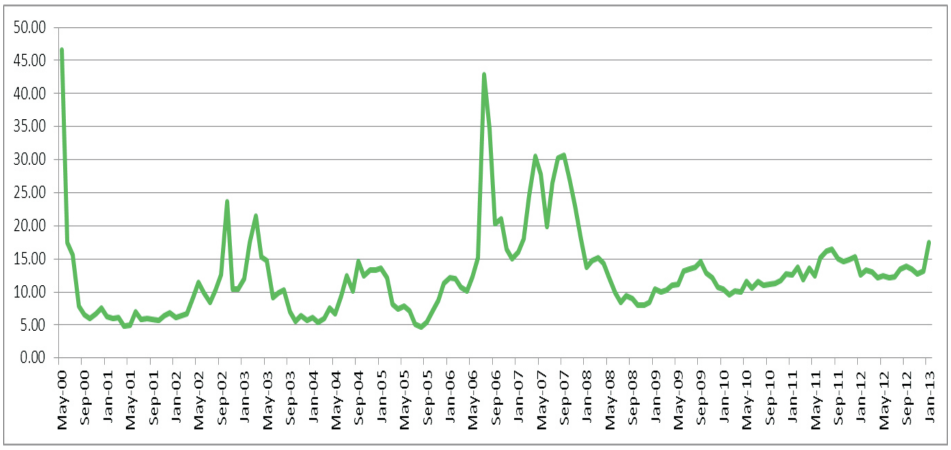
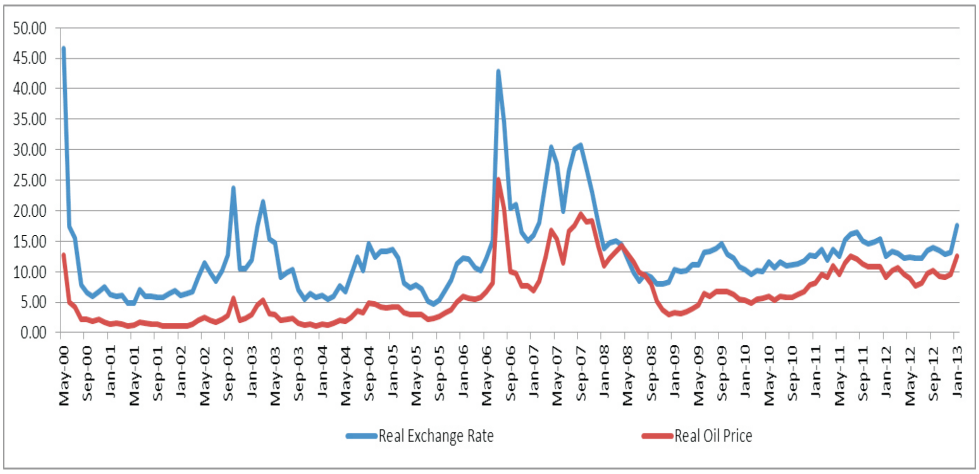


Figure 5: Real Exchange Rate and Real Oil Price Volatilities 2000-2013



As revealed in Table 6, the result of the Generalised Autoregressive Conditional Heteroskedasticity (GARCH) suggests that the volatility shocks between real oil prices and the RER are quite persistent because the associated coefficient of GARCH (1, 1) approximately equals unity (0.968). The mean equation of the GARCH (1, 1) implies that a rise in oil price impacts positively on the real exchange rate. Technically put, a negative shock on oil price would lead to 1.46 per cent depreciation of the naira in relation to the US dollar. A similar result was obtained for the EGARCH (1, 1) model displayed in the last column of Table 6. In this case, however, the magnitude of depreciation was slightly lower standing at about 1.06 per cent.

Finally, it is imperative to analyse the results of the variance equation. The parameter, γ, captures the asymmetry. It was found to be positive and statistically significant suggesting that within sample; shocks to exchange rate have asymmetric effect. In other words, in terms of magnitude, positive and negative shocks have unequal effects on the volatility of exchange rates. The volatility persistence term, β, was positive and statistically significant at 1.0 per cent level.

Table 6: GARCH (1, 1) and EGARCH (1, 1) Model Estimation Results

Parameter/Model	GARCH (1, 1)	EGARCH (1, 1)
I. Mean equation		
c	3.599667 (12.38856)*	4.566145 (39.50771)*
θ	1.461819 (56.54030)*	1.059647 -40.21219
λ	---------	-------
II. Variance equation		
ω	0.814025 -1.521651	-1.224951 (-4.4340888)*
a_1	0.857627 (2.806656)*	-------------
δ_1	0.116082 -0.708642	--------------
a	------------	2.067842 (5.284888)*
γ	-------------	0.230517 (3.778313)*
β		0.623375 (4.737791)*

Source: Author's Computation
Notes: Figures in parenthesis are z-statistics

Table 7: Logistic Smooth Transition Regression Results

Variables	estimate	SD	t-stat	p-value
Linear Regime				
Intercept	0.123	0.057	2.135	0.034
Nominal Exchange Rate (t-1)	1.695	3.970	0.427	0.670
Oil Price (t)	0.537	0.271	1.979	0.050
Oil Price (t-2)	-0.328	0.185	-1.774	0.078
Nonlinear Regime				
Intercept	-0.121	0.058	-2.105	0.037
Nominal Exchange Rate (t-1)	-1.495	3.971	-0.377	0.707
Oil Price (t)	-0.538	0.271	-1.981	0.049
Oil Price (t-1)	-0.030	0.014	-2.112	0.036
Oil Price (t-2)	0.320	0.186	1.721	0.087
Adj. R2	0.381			
Gamma ( )	17.438	32.413	0.538	0.591
C (threshold parameter)	-0.178	0.026	-6.874	0.000

The result from the STR well supported the nonlinearity in the relationship between nominal exchange rate and the oil price. This implied that there exist two switching dynamics that makes the exchange rate react asymmetrically to a rise or fall in oil prices. It confirmed that the threshold parameter (c) is statistically significant suggesting that two regimes, high and low characterize the lead indicator role of oil price in the nominal exchange rate. The threshold parameter thus, incorporates an inbuilt inverse risk factor of approximately 20.0 per cent and locates several months where the transition occurred with the 1-month lag of oil price as an appropriate transition variable.

Intuitively, the finding suggested that contemporaneously, an increase in the price of oil tends to appreciate the nominal exchange rate, while a drop in oil price depreciates the currency. This satisfies a priori expectation that high oil receipts are associated with the creation of reserve buffers, while a drying up of receipts can also put pressure on reserves and hence, depreciate the currency, all things being equal. The impact is apparently similarly but the magnitude is slightly different.

The policy implication of this finding is that a decline or increase in oil price that amounts to about 20.0 per cent is a potential risk factor for a sharp depreciation or appreciation of the exchange rate. At that level oil prices would be an appreciable distance from the oil price fiscal rule and require appropriate action to stem any unusual volatility in the naira exchange rate.

VI. Conclusion and Policy Recommendations

This paper investigated the link between oil prices and exchange rate using monthly time series data covering the period 2000 to 2013 to ascertain whether oil price is a leading indicator of the direction of exchange rate movement in Nigeria. The result from the GARCH (1, 1) and EGARCH (1, 1) tests, suggested the persistence of the volatility term between the real oil prices and the real exchange rate. The STR results also showed the expected reaction from the exchange rate following changes in oil prices. Thus, we concluded that oil price developments lead exchange rates movement in Nigeria. Consequently, measures to tackle the impact of oil price swings would be germane in stabilising the movement in the exchange rate.

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