Effect of the Fall of International Oil Price on Exchange Rate in Nigeria

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ABSTRACT

This study examines the effect of the fall of international oil price on Nigeria exchange rate within the period of 1981-2018. specifically, other objectives include to; Investigate the effect of international crude oil price on the exchange rate and Examine the responsiveness of Real exchange rate to international oil price fall in Nigeria. The study adopted ex post facto research design. The study makes used of secondary data and the data were drive from a higher-quality database which has been subjected to series of tests before being published. The data is annualized time series data which cover from the period of 1981 − 2018. Multiple regression analysis was used to analyzes the data and it is based on the classical linear regression model, which can be called Ordinary Least Square (OLS) technique. The result reveal that, international crude oil price fall always have negative and significant effect on exchange rate in Nigeria economy and there are negative and significant responses between real exchange rate and international crude oil price fall in Nigeria economy.

Keywords: International Oil Price; Exchange Rate; Nigeria

1. Introduction

Any change in international oil price normally affect Nigeria Exchange Rate, negatively or positively, just as a change in exchange rate affect the Nigeria economy. The Nigeria economy fully depend on crude oil, the same way the Nigeria exchange rate depend on crude oil. Since the ending of the I 940s to. the beginning of 1970s the international oil price was very steady having only small changes. From 1970 to 1980s crude oil price increased beyond expectation with respect to the escalation of OPEC and this disrupt the supply of oil. OPEC started to exercised its oil controlling power during Yom Kippor War that commence in 1973 by imposing crude oil restriction on most of the western republics as a result of U.S and Europeans supporting the Israelized. The Production of crude oil was abridged by about five million barrels in a day, this draw a setback amounted to about 7% of the global production and the price of crude oil rise to four hundred percent (400%) in six months. Starting from 1973 to 1974 the price of crude oil was relatively steady ranging from $12 to $14 per barrel. From 1979 to 1980 when Iranian revolution and Iraq started their war, global crude oil production reduce by ten percent (10%) and caused the crude oil price to increase from $14 to $35 per barrel. The rising of crude oil prices forced some leading consumers and firms to employed more of conserving energy, that is when people started buying cars that could minimax the used of fuel and organizations buying machine that were more fuel efficient (Sharma 2018). The increased of crude oil price enlarged the search and production by countries that were not members of OPEC. Starting from 1982 to 1985 OPEC wanted to stabilize crude oil price through production of quotas, nevertheless safeguarding efforts, was globally economic meltdown

and wrongful quotas was produced. OPEC participant nations contributed to the plunging of crude oil prices beneath 810 per barrel. From the Middle of 1980 oil price fluctuations started to occurred more frequently than the previous years. OPEC has been repeatedly trying to influence the price of crude oil in order to ensure its stability through quotas production of crude oil allocation to its member nations but has been unable to stabilize it; as OPEC share of the global oil production has fallen from fifty five percent (55%) in 1976 to forty two percent (42%) today with the covid-19 pandemic issue. The influence of crude oil prices really matters in the face of our economy in numerous ways; any changes in crude oil price directly affect the cost of transportation, price of goods and serving and heating bills etc. Oil price spikes induce greater uncertainty about the future, which affects households and firms spending and investments decisions. Also changes in oil prices leads to real locations of labor and capital between energy intensive sectors of the economy and those that are non-energy intensive sector (Sill, 2019).

1.2 Research Problem

The studies international of crude oil price and exchange rate connection with oil importing nations clustered mostly among developed economies and Nigeria is one of the developing countries among them Since the Nigeria authority cannot control international oil price and fall in international oil price affect the exchange rate, also the Nigeria economy. This is the deepens challenge facing Nigeria economic and any negative effect in crude oil price directly affect the cost of transportation, price of goods and serving and heating bills etc. And the poor responsiveness of real exchange rate in the international oil price also affect Nigeria exchange rate.

1.3 Research Objectives

The main objective of the study was to examine the effect of the fall of international oil price on Nigeria exchange rate within the period of 1981-2018. specifically, other objectives include to;

1. Investigate the effect of international crude oil price on the exchange rate.
2. Examine the responsiveness of Real exchange rate to international oil price fall in Nigeria.

1.4 Research Hypotheses

Through the research objectives and research questions. The following hypotheses were formulated;

1. H_0: International crude oil price have not significant effect on the exchange rate.
   H_1: International crude oil price have significant effect on the exchange rate.
2. H_0: There is no significant responsiveness of Real exchange rate to international oil price fall in Nigeria.
   H_1: There is significant responsiveness of Real exchange rate to international oil price fall in Nigeria

2.1 Conceptual Review

Nominal Exchange Rate

Nominal exchange rate can be viewed from two angles; Domestic currency terms and foreign currency terms. Nominal exchange rate from the domestic currency term is defined as units of domestic currency per unit of foreign currency. From foreign-currency term, it is the units of foreign exchange per unit of domestic currency. The domestic currency measure is the reciprocal of the foreign currency term. In general; the nominal exchange rate (NER) is a monetary concept which measures the relative price of two moneys or currencies, e.g., Naira in relative to the U.S dollar (Obadan, 2006).

Effect of the Fall Of International Oil Price on Exchange Rate

In the commodities market, the positive shocks cause an increase in the price of imported goods and decrease in the price of imported goods. As a result, demand for domestic goods wi1l increase (Kanamon, and Zhao 2016). On the supply side, it can be argued that in developing countries. positive shocks to the exchange rate (national currency devaluation) will lead to an increase in the cost of imported intermediate goods and, therefore, the import of intermediate goods will be more expensive. This may have a negative effect on production.

Also, the oil and its price effects on oil exporter and importer countries through various mechanisms. In the oil-importing countries, the oil price influence through two channels of supply and demand on real activities. In terms of oil supply side. it can be said that crude oil is a major factor in production. By increasing of oil price, the production costs will increase and production will decrease. On the demand side, it can be said that by increase of oil price, the consumption will reduce because the available income (in oil-importing countries) is decreased. Also, the increase in price leads to a decrease in investment because the increase in oil price increases cost of firms (Jin, 2012). Given their economic structure, the petroleum exporting countries are not much impacted by above oil prices trends. The oil price impacts through different mechanisms on the economies of these countries. The increase in oil prices stimulates both the supply and demand sides in the oil-dependent economies. But because of government subsidies and support systems, the costs of activities which use energy (petroleum and petroleum products) as input to production will not increase. As a result, it does not shift the macro supply curve and only stimulate the demand (Jong -wook, 2013). The increase of oil price causes more revenues to be transferred from oil importing countries to oil exporting countries. Also, the oil sector is one economic part of the petroleum exporting countries and has a large share of value added in these countries (Delavari, 2008).

Measuring of Exchange Rate

It is well-known in literature that getting the exchange rate right maintaining relative stability is important for both internal and external balance and consequently growth in the economy. Exchange rate is seeming to be the most vital price variable in any economy and it accomplishes the twin role of preserving international competitiveness and serving as nominal commentator to domestic price (Mordi 2016). Fluctuations in the exchange rates over a period of time, from an equilibrium exchange rate is known as exchange rate volatility. The situation where we have multiple parallel markets with the market officials, there would be deviations in the equilibrium exchange rate. Volatility over any time period interval tends to increase when supply, demand or both are likely to respond to large random shocks and when the elasticity of both supply and demand is low price volatility tends to be low (Obadan 2016). The exchange rate is subjected to variations when it is not fixed, thus floating exchange rate tends to be more volatile. Economic essentials affect the level of volatility and the extent to which exchange rate stability is maintained. Favorable economic circumstances and outcome which in turn would appreciate the currency and maintain stability is caused by strong fundamentals (Mordi 2016).

In the vast wide-ranging literatures on exchange rate volatility, there has been no agreement on the appropriate approach for evaluating volatility by economic researchers. The lack of an agreement on this topic echoes a number of factors as different theories cannot provide a definite guidance as to which measure is the most suitable. Moreover, the type of measure to be adopted will depend on the scope of study. The time period over which fluctuations is to be measured, as well as whether it is unrestricted volatility or the sudden movement in the exchange rate parallel to its predicted value needs to be taken into consideration. Finally, in shaping the applicable measure of exchange rate to be used, the level of collective trade flows should be taken into consideration. The degree to which exchange rates, due to its habitually high volatile state are a source of risk and ambiguity depends on the degree to Which movements in the exchange rate are predictable. With hedging, the predictable part can be hedged away so that the cost on trade is minimal. A realistic measure would be to use the forward rate as an sign of the future spot rate, and indicating the exchange rate risk with the discrepancies between the current spot rate and the earlier period forward rate even though using the forward rate as an indicator as a problem with predicting the future exchange rates adding to the fact that quotations are only existing for major currencies.

McKenzie (2019) believes that there are a number of measures that should be taken into consideration ranging from the structural models to the time series equation making use of the ARCH/GARCH approaches. The standard deviation of the first variation of logarithms of the exchange rate is the most widely used in measuring exchange rate volatility. If the exchange rate is on a steady trend, which could easily be forecasted the result will therefore not be a source of uncertainty. The standard deviation is calculated over a period of one year to point out a short-run volatility and in acquiring long-term variability, a period of five years is used.

Finally, in measuring exchange rate, the importance of currency invoicing is to be taken into consideration. Mostly, trade between two developing countries is not invoiced in the currency of either country. A standard currency is

been used mostly the U.S. dollars is often used as the invoicing currency. It may look like the exchange rate between the two trading partners' currencies is not the important to consider however this is wrong. For example, if trade exports from China to Nigeria are invoiced in U.S. dollars, it might look like the Chinese exporters would only care about the changes between the U.S. dollar and the Chinese Yuan, but not between the Nigeria naira and the Chinese Yuan. Nevertheless. any change between the Chinese Yuan and (Nigeria naira holding constant the Chinese Yuan/U.S. dollar rate must mirror fluctuations in the Nigeria naira U.S. dollar rate. As the latter could affect the Nigerian demand for Chinese exports, changes in the Chinese Yuanl Nigeria naira exchange rate would also affect the Chinese exports to Nigeria even if the trade is invoiced in the U.S. dollar (Ojebiyi & Wilson 2011).

Exchange Rate Stability

1. When exchange rate is stable it increases the standard of living of the people by helping to decrease the uncertainty about general price developments and in so doing improve the transparency of general prices.

2. It leads to reduction in inflation risk. premia in interest rates: if creditors are certain that prices will remain stable in the future, they will not demand for an extra return risk premium) to compensate them for the inflation risks associated with holding nominal assets over the longer term. It increases the incentive to invest because the capital market allocates resources more efficiently. This again fosters job creation and, more generally, economic welfare.

3. It also helps to circumvent unnecessary hedging risk: The maintenance of exchange rate stability will make it less likely for individuals and firms to redirect resources from productive uses in order to hedge themselves against inflation or deflation, for example by indexing nominal contracts to price developments. Since full indexation is not feasible or is too costly, in a high¬ inflation environment there is a reason to stockpile real goods given that in such circumstances they retain their value better than money or certain financial assets. An excessive stockpiling of goods hinders economic and real income growth because it is not an efficient investment decision.

4. It increases the benefits of holding cash: Inflation can be interpreted as an unknown tax on holding cash. This means that, people who hold cash (or deposits which are not rewarded at market rates) experience a decline in their real money balances and thus in their real financial wealth when the price level rises, just as if part of their money had been taxed away. Therefore, the higher the anticipated rate of inflation, leads to a fall in demand by households for cash holdings. This happens when inflation is fully expected, that is inflation is uncertain. Consequently, if people do not hold a lot of cash, they must make more regular visits to the bank to withdraw money. In general, reduced cash holdings can be said to generate higher transaction costs.

5. It contributes to financial stability: Unexpected revaluations of assets owing to unforeseen changes in inflation can undermine the reliability of a bank's balance sheet. For example. let us assume that a bank provides long-term fixed interest loans which are financed by short-term time deposits. If there is a sudden shift to high inflation, this will mean a fall in the real value of assets. Following this, the bank may face solvency problems. If monetary policy maintains price stability, inflationary order inflationary shocks to the real value of nominal assets are avoided and financial stability is therefore also enhanced.

6. Maintenance of a constant exchange rate contributes to broader economic goals: In summary all of these arguments suggest that a central bank that maintains exchange rate stability contributes substantially to the achievement of broader economic goals, such as higher standards of living, high and more stable levels of economic activity and employment (European central bank, 2017).

2.2 Theoretical Review

The Monetarist Theory

The monetarist theory was developed by Dombusch in (J 976) who developed a theory of exchange rate dynamics under perfect capital mobility, a slow adjustment of goods markets relative to asset markets. and consistent expectations. He focused on how a monetary expansion affects the time paths of the exchange rate, the domestic price level, and the domestic interest rate. The monetarist model of exchange rate determination, in that it does not assume that all other assets but monies are perfect substitutes. It is therefore necessary to specify the demands for and supplies of all assets in the portfolio. These normally include a domestic non-traded bond, which is issued by the domestic government, and a foreign traded bond which is denominated in foreign currency and pays an exogenously given world rate of interest.

This approach was adopted by Kaouri (1976), and others. In this approach, two forms of monetary expansion, an open market purchase of domestic bonds, and an open market purchase of foreign exchange are considered and compared. Some interesting qualitative results emerge from these models. In the case of an open economy whose residents hold domestic money, bonds denominated in domestic currency units, and bonds denominated in foreign currency units, it is generally established that the short run effects of an expansionary monetary policy depend, firstly, upon how an increase in money supply is created (all open market operation, or by an exchange market operation). and secondly upon the mode of deficit financing employed by the government. An open market purchases of domestic bonds by the monetary authorities causes the domestic interest rate to fall, and also causes a depreciation of domestic currency. The domestic currency will depreciate more: (a) the greater the substitutability between domestic and foreign assets, (b) if the expectation of asset holders is such that there would not be any subsequent appreciation, (c) the smaller is the fraction of domestic wealth held in the form of foreign currency assets. Similarly the effect of exchange market operation depends on asset substitutability, expectation forces and fraction of domestic wealth held in one form of foreign currency assets.

However, if the domestic and foreign assets are perfect substitutes, then sterilized intervention wilt have almost of impact on interest rates or exchange rates. But a non-sterilized intervention will have the same effects as an open-market operation by domestic monetary authorities. For the monetarist model, a monetary expansion is shown to induce an immediate depreciation in the exchange rate.

Relevance of Monetarist Theories: The monetary approach is predicted on the importance of money. It identifies. exchange rate as a function of relative shift in money stock. Inflation rate as a proxy and domestic output between an economy and a trading partner economy.

2.3 Empirical Review

Terfa (2016) investigated on exchange rate policy and falling crude oil prices, effect on the Nigerian stock market. The study investigates the effect of crude oil price movement on the Nigerian stock market and the role of exchange rate as a plausible countercyclical policy tool. Data was collected from the daily data on All Share Index from the Nigerian stock market, exchange rate and crude oil prices, ranging's from two periods: 2008-2009 and 2012-2015. Autoregressive Distributed Lag (ADL) model was used to analysis the data. The result reveal that oil prices are positively related with the performance of the Nigerian stock market thus it would always drag the market down in times of turmoil. Howbeit, devaluation of the naira is found to be effective in cushioning the effect of crude oil price decline on the stock market. Results from the granger causality test, however, suggest that this policy measure may not be potent as expected.

Sharma (2015) studied the dynamics of exchange rate and crude oil price- evidence from India. The objective of the study was to study the relationship between international oil prices and real exchange rate for India. The monthly data for oil prices and nominal exchange rate was obtained for period January 2001 to September 2013. The data was processed using regression technique and excel was used for analysis and charting purpose. The hypothesis was tested by using F statistics and applying statistical formulae. The results obtained showed that there exist a relationship between oil prices and real exchange rate for India. The result reveals a negative relation between oil

prices and real effective exchange rate. Hence, as oil prices go up, Indian rupee will depreciate against US dollar in real terms which in turn implies a rise in nominal exchange rate. As oil prices rise, India being an importing nation of crude oil results into shift of its wealth to exporting nation thereby putting downward pressure on rupee worth in international market.

Obioma and Eke (2015) conducted research on the investigated of interaction of crude oil price, consumer price level and exchange rate in Nigeria. Data from 2007-2015 was obtained from the Central Bank of Nigeria. Vector Autoregressive (VAR) Model was used to analysis the data. The result reveal that, all the variables were integrated of order one I(l) and no long-run relationship existed among them. The result also indicated that, a shock on crude oil price had a negative impact on exchange rate. Additional, variation in exchange rate was substantially caused by crude oil price. Besides, a shock on exchange rate had a negative effect on consumer price level. Therefore, government should initiate policies that will diversify the income stream of Nigeria's economy. Similarly, a policy that will promote an enabling environment for local investors to produce goods locally so as to conserve foreign exchange was equally encouraged.

Osuji, (2015) examined the effect of oil price movements on USD-Naira exchange rate pair using 420 observations from monthly time series data for the period January 2008 to December 2014. An ordinary least squares (OLS) model and a vector auto regression (VAR) 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 indicated 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. Based on the findings, policy recommendations were made in favour of a change in the current structure of our international trade to reduce and gradually eliminate import dependence in order to enhance the ability of the monetary authorities to manage both exchange rate and foreign reserves.

3. Methodology

3.1 Research Design

The study adopted *ex post facto* research design. The *ex post facto* research design was systematically empirical that inquiry about scientist that does not have direct control of independent variables. Those variables are variables that cannot be manipulated by anyone, their manifestations are in nature. The study makes used of secondary data. The data was drive from a higher-quality database which has been subjected to series of tests before being published. The secondary data was appropriate because of the macroeconomic variables involved. The data is time series data, it is annualized time series data which cover from the period of 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 scholars employed multiple regression analysis based on the classical linear regression model, which can be called Ordinary Least Square (OLS) technique. Exchange rate was used as the independent variables such as nominal exchange rate, real exchange rate, the dependent variable was used as international oil price and other variables were external reserve, GDP and inflation rate. The econometric model below was used for empirical analysis and investigation of the relationship between the fall of international oil prices and Nigeria exchange rate. The model specification was adapted from the study by Obioma and Eke (2015). used variables that are similar to that of the study. annualized data were used because of its variability and data are not dynamic, but some are showing dynamism in nature. The functional form specification in investigating exchange rate and international oil price fall were stated as follows;

$$Y = \beta_0 + \beta_{1X1} + \beta_{2X2} + \beta_n + e \text{ --------------------- eq 1}$$

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:

$$EXR, = f(COP,)$$

Where

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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 = β_0+ β_1ICOP + β_2(ER) + β_3RRER+ μ -------------- 2

where

ICOP = International Crude Oil Price (in dollar per barrel).

ER = Exchange Rate.

RRER = Responsiveness of Real Exchange Rate.

μ = Error Term

β_0 = Intercept, and β_1 to β_6 parameters to be estimated.

In equation 2 above the signs of β_1, β_2, and β_3 are expected to be negative theoretically.

Hypothesis One is mode led thus:

ER_t = a + b_l $ICOP_l$ + U ---(1)

Where:

ER = Exchange Rate

ICOP = International Crude Oil Price

t = Time Period.

Hypothesis Two

$ICOP_t$ = a + b_l RRERt + u --(2)

Where:

ICOP =International Crude Oil Price

RRER = Responsiveness of Real Exchange Rate

t = Time Period

4. Presentation and Data Analyses

4.1 Data Presentation

Our 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 table 4.1 below:

YEARS	ICOP	RRER	ER
1981	8.56	0.6356	110.39
1982	7.81	0.6720	109.86
1983	7.25	0.7486	109.84
1984	8.27	0.8081	113.20
1985	10.92	0.9595	99.90
1986	8.11	3.1828	51.89
1987	19.03	4.1664	14.72
1988	19.83	5.3530	12.97
1989	39.13	7.6221	8.88
1990	71.89	8.7071	7.72
1991	82.67	9.8650	6.34
1992	164.08	19.6609	3.74
1993	162.10	21.8861	2.97
1994	160.19	21.8861	2.96
1995	324.55	21.8861	0.74
1996	408.78	19.07	30.17
1997	46.81	19.22	28.83
1998	324.31	19.88	28.32
1999	724.42	53.76	73.91
2000	1591.68	58.25	77.21
2001	1707.56	70.58	81.30
2002	1230.85	85.13	88.95
2003	2,014.28	106.68	100.63
2004	3,354.80	126.69	107.07
2005	4,762.40	143.78	106.58
2006	5,287.57	148.33	105.02
2007	4,462.91	155.75	106.41
2008	6,530.60	90.31	96.74
2009	3,191.94	97.44	102.30
2010	5,396.09	93.39	98.08
2011	8,878.97	89.82	95.64
2012	8,025.97	79.58	94.05
2013	6,809.23	74.20	102.00
2014	6,793.82	69.51	131.30
2015	3,830.10	70.83	158.07
2016	2,693.90	80.36	157.80
2017	4,109.80	85.62	96.74
2018	9,551.80	78.34	102.30

Source: CBN Statistical Bulletin of Various

4.2 Descriptive Statistics

Option	Mean	Median	Std Dev	Skewness	Kurtosis	Jarque-Bera	Prob	Ob
LNCOP	2442	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; (11) playkurtic is when it is lower than three and (Ill) 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, LNNNER and LNEDR) can be regarded as playkurtic 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
LNEDR	0.887625 11.56344 0.0000	-	-	-
LNINFR	-0.543235 -3.882186 0.0004	-0.538100 -3.88043 0.0005	-	-
LNINTR	-0.133929 -0.810878 0.4228	-0.268213 -1.670487 0.1035	-0.152962 -0.928700 0.3592	-
LNERE	0.709270 6.036882 0.0000	0.773917 7.332388 0.0000	-6.67744 -5.525815 0.0000	-0.080739 -0.486019 0.6299
LNNER	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 same are high than 0.05.

Fig 4.4 Graphical Presentation of crude oil price and exchange rate under study
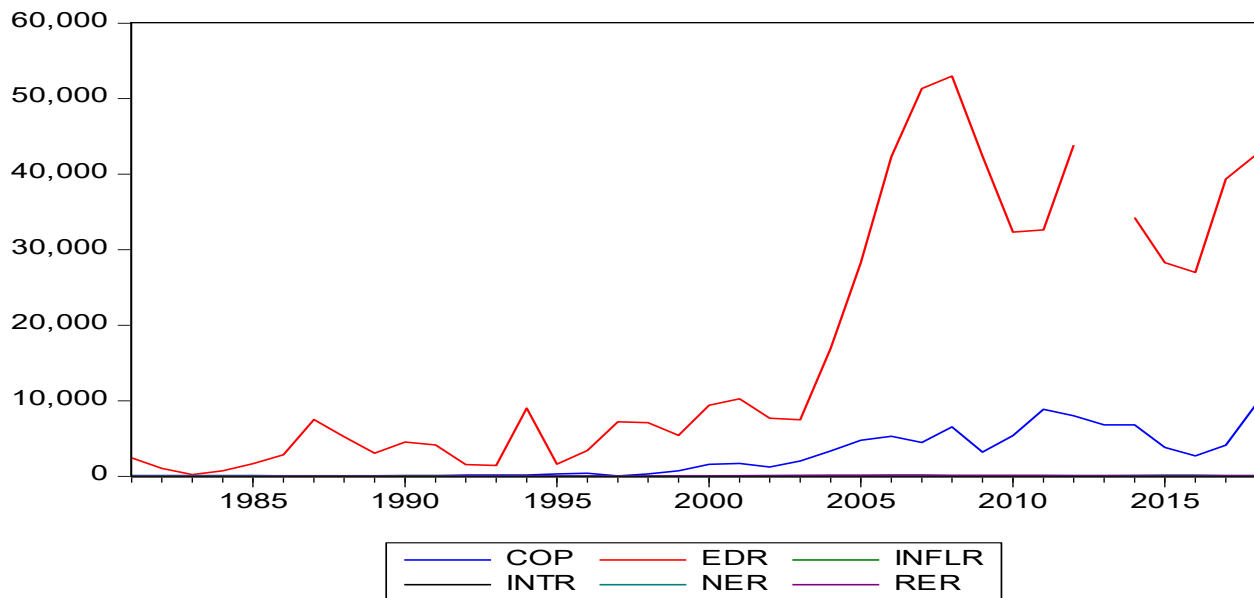
Test of Hypotheses

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;

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.
iv. 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.

4.5.1 Test of Hypotheses One

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

H_0: International crude oil price have not significant effect on the exchange rate.

H_1: International crude oil price have significant effect on the exchange rate.

Step One: the test results for hypotheses one and two are summarized in the box below:

LNCOP =	$-43.39587_{-4} + £$
t =	(2.800242)
Se =	[15.04682)
P value =	0.02<0.05

Source: Extracted from ARDL Estimation Results

From the Autoregressive distributed lag regression result shown above, we nominal exchange and international crude oil price with an associated probability value of 0.002. The result further revealed that 1 percent increase in international crude oil price fall it will lead to about 43 percent decrease in nominal exchange rate. The R-square value of 99% shows that the independent variables jointly explain about 99% of the total variations in international crude oil price fall while the remaining unexplained 1% might be attributable to other relevant variables not included in the model. The Durbin- Watson statistic value of 2.34 indicates that there is no serial correlation problem in the model. The bases here was that coefficient showed negative sign while pv is less than 0.5% level of significant. The study concluded that international crude oil price fall always have negative and significant effect on exchange rate in Nigeria economy.

4.5.2 Test of Hypotheses Two

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

H_0: There is no significant responsiveness of Real exchange rate to international oil price fall in Nigeria.

H_1: There is significant responsiveness of Real exchange rate to international oil price fall in Nigeria.

Step Two: the test results for hypotheses one and two are presented in the box below:

LNCOP =	$-34.48181_{-4} + £$
t =	(-1.8446)
Se =	[12.11522)
P value =	0.02<0.05

<div align="right">Source: Extract from ARDL Estimation Results</div>

From the Autoregressive distributed lag regression result shown above, will the responsiveness of real exchange rate and international crude oil price fall with an associated probability value of 0.002. The result further revealed that 1 percent increase in international crude oil price it will lead to about 34 percent decrease in the responsiveness of real exchange rate. The R-square value of 99% shows that the independent variables jointly explain about 99% of the total variations in international crude oil price fall while the remaining unexplained 1% might be attributable to other relevant variables not included in the model. The Durbin-Watson statistic value of 2.34 indicates that there is no serial correlation problem in the model. The bases here was that coefficient showed negative sign while pv is less than 0.5% level of significant. The study concluded that there are negative and significant responses between real exchange rate and international crude oil price fall in Nigeria economy.

Discussion of Findings Objective One: investigate the effect of the international oil price on the exchange rate in Nigeria with related hypothesis one which states that International crude oil price have not significant effect on the exchange rate. Schnabel (2017) argued that theoretically, flexible exchange rate allows an easier adjustment in response to asymmetric country specific real shocks. The study revealed that international crude oil price fall always have negative and significant effect on exchange rate in Nigeria economy. By implication, the study also revealed that the nominal exchange rate and real exchange rate of the rupee against the US dollar is non-stationary and that real shocks have permanent effects on the exchange rate, thus making exchange rate management at best futile and possibly harmful to the economy. Even though the study by Jebbin and Osu, (2012) The study founded out that real exchange rate fluctuation in Nigeria is significantly influenced by oil price fluctuations and it agreed with same empirical evidence.

Objective Two: examine the responsiveness of real exchange rate to international oil price fall in Nigeria. The following hypothesis two was stated in null form that there is no significant responsiveness of Real exchange rate to international oil price fall in Nigeria. 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). The study founded that there are negative and significant responses between real exchange rate and international crude oil price fall in Nigeria economy. The study of Djebbouri (2018) The researcher found that the shocks in world prices of crude oil play an important role in explaining the movements of the Algerian dinar exchange rate. The results of the shock

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response and analysis of the variance tests showed that there is a significant negative impact of the oil price shocks on the exchange rate in Algeria. Therefore. It is in consistent with this present study. At the same time Ahmed (2019) The results of the analysis showed that all variable is found to be integrated at level after application of Bealieu and Miron Seasonal Unit Root test. Results of the relationship between oil prices and exchange rate show that oil price is impacting exchange rate positively. while interest rate differential is negatively influencing the exchange rate. While examining the results for impact of change in regime on exchange rate. structural shifts were prominent during managed floating regime and floating regime which were causing changes in the exchange rate policies.

5. Conclusion

Based on the findings, the study concluded that international crude oil price fall always have negative and significant effect on exchange rate in Nigeria economy and there is always negative and significant responses between real exchange rate and international crude oil price fall in Nigeria economy.

Recommendations

In respect of the findings of this study, the following recommendations were made:

i. Ending Nigeria's oil dependency is the best thing that could happen to the economy. There is need to insulate the economy from international oil price with home- made solutions. Nigeria needs a set of policy packages that could reverse the shadow of macroeconomic situation.
ii. There is a strong need for policy makers to focus on policy that will strengthen/stabilize the macroeconomic structure of the Nigerian economy with specific focus on; alternative sources of government revenue (reduction of dependence on oil proceeds), reduction in monetization of crude oil receipts (fiscal discipline), aggressive savings of proceeds from oil boom in order to withstand vicissitudes of oil shocks in the future.

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