



## **An Investigation of The Responsiveness of Real Exchange Rate to International Oil Price Fall in Nigeria, 1981 – 2018**

**Obinuba, Chinwe Blessing, PhD<sup>1</sup>, Onyia, Chinedu Callistus, PhD<sup>2</sup> and Mbah, Chris Chukwuemeka, PhD<sup>3</sup>**

<sup>1</sup>Department of Banking and Finance, Faculty of Management Sciences  
Enugu State University of Science and Technology, Enugu

<sup>2&3</sup>Department of Marketing, Faculty of Management Sciences  
Enugu State University of Science and Technology, Enugu

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### **ABSTRACT**

*This an is an Investigation of the Responsiveness of Real Exchange Rate to International Oil Price Fall in Nigeria, 1981 – 2018. The specific objectives are to; Examine the causal relationship between real exchange rate and international oil price fall in Nigeria. Ascertain the degree of association between real exchange rate and international oil price fall in Nigeria. The study adopted ex post facto research design. The data employed for this work is time series which are secondary in nature. The secondary data was appropriate because of the macroeconomic variables involved. It is an annualized time series data which cover 1981 - 2018, They are drawn from the Statistical Bulletins of Central Bank of Nigeria, Organization of the Petroleum Exporting Countries (OPEC) annual statistical bulletin, and the Nigerian National Petroleum Corporation (NNPC) annual statistical bulletin; these data were suitable because they show the trend of international oil prices and exchange rate overtime. The researcher adopted multiple regression analysis based on the classical linear regression model, otherwise known as Ordinary Least Square (OLS) technique, causality test and correlation test etc. The indicate that, there is bidirectional causality that exists between real exchange rate and crude oil price fall in Nigeria economy. While there is positive and significant effect between real exchange rate and international oil price fall in Nigeria economy*

**Keywords:** Real Exchange Rate; International Oil Price Fall; Nigeria

## 1. Introduction

Real exchange rate can be defined from both external and internal perspectives; External RER is the nominal exchange rate adjusted for price level differences between countries. It is the ratio of the aggregate of foreign price level or cost level to the home country's aggregate price level or cost measured in a common currency. Internal Real Exchange Rate measures the relative prices of two broad categories of goods tradable and non-tradable goods: ratio of the domestic price of tradable to non-tradable goods are to capture the internal relative price incentive in a particular economy for producing or consuming tradable as opposed to non-tradable goods. In general, the real exchange rate (RER) as the name implies, is a real concept that measure the relative price of two goods (goods and service produced and consumed locally). Many Empirical evidence review that real exchange rate variations can affect growth outcomes. Edwards and Levy Yeyati (2013) found evidence that countries with more flexible exchange rate grow faster. Faster economic growth is significantly associated with real exchange rate depreciation (Hausmann, Pritchett & Rodrik 2015). Fill argued that real undervaluation promotes economic growth, increases the profitability of the tradable sector, and leads to an expansion of the share of tradable in domestic value added. He claims that the tradable sector in developing countries can be too small because it suffers more than the non-tradable sector from institutional weaknesses and market failures.

By 2015, the annual average real price of oil halved from \$100/b down to \$53/b, as global oil production continued to grow at an annual average rate of 2.8% driven by an increase in OPEC and US crude oil production by 4% and 7.4% respectively, while global oil consumption grew by a comparably weaker annual average rate of 1.6%. The implication of exogenous shocks in crude oil production would be expected to have a markedly different effect on the real price of oil, as on the rest variables of the model, compared to shocks to crude oil production within the confines of the world oil market. To the extent that this assumption is valid, estimates of the dynamic effects of flow supply shocks on the real oil price are potentially misleading, especially at increasingly distant horizons.

### Statement of the Problem

The issue of exchange rate and the achievement of a realistic exchange rate for the naira have continued to generate a great challenge to macroeconomic policy formulators, owing to its unarguable significance in bringing about economic growth. Studies of oil price-exchange rate relationship in oil importing countries clustered mainly among developed economies, very few exists for developing countries such as Nigeria. Attempts to model long-run movements in real exchange rate have generally had mixed results. The simple purchasing power parity (PPP) hypothesis has proven to be a weak model of the long-run real exchange rate. Results from time series models that try to establish the link between real exchange rate behavior and economic fundamentals have failed to find a robust relationship between the real exchange rate and its determinants.

### Objective of the Study

The main objective of this is An Investigation of the Responsiveness of Real Exchange Rate to International Oil Price Fall in Nigeria, 1981 – 2018.

The specific objectives are to;

- i. Examine the causal relationship between real exchange rate and international oil price fall in Nigeria.
- ii. Ascertain the degree of association between real exchange rate and international oil price fall in Nigeria.

### Statement of Hypotheses

- i.  $H_0$ : There is no causal relationship between real exchange rate and international oil price fall in Nigeria.  
 $H_1$ : There is causal relationship between real exchange rate and international oil price fall in Nigeria.
- ii.  $H_0$ : There was no positive and significant association between real exchange rate and international oil price fall in Nigeria.  
 $H_1$ : There is positive and significant association between real exchange rate and international oil price fall in Nigeria.

## 2. Literature Review

### Real Exchange Rate

A real exchange rate undervaluation works as a second-best policy to compensate for the negative effects of these distortions by enhancing the sector's profitability (BatTes Kose, Ohasorge, Stocker, Chen, Cosic, Gong, Huidrom, &, Zhao, 2015). Higher profitability promotes investment in the tradable sector, which then expands, and promotes economic growth. Asher (2012) examined the impact of exchange rate fluctuation on the Nigeria economic growth for period of 1930 - 2010. The result showed that real exchange rate has a positive effect on the economic growth. Real Exchange rate policy determines the mechanism for channeling foreign exchange to end- users and therefore, reflects the institutional framework, system of exchange rate determination and allocation of foreign exchange as well as the policy options for managing the exchange rate. The issue of exchange rate and the achievement of a realistic exchange rate for the naira have continued to generate a great challenge to macroeconomic policy formulators, owing to its unarguable significance in bringing about economic growth. This therefore explains in part why it is necessary for any growth-conscious country to manage its foreign exchange. Exchange rate. is the rate at which a currency purchases another (Jhingan, 2013) it reflects the strength of a currency when measured against another country's currency? Oloyede (2012) it is the price of one currency in terms of another, which is important decision-making variable in every nation, thus making it a crucial issue for any country desirous of economic growth as pointed out by Ahmed and Zarma (2017).

### Floating Exchange Rate

It is an exchange rate regime in which the country's value is allowed to fluctuate in response to foreign exchange market mechanism. A regime that managed float has been the most important feature of the floating regime in Nigeria since 1986 without any strong compulsion to protecting any particular parity. A continued distortion of the value of exchange rate in the market for foreign exchange rate will cause a hostile effect on Nigeria's economic performance in the medium term. Therefore, the Nigerian authorities should react to changes in the equilibrium exchange rate on time. Given the structure of the Nigerian economy, maintenance of a realistic exchange rate for the naira is very vital, and the need to reduce fluctuations in production and consumption. increase the inflow of non-oil export receipts and attract foreign investments.

The activities of demand and supply will control the exchange rate in a floating exchange regime This system believes that there is no hand controlling the foreign exchange market even the government and that the exchange rate corrects to any shortfall or excess in the foreign exchange market without the intervention of the public. This means that any change in the demand and supply of foreign exchange can change the exchange rates but cannot change the reserve position of the country (Obadan, 2016).

In this arrangement, the exchange rate assists as a "jumbo" for outside shocks, therefore permitting the monetary authorities' complete discretion in the demeanor of monetary policy. The drawbacks of the freely floating exchange rate system have been known. It includes insistent exchange rate variations, increased inflation and increased transaction cost. The best advantage of the floating exchange rate system is monetary policy freedom, explained by a country's capacity to influence its monetary totals and control its national interest rate and inflation. An adjustment to the freely floating system is managed floating system which exists when the local government interferes in the market for foreign exchange in order to regulate movements in the exchange rate. It does not obligate itself to maintain a fixed exchange rate or some thin limits round it (Obadan, 2016).

### World Real Price of Oil

The link between the price of oil and exchange rate has followed two main avenues. The first one focuses on oil as a major determinant of the terms of trade. Amano and van Norden (2018) propose a model with two sectors; tradable and non-tradable goods. Each sector uses both a tradable input (oil) and a non-tradable one (labour). Besides constant returns to scale technology, it assumes that inputs are mobile between the sectors and that both sectors do not make economic profits. 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 the oil price leads to a decrease in the labour price 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.

Accordingly, for oil importing country, a real oil price hike may increase the price of tradable relative to non-tradable by a bigger proportion than that of in the oil exporting country and thus cause a real depreciation of their currencies. For oil exporting country, a real oil price increase may lead to appreciation of the real exchange rate as prices of non-tradable goods increase relative to tradable. However, due to the small-country assumption, Amano and van Norden (2018)'s approach neglects the fact that tradable prices can rise worldwide following an oil price shock. Thus, allowing for this possibility (while keeping the law of one price in the tradable sector) allows one to conclude that real oil price effect on real exchange rate will depend on the oil intensity of both tradable and non-tradable sectors of the countries under review (Benassy-Quere et al., 2007).

A second strand of the literature (Krugman, 2003, Golub, 2013) focuses on the balance of payments and international portfolio choices. Krugman (2003) note that in a three-country world Europe, America and OPEC, higher oil prices will transfer wealth from the oil importers (America and Europe) to oil exporters (OPEC). The real exchange rate equilibrium in the long run will 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 (2003) posited that if America is a relatively small share of OPEC's export market but 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. The introduction by Golub (2003) of a fourth country (the United Kingdom) and a third currency (the sterling) does not change the qualitative conclusions.

## Theoretical Review

### The Purchasing Power Parity Theory

Purchasing power parity theory was propounded by Bilsoa in (1978) which presented a model of exchange rate determinate oil combining elements of the efficient market and monetary approaches to asset markets. The efficient market characteristics consist of purchasing power parity. The purchasing power parity (PPP) is one of the earliest and perhaps most theory of exchange rate between two currencies would be equal to the relative national price levels, it assumes the absence of the trade barriers and transactions cost and existence of the purchasing power parity (PPP). In its version the purchasing power parity (PPP) doctrine equates the equilibrium exchange rate of the ratio of domestic to foreign price level (Lyon, 1992). The concept of purchasing power parity allows one to estimate what the exchange rate between two currencies would have to be in order for the exchange to be at par with the purchasing power of the two countries' currencies. Using that PPP rate for hypothetical currency conversions, a given amount of one currency thus has the same purchasing power whether used directly to purchase a market basket of goods or used to convert at the PPP rate to the other currency and then purchase the market basket using that currency.

Here, the assertion is that the change in the exchange rate between any two currencies over any period of time is determined by the change in the two countries relative price levels. Thus, some economist singled out the price level changes as being the major determinant of exchange rate movement. The two versions of purchasing power parity theory are the strong (absolute) version and the weak (relative) version. The strong version is based on the Law of one price and thus maintains that abstracting from all controls, restrictions and costs, the price of a gives commodity would be the same in all locations when quested in the same currency. The weak version tries to take cognizance of the several obstacles that may hinder the equalization of prices across national boundaries.

Relevance of PPP Theory: The purchasing power parity exchange rate serves two main functions. PPP exchange rates can be useful for making comparisons between countries because they stay fairly constant from day to day or week to week and only change modestly, if at all, from year to year. Second, over a period of years, exchange rates do tend to move in the general direction of the PPP exchange rate and there is some value to knowing in which direction the exchange rate is more likely to shift over the long run.

## Empirical Review

Coudert, Mignon and Penot (2015) employed Vector Error Correction Model (VECM) on a sample of monthly observations between 1974 and 2004 and uncover empirical evidence that the real effective exchange rates of dollar suffer from depreciation pressure in the wake of increased oil prices, not the other way around. The primary mechanism through which this stable tie is transmitted is found to be USA net foreign investment asset rather than the terms of trade with intuitive rationale that the authors solely detect co-integration between the former and exchange rates of dollar and oil prices.

Adejumo (2016) examined the effects of oil price shocks on output inflation, real exchange rate and money supply in Nigeria using quarterly data from 1970 to 2003. Using VAR methodology, they find that oil price shocks do not have any substantial effect on output and inflation. Oil price shocks only significantly determine the real exchange rate and in the long run money supply.

Olomola and Adejumo (2016) examined the effect of oil price shock on output, inflation, the real exchange rate and the money supply in Nigeria using quarterly data from 1970 to 2003. The VAR method was employed to analyze the data. Their findings were contrary to previous empirical findings in other countries; oil price shock does not affect output and inflation in Nigeria. However, oil price shocks did significantly influence the real exchange rates. The implication was that a high real oil price gave rise to wealth effect that appreciated the real exchange rate. This squeezed the tradable sector, giving rise to the Dutch Disease.

In related study of Aliyu (2019) assessed the impact of oil price shock and real exchange rate volatility on real economic growth in Nigeria on the basis of quarterly data from 1986Q1 to 2007Q4. The empirical analysis started by analyzing the time series properties of the data which is followed by examining the nature of causality among the variables. Furthermore, the Johansen VAR-based co-integration technique was applied to examine the sensitivity of real economic growth to changes in oil prices and real exchange rate volatility in the long-run while the short run dynamics was checked using a vector error correction model. Results from ADF and pp tests show evidence of unit root in the data and Granger pairwise causality test revealed unidirectional causality from oil prices to real GDP and bidirectional causality from real exchange rate to real GDP and vice versa. His findings showed that oil price shock and appreciation in the level of exchange rate made positive impact on real economic growth in Nigeria.

Neetu, Raja and Kamal (2014) studied the effect of oil price change on the real exchange rate between the Indian rupee and the U.S. dollar. For that, a model was developed which is based on a monetary model of exchange rate which incorporates the real GDP, real money balances, and the interest rates of both the home and foreign country and the real price of the crude oil. Quarterly time series data from 1996 to 2012 was used. Before estimating the model, the time series properties of the data were diagnosed in order to ensure the stationarity of the data. The data series are found to be integrated of order one and the null hypothesis of no co-integration was rejected. Therefore, an error correction model was developed and estimated. The estimated results suggest that there was no detectable effect of oil price change on the real exchange rate between the Indian rupee and the U.S. dollar.

## 3. Methodology and Data Analyses

### Research Design

The study adopted ex post facto research design. The study used existing data to predict future outcomes (Kothari, 2010). ex post facto research design is systematic empirical inquiry in which the scientist does not have direct control of independent variables because their manifestations have already occurred or because they are inherently not manipulated. Inferences about relations among variables are made, without direct intervention, from commitment variables of independent and dependent variables (Hassan 2016). The researcher adopted multiple regression analysis based on the classical linear regression model, otherwise known as Ordinary Least Square (OLS) technique, causality test and correlation test etc.

The study adopts secondary data. The secondary data was appropriate because of the macroeconomic variables involved. The data employed for this work is time series which are secondary in nature. They are annualized time series data which cover 1981 - 2018, They are drawn from the Statistical Bulletins of Central Bank. of Nigeria, Organization of the Petroleum Exporting Countries (OPEC) annual statistical bulletin, and the Nigerian National Petroleum Corporation (NNPC) annual statistical bulletin; these data were suitable because they show the trend of international oil prices and exchange rate overtime.

**Model Specification**

Exchange rate was used as the independent variables such as real exchange rate, the dependent variable was used as international oil price. The econometric model below was used for empirical analysis and investigation of the relationship between international oil prices and exchange rate.

The functional form specification in investigating exchange rate and international oil price fall were stated as follows;

$$Y = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_n + e \text{ ----- eq 1}$$

To capture the response of exchange rate to international oil price fall fluctuation in Nigeria. the essential variables are fitted into the classical linear regression model (CLRM) as shown thus:

$$EXR_t = f(COP_t)$$

Where

EXCH = exchange rate (It is the price of a country currency expressed in terms of one unit of another country's currency. It is measure as the exchange rate of the naira to the dollar).

The econometric form of the Ordinary Least Square (OLS) linear regression equation for the above functional relation is stated as:

$$EXCH = \beta_0 + \beta_1COP + \beta_2(RER) + \mu \text{ ----- 2}$$

where

COP = Crude Oil Price (in dollar per barrel). RER = Real Exchange Rate.

INFR = Inflation Rate

$\mu$  = Error Term

$\beta_0$  = Intercept, and  $\beta_1$  to  $\beta_6$  parameters to be estimated.

In equation 2 above the signs of  $\beta_1$ , and  $\beta_2$ , are expected to be negative theoretically.

Hypothesis One is mode led thus:

$$RER_t = a + b_1COP_t + U \text{ -----(1)}$$

Where:

RER = Real Exchange Rate

COP = Crude Oil Price

t = Time Period.

Hypothesis Two

$$DER_t = a + b_1COP_t + u \text{ -----(2)}$$

Where:

NER = Degree of association of Exchange Rate

COP = Crude Oil Price

t = Time Period

#### 4. Presentation and Data Analyses

This chapter presents the data used to execute this work, the results of the analysis and the findings are also presented.

##### 4.1 Data Presentation

The data set comprises yearly time series data sourced from the official website of the Central Bank of Nigeria (BN) and the Nigerian National Bureau of Statistics (NBS) for the period covering 1981 to 2018 for the selected variables. The necessary variables for this study are presented in appendix.1 below:

##### 4.2 Descriptive Statistics

Option	Mean	Median	Std Dev	Skewness	Kurtosis	Jarque-Bera	Prob	Ob
LNCOP	2442.716	977.63	2917.216	0.96	2.68	6.01	0.04	38
LNEDR	17.4295	7592.85	17393.9	0.69	1.90	4.99	0.08	38
LNINFLR	34.21842	15.950	30.00	0.89	2.15	5.39	0.06	38
LNINTR	12.5394	12.1000	3.839	0.529	3.705	2.56	0.2	38
LNRER	53.804	56.005	47.12	0.496	2.14	2.713	0.25	38
LNNER	14.356	96.190	46.75	-0.340	1.90	2.61	0.2	38

Source: Extracted from E-views Version 10

From table 4.2 above, Log interest rate (LNINTR) has the lowest mean value of 12.5394 while Crude Oil Price (COP) 2442.716 and Real debt deserve has the highest mean value or 17429.5. Additionally, the descriptive analysis was also furnished with Skewness and Kurtosis of all the variables of interest. The Skewness measures symmetrical property of the histogram while the kurtosis measures the height and the tail shape of the histogram. The yardstick for measuring the Skewness is how closer the variable is to the zero (0) and for the kurtosis is how closer the variable is to the three (3). Basically, we have three kind of kurtosis, (I) Mesokurtic is when the value 01 kurtosis is exactly equal to three; (II) platykurtic is when it is lower than three and (III) leptokurtic when it is above three. Based on this INTR has symmetrical distribution as opposed to LNCOP, LNINFLR and LNNER that have relatively asymmetrical distribution. For the kurtosis, all the variables (LNCOP, LNINFLR, LNNER and LNEDR) can be regarded as platykurtic because they have values less than 3. It was only interest rate (INTR) was equal to three which was Mesokurtic. From the normality test results presented in Table 4.2. the null hypothesis of a normal distribution is rejected for all the variables used in this study because they all have a Jarque-Bera statistic with a probability is less than 5% while some are not.

##### 4.3 Unit Root Test

Table 4.3 Unit Root Test

Variables	ADF	1%	5%	10%	Order of Integration	Prob
LNCOP	-4.25	-3.67	-2.96	-2.62	1(0)	0.002
LNEDR	-4.76	-4.24	-3.54	-3.20	1(0)	0.002
LNINFLR	-5.42	-4.24	-3.54	-3.20	1(0)	0.005
LNINTR	-3.96	-3.62	-2.94	-2.94	1(0)	0.004
LNRER	-5.31	-3.62	-2.94	-2.6	1(1)	0.001
LNNER	-4.46	-3.62	-2.94	-2.61	1(1)	0.001

\*\*\* \*\*and \* connotes that variables are stationary at 1%, 5% and 10% significance level respectively. Source: Computed by the authors with the help of EViews 10 (see appendix 2).

The unit root test results displayed in Table 4.3 showed that crude oil price and interest rate are stationary at level, while external debt reserve, inflation rate, real exchange rate and nominal exchange rate is stationary at first difference. The results revealed that all the variables are stationary at 5%. Durbin-Watson statistic for all the variables shows no issue of autocorrelation. Due to the fact that some variables are stationary at level while others are stationary at first difference, autoregressive distributed lag model (ARDL) as the suitable estimation technique was employed.

#### 4.4 Correlation Matrix

Table 4.4 Correlation Analysis Result

Variable Correlation t-Statistic Probability	LNCOP	LNEDR	LNINFLR	LNINTR
<i>LNEDR</i>	0.887625 11.56344 0.0000	-	-	-
<i>LNINFR</i>	-0.543235 -3.882186 0.0004	-0.538100 -3.88043 0.0005	-	-
<i>LNINTR</i>	-0.133929 -0.810878 0.4228	-0.268213 -1.670487 0.1035	-0.152962 -0.928700 0.3592	-
<i>LNERE</i>	0.709270 6.036882 0.0000	0.773917 7.332388 0.0000	-6.67744 -5.525815 0.0000	-0.080739 -0.486019 0.6299
<i>LNNER</i>	0.542437 3.874116 0.0004	0.536358 3.813011 0.0000	-0.646961 -5.090692 0.0000	0.238767 1.475270 0.1488

Source: Extracted from Eviews Version 10 (see Appendix 3)

From the result in table 4.4, all the series share bivariate positive and significant correlation one with another and others share negative and non-significant correlation with another. This is evidenced by the fact that their respective correlation coefficients are positive or negative and the probability values of the associated t-statistics respectively significant and non-significant by all being less than 0.05 while some are high than 0.05.

#### Test of Hypotheses

The hypotheses stated earlier in this research were tested using the Autoregressive Distributed Lag Model (ARDL) econometric technique. In arriving at a decision, the following steps were taken;

- iii. The hypotheses were restated in null and alternate forms,
- iv. The test results were presented and analyzed and,
- v. The decision involving the rejection or acceptance of the null hypothesis based on the decision criterion of the techniques of analysis is made.
- vi. Statement of decision rule (accept if pv is less than 0.5% or reject if pv is high than 0.05%) while coefficient measures direction whether it has positive or negative sign.

#### Test of Hypothesis one

Step Four: Restatement of the null hypothesis in null and alternate form thus:

H0I: There is no causal relationship between real exchange rate and international oil price fall in Nigeria.

Ha1: There is causal relationship between real exchange rate and international oil price fall in Nigeria.

The following steps were taken;

- iv) The hypotheses were restated in null and alternate forms,
- v) The test results were presented and analyzed and.
- vii) The decision involving the rejection or acceptance of the null hypothesis based on the decision criterion of the techniques of analysis is made.

**Pairwise Granger Causality Tests**

**Date:** 08115/19 **Time:** 07:51

**Sample:** 1981 2018

**Lags:** 2

Null Hypothesis:	Obs	F-Statistic	Prob.
LNCOP does not Granger Cause LNRER	36	0.58545	0.5629
LNRER does not Granger Cause LNCOP		6.48488	0.0044

*Source: Extraction from E-views 10*

The result above showed bidirectional causality between the two variables because there was a response from crude oil price to real exchange rate and there was feedback response from real exchange rate to crude oil price fall because of that the value of 0.004 which is less than 0.05%.

**Test of Hypothesis two**

Step Six: Restatement of the null hypothesis in null and alternate form thus:

H<sub>01</sub>: There is no positive and significant effect between real exchange rate and international oil price fall in Nigeria.

H<sub>a1</sub>: There is positive and significant effect between real exchange rate and international oil price fall in Nigeria.

The following steps were taken;

- i) The hypotheses were restated in null and alternate forms,
- ii) The test results were presented and analyzed and,
- iii) The decision involving the rejection or acceptance of the null hypothesis based on the decision criterion of the techniques of analysis is made.

Variables	LNNER	LNCOP
LNNER	-	-
LNCOP	0.542437 3.874110 0.00004	-

*Source: Extraction from E-views 10*

From the result in table 4.5.6, all the series share bivariate positive and significant correlation between real exchange rate and international crude oil price fall. This is evidenced by the fact that their respective correlation coefficients are positive and the probability values of the associated t-statistics respectively significant by all being less than 0.05 with above 2.5 base line.

#### 4.6 White Heteroskedasticity Test

The null hypothesis is that the model is not heteroskedasticity

Reject the null hypothesis only if the probability value is less than 0.05%. Decision must be made.

**Table 4.6: Heteroskedasticity Test Result**

White Test	Breusch-Pagan Godfrey Test
F-Statistic = 0.814927	F-Statistic = 2,804333
Prob F (20,17)	Prob F (5,32)
Pv = 0.6723	Pv = 0.03
R2 = 48%	R2 = 30%

Source: Extracted from E-Views 10 (see appendix 6).

From the result above Breusch-Pagan did not agreed with the result of White Test. Based on that there was disparity between the two heteroskedasticity test.

#### 4.6.1 Ramsely Test (RESET)

##### Regression error specification Test

The null hypothesis is that the model is correctly specified while the alternate is that the model is not correctly specified.

##### Ramsey RESET Test

Equation: UNTITLED

Specification: LNCOP C LNEDR LNINFLR LNINTR LNNER LNRER

Omitted Variables: Squares of fitted values

	<u>Value</u>	<u>df</u>	<u>Probability</u>
t-statistic	1347076	31	0.1877
F-statistic	1.814614	(1,31)	0.1877
Likelihood ratio	2.161697	1	0.1415

##### F-test summary:

	<u>Sum of Sq.</u>	<u>df</u>	<u>Squares</u>
Test SSR	3455316.	1	3455316.
Restricted SSR	62484278	32	1952634.
Unrestricted SSR	59028963	31	1904160.

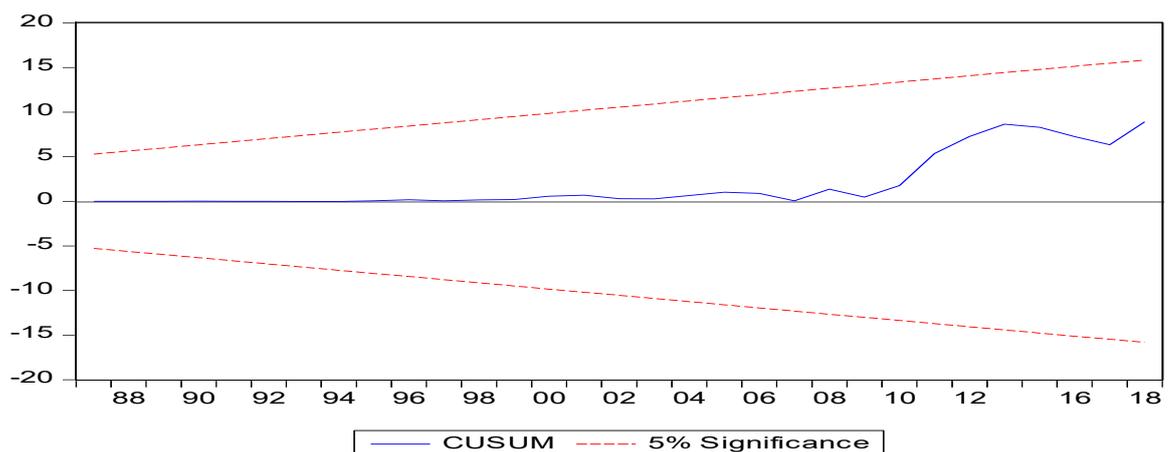
#### LR test summary

	Value
Restricted Logl	-325.8636
Unrestricted Logl	-324.7828

Source: extracted from E-Views 10.

Based on the pv and F-statistic showed that the model is corrected (pv= 0.18, F-statistic = 0.18).

#### 4.6.2 CUSUM Test (Cumulative Sum of Square)



The results show that we cannot reject the null hypothesis because the line lies within the five percent confidence bands. This therefore, suggests that our parameters are stable. The model is stable according to the line base directions.

#### Discussion of Findings

**Objective one:** examine the causal relationship between real exchange rate and international price fall in Nigeria. The following hypothesis four were state that there is no causal relationship between real exchange rate and international oil price fall in Nigeria Osuji (2015) An ordinary least squares (OLS) model and a vector auto regression (V AR) model were estimated for analyzing respectively, the impact of oil price movements on exchange rate and the nature of causal link between them. Empirical results showed that oil prices on a relative basis significantly affect exchange rate compared to imports. Also. there was evidence of unidirectional Granger causality from oil prices to exchange rate and from oil prices to foreign reserves.

**Objective two:** ascertain the degree of association between real exchange rate and international price fall in Nigeria. With associated hypothesis six which state that there is no positive and significant degree of association between real exchange rate and international oil price tall in Nigeria. In their study, Adeniyi and Chapman (2012) In addition, they reported that Amano and Van Norden (1998) investigated the causal link between oil prices and exchange rates in the USA. Germany and Japan and found that oil prices caused exchange rates in all three countries to fluctuate. Yoshizaki and Hamori (2013) had reported the observation of Gregorio and Wolf (1994) that the currencies of countries trading commodities responded to movements in the prices of those commodities.

- i. There is bidirectional causality that exists between real exchange rate and crude oil price fall in Nigeria economy.
- ii. There is positive and significant effect between real exchange rate and international oil price fall in Nigeria economy.

## 5. Conclusion

bidirectional causality that exists between real exchange rate to crude oil price fall in Nigeria economy. There is positive and significant effect of association between nominal exchange rate and international oil price fall in Nigeria economy, and there is positive and significant effect of association between real exchange rate and international oil price fall in Nigeria economy. The recent oil price shocks and the consequent economic crisis in oil exporting countries had necessitated an empirical enquiry of this type. Time series data employed in the study were tested for stationarity. Consequently, the variables were estimated using ARDL technique; impulse response function as well as variance decomposition results were obtained from the analysis. Some striking findings emerged from the impulse response function and variance decomposition estimation.

## Recommendations

The Central Bank of Nigeria (CBN) should improve more appropriately on inflation and exchange rate modeling in a way that will translate into real sector, non-oil exports, and employment benefits for sustainable development.

v. Government should free our seaports of scraps that are shipped to Nigeria as a dumping ground. Automobile companies should be encouraged to come to Nigeria to invest here and produce "made in Nigeria" cars with at least 80% local contents. Fixing the power sector could also reduce the demand for petrol by at least 40%, and will revitalize strategic industrial subsectors including manufacturing.

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## Appendix 1

Source: CBN Statistical Bulletin of Various

YEAR	COP	RER	NER	INTR	INFLR	EDR
1981	8.56	0.6356	110.39	14.5	35.6	2,441.6
1982	7.81	0.6720	109.86	16.5	37.7	1,043.3
1983	7.25	0.7486	109.84	12.2	42.4	224.4
1984	8.27	0.8081	113.20	23.8	53.9	710.1
1985	10.92	0.9595	99.90	10.0	62.3	1,657.9
1986	8.11	3.1828	51.89	11.6	67.8	2,836.6
1987	19.03	4.1664	14.72	8.5	76.4	7,504.6
1988	19.83	5.3530	12.97	6.6	83.5	5,229.1
1989	39.13	7.6221	8.88	15.1	87.7	3,047.6
1990	71.89	8.7071	7.72	13.9	95.8	4,541.4
1991	82.67	9.8650	6.34	11.8	107.6	4,149.3
1992	164.08	19.6609	3.74	10.30	48.8	1,554.6
1993	162.10	21.8861	2.97	12.00	61.3	1,429.6
1994	160.19	21.8861	2.96	8.40	76.8	9,009.1
1995	324.55	21.8861	0.74	6.30	51.6	1,611.1
1996	408.78	19.07	30.17	9.00	14.3	3,403.9
1997	46.81	19.22	28.83	14.5	10.2	7,222.2
1998	324.31	19.88	28.32	16.5	11.9	7,107.5
1999	724.42	53.76	73.91	18.00	0.2	5,424.6
2000	1591.68	58.25	77.21	13.50	14.5	9,386.1
2001	1707.56	70.58	81.30	20.50	16.5	10,267.1
2002	1230.85	85.13	88.95	16.50	12.2	7,681.1
2003	2,014.28	106.68	100.63	15.00	23.8	7,467.8
2004	3,354.80	126.69	107.07	15.00	10.0	16,955.0
2005	4,762.40	143.78	106.58	13.00	11.6	28,279.1
2006	5,287.57	148.33	105.02	10.00	8.5	42,298.1
2007	4,462.91	155.75	106.41	9.50	6.6	51,333.2
2008	6,530.60	90.31	96.74	9.75	15.1	53,000.4
2009	3,191.94	97.44	102.30	6.00	13.9	42,382.5
2010	5,396.09	93.39	98.08	6.25	11.8	32,339.3
2011	8,878.97	89.82	95.64	12.00	10.30	32,639.8
2012	8,025.97	79.58	94.05	12.00	48.8	43,830.4
2013	6,809.23	74.20	102.00	12.00	8.0	42,847.3
2014	6,793.82	69.51	131.30	13.00	8.0	34,241.5
2015	3,830.10	70.83	158.07	11.00	9.6	28,284.8
2016	2,693.90	80.36	157.80	14.00	18.5	26,990.6
2017	4,109.80	85.62	96.74	14.00	15.4	39,353.5
2018	9,551.80	78.34	102.30	14.00	11.4	42,594.8