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IMPACT OF OIL PRICE SHOCKS ON EXCHANGE RATE AND INFLATION RATE IN NIGERIA (1981 - 2021)

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ABSTRACT

Volatility in the oil price affects some macroeconomic variables in the country either positively or negatively. To this end, this paper attempts to investigate the impact of oil price shocks on exchange rate and inflation rate in Nigeria using time series date for the periods of 1981 – 2021. The Non-linear Autoregressive Distributed Lags (NARDL) model is as an econometric technique was used for the analysis. The exchange rate, inflation rate and interest rate data were collected for the periods of 41 years (1981 – 2021) from Central Bank of Nigeria (CBN) and oil price was collected from the US Energy Information Administration (EIA). The bound test of the NARDL specification suggests the presence of cointegration among variables. The estimated NARDL model affirms the presence of asymmetries in the variables behavior. The results show that in the short-run and long-run, global oil price shock has significant effects on exchange rate and inflation rate; and the findings show that the response of global oil price shocks on inflation rate is positive meaning that increase in oil price leads to increase in inflation rate in Nigeria; while the response of oil price shocks on exchange rate is negative indicating the rise in global oil price leads to depreciation of exchange rate and rise in interest rate in Nigeria. This study therefore recommends that appropriate measures on depreciation of exchange rate and controlling inflation should be emphasized by Nigerian government.

Keywords: Global Oil Price, Exchange Rate, Inflation Rate, NARDL Model and Nigeria

1.0 Introduction

Nigeria is known as an import dependent economy, that highly depending on the foreign exchange through the sales of her crude oil in order to finance its enormous expenditures. The continued heavily depending on oil as major export product is perceived to continue impacting negatively on all macroeconomic variables of a developing economy like Nigeria. Nigeria is highly affected by the shocks at a global oil market despite being the 2nd and 5th positions of oil producing country in Africa and the World in 2022 respectively, with the fragile nature of the Nigerian macro economy and the higher dependence on crude oil transactions. Theoretically, if an oil-price increases, it leads to a movement of labor and resources from importing to exporting countries through the terms of trade. The extent of the direct effect of an oil-price increase depends on the movement of tradable to non-tradable and services sector in the country. The rise in the price of oil leads to rise domestic cost of production, then the supplier price index will also increase, the wages will also rise

thereby reducing the level of employment and level of output which will lead to rise in the both consumer and producer price indices (Buhari, 2020).

An oil price increase, all things being equal, should be considered positive in oil exporting countries and negative in oil importing countries, while the reverse should be expected when the oil price decreases. The challenge, however, of the combined effect of hikes in oil prices and exchange rate instabilities on macroeconomic economic stability and economic growth for oil producing nations like Nigeria is really enormous. Huge inflow of oil revenues in Nigeria are more often associated with expansion in the level of Government spending while periods of dwindling oil revenues are usually accompanied by budget deficits (Eric 2020).

The Nigerian inflation rate is however affected by the shocks in oil price because both consumption and investment were adversely affected due to a rise in oil price which affects disposable income of households, domestic of tradable and non-tradable goods and services. During the period under study, the year-on-year inflation rate jumped from 9.3% in the 10th of 2015 to 17.6 percent in August 2016, and there was also recent increment of inflation rate to 18.1 percent in July, 2022 to 20.3 in December 2022. While lower oil prices will support global economic activity and reduce inflation in the medium term, many oil-exporting countries could find themselves in a difficult position as a result of decreasing oil prices. This is because declining oil revenues affect the budget, and exchange rates are depreciated as a result of weakening economic growth and decreasing GDP, as well as per capita GDP. Changes in oil prices increase shocks in financial and foreign exchange markets and it can also affect capital flows. Subsequently, investments in the oil industry in oil-exporting countries may fall sharply (Ahmad, *et al.,* 2020).

Nigeria is however, endowed with abundant oil and gas resources, in which its production constituted about almost one-third of her GDP from 1981 to 2021. Similarly, the immediate effect of rise in oil prices is the rise in oil revenue, then rise in oil GDP that has a short term and long run effect. The short term effect is the appreciation exchange rate, then rise in wages because of the rise in money supply in oil sector thereby leading to a rise in the cost of production which leads to a reduction in the level of output and unemployment will rise as well as rise in inflation in Nigeria. In the long run, however, the rise in wages of labor in resource and oil sector, leads a movement of labor from productive sector because the people are moving to oil sector since most of the investments are centered to oil and service sector due to more profits in the sector thereby leading to a shortage of goods and services from non-oil (productive) sector which consequently leads to a domestic inflation in Nigeria. Moreover, the macroeconomic performance of Nigeria has been associated strongly with the oil sector. Although Nigeria remains second Africa's largest oil producer after Angola in 2022, the country has inadequate refining capacity, hence imports refined petroleum products to meet the local demand. Thus, government kept subsidizing petroleum products so as to maintain its controlled price despite the changes in prices at international oil market and the exchange rate (Bawa, Ismail, Abdullahi, Sani & Yusuf 2020).

İt is against this background that the study put forward the following objective. The objective of this study is to empirically investigate the impact of oil price shocks on exchange rate and inflation rate in Nigeria.

2.0 Literature Review

This literature review was outlined the four different sections of the study which include the conceptual literature review which talked about the meanings of the basic concepts of the research given by various authors who conceptualized and defined the real meanings of the subject matter. The second section of this study is the theoretical underpinnings of the research which laid the foundation of the research. The third section is the empirical literature review which talked about the existing of previous studies given by various researchers.

The following are the basic concepts of this research:

2.1 Conceptual Literature

2.1.1 Concept of Oil Price Shocks

According to Lippi and Nobili (2008), define "Crude Oil Price Shocks" as a source of oil shocks that affect economic performance differently: oil price increase due to higher oil demand shocks affect output differently than oil price increase due to lower world oil supply shocks. They argued that positive oil supply shocks decrease domestic production. However, the crude oil fluctuation could be either in the production process or in the oil prices which positively and negatively affect macroeconomic variables and even every sector of economy either directly or indirectly.

2.1.2 Concept of Exchange Rate

According to Buhari 2020, defines exchange rate as the value of a country's currency in terms of another country's currency. It is normally expressed as the number of units of a domestic currency that will purchase one unit of a foreign currency or the number of units of a foreign currency that will purchase one unit of a domestic currency, for example, the Naira per United States Dollar (N/USD) or US dollars per naira (USD/N). Essentially, exchange rate changes affect the prices of imported goods, services and exports. When the value of a currency falls, imported goods become more expensive, and the volume of imports tend to reduce.

2.1.3 Concept of Inflation Rate

Krugman (1998) defined "Inflation" as a persistent increase in the average price level in the economy, usually measured through the calculation of consumer price index. The word "persistent" is of great importance in understanding the concept. A single increase in prices is not called inflation. When inflation occurs, there is a sustained increase in the price level. Prices of individual goods and services are determined in many ways. In competitive markets, the interaction of many buyers and sellers. In imperfectly competitive markets, prices are determined by producer's decisions. In any economy, prices are continuously changing as markets adjust to changing conditions (Friedman, 1963).

2.1.4 Concept of Interest Rate

Aminu and Buhari (2018), defined an interest rate as a form of rate or percentage charged on loan-able funds by the commercial banks on their customers for over a specific period of time by the regulations of the apex bank (Central Bank of the Country). İt can also be defined as a rate or proportionate amount of money agreed to charge any debtor who wants to get loanable funds from the commercial banks or commercial banks will give the interest at a rate to any saving or fixed account holders in their banks after maturity periods of the deposited amount of money at the banks.

2.2 Theoretical Framework Underpinning the Study

Supply and Demand Side channels were used for the theoretical foundations of the research. According to Jin (2008), the transmission mechanisms in which the prices of oil affect real economic activity that include supply and demand side channels. The supply side shocks are of the fact that crude oil is used as a raw material (basic input) to production, and an increase rise in the oil price leads to a rise in the costs of production that induces firms' lower output. Supply-side is on the argument that rising oil prices is an evidence of a disruption in the tradable techniques within the economy, thereby leading to decline in the level of output. This indicates that a rise in the cost of production per average unit of output leads to slow down the growth rate of product and profitability. The demand side shocks are derived from the based on oil prices changes both consumption and investment decisions. Consumption is negatively affected because a rise in oil price changes disposable income and the domestic price of tradable goods. Investment is negatively affected because such rise in oil price thus affects firms' input prices and thereby increasing their costs. Demand side effect depicts that rise in oil price could lead to decrease in consumption, investment and expenditure prices.

2.3 Empirical Literature

Shitile and Usman (2022) estimate NARDL models of the link between oil price and inflation decomposed into consumer price index sub-indices of food, core, other energy and transport and find support for long-run asymmetry in relation to oil price shocks as well as incomplete pass-through of oil price to inflation in Nigeria. The results of the study suggests that it takes within 4-8 quarters for the disaggregated inflation to converge to its long-run equilibrium after a negative or positive unitary oil price shock in Nigeria. However, this research has failed to adopt Vector Error Correction Model (VECM) which can be used to correct for short-run disequilibrium or deviations, Impulse Response Functions (IRFs) and Variance Decompositions (VCDs) so as to show the responses between oil price and inflation nexus in Nigeria.

Raheem, Bello, and Agboola (2021) investigate if asymmetric relationship exists between oil price and inflation nexus. The study uses a multiple threshold nonlinear autoregressive distributed lag model in a dynamic common correlated effect within the environment of heterogeneous panel framework. Results reveal the importance of asymmetry in the model for both oil-import and exporting countries, with countries responding more to positive shocks. Quintile decompositions show that the asymmetry effect of oil price change fizzles out only for the oil importing country. For the oil exporting countries, asymmetry is important at higher quintiles. However, this research has failed to adopt Vector Error Correction Model (VECM) which can be used to correct for short-run disequilibrium or deviations, Impulse Response Functions (IRFs) and Variance Decompositions (VCDs) so as to show the responses between oil price and inflation nexus for both oil importing and oil exporting countries.

Bawa, *et al.,* (2020) investigate asymmetric impact of oil price on inflation in Nigeria using a Non-Linear Autoregressive Distributed Lag (NARDL) approach on quarterly time series data of spanning 1999Q1 to 2018Q4 in Nigeria. Results showed that oil price increases led to increase in headline, core and food measures of inflation in Nigeria. However, a decline in oil price resulted in a decline in the marginal cost of production and culminated in moderation of domestic inflation. Furthermore, negative oil price shocks led to higher inflation in Nigeria when exchange rate is dropped from the models, indicating that exchange rate absorbed the impact of oil price declines earlier, as lower oil prices culminated

in lower external reserve, depreciation of the naira and ultimately higher inflationary pressures.

Ahmad, *et al.,* (2020) investigate an On the Intraday Dynamics of Oil Price and Exchange Rate: What Can We Learn from China and India? The paper tried to investigate the volatility determinants of crude oil and foreign exchange markets and jump spillover between them. The study considers currencies of two major oil-importing countries (India and China) over the sample period of January 1, 2013 to October 31, 2019. However, the paper above has tried in conducting descriptive statistical analysis and Generalized Autoregressive Hetrocesdansticity (GARCH) model for econometric analysis.

Nwanne and Eze (2019) empirically investigated the effect of government oil revenue and the growth of agricultural sector in Nigeria For the periods of 37years (1980 – 2017) . Non-linear Autoregressive Distributed Lags (NARDL) econometric technique was adopted in analyzing the data for this study with the following analysis carried out on the pre-estimation diagnostic tests (Unit Root Test, cointegration test, lag Length Selection, etc.), short-run and long-run bound test results and post-estimation diagnostic tests (stability test, normality test, etc.) using the following variables in the study: Agriculture Sector contributing to GDP (AGDP), Government Oil Revenue (GOR), Exchange Rate (EXR), Inflation Rate (INFR) and Interest Rate (INTR). The results show that the government financing budget deficit through domestic means crowd out private investment especially the agricultural sector and thereby reduces its contributions to the growth of the economy.

3.0 Methodology

3.1 Source of Data

The Secondary data was used for the purpose of this study. The study used annually time-series data on oil price and some selected macroeconomic variables. Secondary data covered the macroeconomic variables yearly transactions for 41 years (1981 – 2021) for each macroeconomic variable which was obtained from the Central Bank of Nigeria (CBN), and National Bureau of Statistics (NBS). The oil price is the Brent crude oil price was also obtained from the US Energy Information Administration (EIA). The data collection was focused on the following variables: exchange rate, inflation rate, oil revenue and government expenditure which are the selected macroeconomic variables.

3.2 Variables and Measurement

The variables used for this research are the Oil Price, Exchange Rate, Inflation rate and Interest Rate as a control variable. The measurement of variable are as follows: the oil price is being measured in dollars at international market per year. However, the exchange rate is measured by Naira per United States Dollar at a financial year. The rate of inflation is the percentage change (% Δ) in the price index from one year to another.

3.3 The specification of NARDL model

The study adopted an alternative econometric framework, namely the Nonlinear Autoregressive Distributed Lags (NARDL) model recently advanced by Shin et al. (2011 and

2014) as an asymmetric extension to the well-known ARDL model of Pesaran and Shin (1999) and Pesaran et al. (2001).

To begin, the study was specified the following asymmetric long-run equation of exchange rate, inflation rate and interest rate (Schorderet, 2003 and Shin et al., 2011):

$$Oilp_t = \alpha_0 + \alpha_1 excr_t + \alpha_2 infr_t^+ + \alpha_3 intr_t^- + \varepsilon_t \quad (1)$$

Where *oilp* is Oil Price, *excr* is exchange rate, *infr* is inflation rate and *intr* is interest rate to capture effects of oil price shocks, and *a = (a0, a1, a2, a3)* is a cointegrating vector or a vector of long run parameters to be estimated. In (1), $op_t^+ + op_t^-$ are partial sums of positive and negative changes in *op*

$$oilp_t^+ = \sum_{i=1}^{t} \Delta excr_i^+ = \sum_{i=1}^{t} \max\left(\Delta excr_i, 0\right) \quad (2)$$

$$oilp_t^+ = \sum_{i=1}^{t} \Delta Infr_i^+ = \sum_{i=1}^{t} \max\left(\Delta Infr_i, 0\right) \quad (3)$$

$$oilp_t^+ = \sum_{i=1}^{t} \Delta Intr_i^+ = \sum_{i=1}^{t} \max\left(\Delta Intr_i, 0\right) \quad (4)$$

Based on the above formulation, the long run relation between exchange rate and oil price increases is α2, which is expected to be positive. Meanwhile, α3 captures the long run relation between inflation rate and oil price reduction. Since they are expected to move in the same direction, α3 is expected to be positive. The research further posited that the oil price increases will result in higher long run changes in the exchange rate and inflation rate as compared to the variables impact of oil price reduction of the same magnitude, i.e. α2 > α3. Thus, the long run relation as represented by (1) reflects asymmetric long-run oil price pass through to the exchange rate and inflation rate variables.

As shown in Shin et al. (2011 and 2014), equation (1) can be framed in an ARDL setting along the line of Pesaran and Shin (1999) and Pesaran et al. (2001) as:

$$\begin{aligned} \Delta oilp_t = \alpha &+ \beta_0 oilp_{t-1} + \beta_1 excr_{t-1} + \beta_2 infr_{t-1}^+ + \beta_2 intr_{t-1}^- \\ &+ \sum_{i=1}^{p} \Phi_i \Delta Oilp_t^+ + \sum_{i=0}^{q} \gamma \Delta Excr_t + \sum_{i=0}^{s} \left(\theta_t^+ \Delta Intr_{i-1}^+ + \Delta Intr_{i-1}^-\right) + \mu_t \end{aligned} \quad (5)$$

Where all variables are as defined above, p, q and s are lag orders and α2 = − β2/β0, α3 = − β3/β0, the aforementioned long run impacts of respectively oil price increase and exchange rate and inflation rate variables. Hence, in this setting, in addition to the asymmetric long run relation, the asymmetric short-run influences of oil price changes on exchange rate and inflation rate will be also captured.

Empirical implementation of the nonlinear ARDL approach entails the following steps. First, while the ARDL approach to cointegration is applicable irrespective of whether the variables are I(0) or I(1), it is still necessary to conduct unit root tests such that no I(2) variable is involved. This is important since the presence of an I(2) variable renders the computed F-statistics for testing cointegration invalid. To this end, the study applies the widely used ADF unit root tests for establishing the variables' orders of integration. In the second step,

we estimate equation (4) using the standard OLS estimation method. As in Katrakilidis and Trachanas (2012), the study adopts the general-to-specific procedure to arrive at the final specification of the NARDL model by trimming insignificant lags. Third, based on the estimated NARDL, the research performs a test for the presence of cointegration among the variables using a bounds testing approach of Pesaran et al. (2001) and Shin et al. (2011 and 2014). This involves the Wald F test of the null hypothesis, $\beta 0 = \beta 1 = \beta 2 = \beta 3 = 0$. In the final step, with the presence of cointegration, examination of long-run and short-run asymmetries in the relations between oil and macroeconomic variables is made and inferences are drawn. A series of stability and diagnostic tests are applied to check the robustness of the ARDL and NARDL models.

3.4 Tools of Analysis

3.4.1 Descriptive Statistics

It is the attributes of variables under study, the mean and standard deviation, as well as minimum and maximum of all endogenous and exogenous variables started from 1981 to 2021 which includes oil price, exchange rate, inflation rate and interest rate. In addition, the standard deviation reports the rate at which these variables deviate from their individual mean values.

3.4.2 Tests for Stationarity

A preliminary analysis will be conducted to examine the unit root properties of the oil price and some selected macroeconomic variables using the Augmented Dickey-Fuller (ADF) test. It is necessary to test whether the sample data for the oil price and macroeconomic variables analyses are stationary or non-stationary. The test shows whether the series are at stationary or not as well as their order of integration (Johansen and Dinardo, 1997). The ADF test will be applied to test for the presence of unit root (Dickey and Fuller, 1981) and to determine the number of times the series needs to be differenced to make it stationary. Once the presence of unit root is confirmed the data is differenced twice to make it stationary.

3.4.3 NARDL Model

In the literature, the oil price – macroeconomic variables relations are normally examined by means of the standard time series techniques of cointegration, error-correction modelling and Granger causality. While the techniques enable evaluation of their long-run relations as well as their short-run interactions, they presume symmetric relations between macroeconomic variables and oil prices. Accordingly, they are not adequate to capture potential asymmetries in the macroeconomic variables dynamics arising from among others the presence of market power and public policy schemes, as noted earlier. Recently, Shin et al. (2011) advance a nonlinear ARDL cointegration approach (NARDL) as an asymmetric extension to the well-known ARDL model of Pesaran and Shin (1999) and Pesaran et al. (2001), to capture both long run and short run asymmetries in a variable of interest. For over the years under study, the macroeconomic variables and crude oil price have been fluctuating as a result of; an ever increase decrease in global oil price has direct effects on exchange rate and inflation rate in Nigeria.

This study is conducted by modifying and adopting the work of Nwanne and Eze (2019) in the field of social sciences after slight modifications in his model. The model of Nwanne and Eze (2019) was modified on the fact that they used five variables (agriculture sector contribution to GDP, inflation Rate, exchange rate, government oil revenue and interest rate) by using NARDL model in annually time series data from 1980 to 2017 in his study titled

"Effect of Government Oil Revenue on Agricultural Sector Growth: Evidence from Nigerian Economy". The modifications, however, affect the period and study variables, that is, this study considers annual time series data from 1981 to 2021 with oil price and the exchange rate and inflation rate) in carrying out the study.

4.0 Data Analysis and Presentation

4.1 Descriptive Statistics Results

Table 4.1: Descriptive Statistics Results

	LOIL_PRICE	EXCH_RATE	INFL_RATE	INT_RATE
Mean	3.5779	108.73	18.908	17.630
Median	3.3955	111.94	12.880	17.550
Maximum	4.7182	423.15	72.840	31.650
Minimum	2.5431	0.6100	5.3900	8.9200
Std. Dev.	0.6655	111.49	16.679	4.7006
Skewness	0.2808	1.0335	1.8534	0.2929
Kurtosis	1.7817	3.4043	5.3014	3.8371
Jarque-Bera	3.0743	7.5786	32.522	1.7834
Probability	0.2149	0.0226	0.0000	0.4099
Sum	146.69	4458.0	775.26	722.86
Sum Sq. Dev.	17.718	497277	11128	883.83
Observations	41	41	41	41

Source: Computed by the Researchers using E-Views

Table 4.1 shows the attributes of variables under study, the mean and standard deviation, as well as minimum and maximum of all endogenous and exogenous variables started from 1981 to 2021 which includes oil price, exchange rate, inflation rate and interest rate. In addition, the standard deviation reports the rate at which these variables deviate from their individual mean values. Oil price has high deviation from its average value. Similarly, oil price, exchange rate, inflation rate and interest rate are all skewed to the right. The 5.0 value of the Kurtosis suggest that the normal distribution of these indicators and variables. In Jaque-bera, we can see that the probabilities are normally distributed to all significance, except for exchange rate and inflation rate; indicating that we reject the null hypotheses of the variables of interested under the study.

4.2 Tests for Stationarity Results

Table 4.2: Unit Root Tests

Variables	Levels (5%)	Critical Values (5%)	1st difference (5%)	P-values	Comment
Loil_price	2.379	3.527	6.235	0.0000	I(1)
Exch_rate	0.068	3.527	4.229	0.0023	I(1)
Infl_rate	4.096	3.530	5.744	0.0031	I(0)

Int_rate	2.633	2.937	5.537	0.0000	I(1)

Source: Computed by the Researchers using E-Views 9

The ADF statistics in Tables 4.2 showed that only one variable (inflation rate) is at level, while none of the remaining series is stationary at level of 5% critical values, but at first difference. Consequently, the levels in the series will generate spurious results if used for information. The table also shows order of integration for oil price, exchange rate and interest rate that the variables are to be integrated of order one, with exception of inflation rate that is, at first difference meaning that the series are not stationary at their level forms (*p*-value > 0.05).

4.3 Johansen Cointegration Test

Table 4.3: Johansen Cointegration Results

Null Hypotheses	Trace Statistics	C.V (5%)	Max- Eigen statistics	C.V (5%)	Variables	Prob.**
r = 0	47.265	47.856	24.805	27.584	Loil_price	0.056
r ≤ 1	22.461	29.797	15.379	21.131	Exch_rate	0.237
r ≤ 2	7.084	15.495	4.843	14.265	Infl_rate	0.568
r ≤ 3	2.241	3.841	2.241	3.841	İnt_rate	0.134

Trace test indicates no cointegrating at the 0.05 level

Max-eigenvalue test indicates no cointegrating at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Source: Computed by the Researchers using E-Views 9

However, since all variables are integrated of the same order, Johansen cointegration test is performed and results are given in Table 4.3 The result showed that the trace value does not exceeds the critical value and there are no cointegrating equation(s) at the 5 per cent significance level, while max eigenvalue indicates no cointegrating equation. As may be observed from the table, the trace statistic and the maximal eigenvalue statistic indicates the presence of cointegrating vector. From these results, the study concludes that there is no unique cointegrating vector governing the long-run relationship among the variables.

4.4 Bound Test Results

Table 4.4 Bounds Test for Nonlinear Cointegration Results

Bound Test	Null Hypothesis: No Level of Relationship			
Test Statistics	**Value**	**Significance**	**I(0)**	**I(1)**
F-statistics	7.915	10%	2.72	3.77
		5%	3.23	4.35
		1%	4.29	5.61

Source: Computed by the Researchers using E-Views 9

The table 4.4 above shows the Autoregressive Distributed Lag (ARDL) Bounds test results which depicted the co-move in the long run cointegration relationship among the oil price and other variables (exchange rate, inflation rate and interest rate). It also indicated that the F-statistics value (7.915) is greater than other critical values especially at 5% level of significance either at lower or upper bound test. However, it also shows that there are long run equilibrium relationships between the dependent and independent variables, which is between oil prices and exchange rate, inflation rate and interest rate which means the variables have passed the cointegration test. Therefore, since the F-statistics value is greater than critical values especially at 5% level of significance at both lower bounds and upper bounds, we reject the null hypothesis of the cointegration test. However, if we look at F-statistics value is 7.915 and greater than lower bound 0(1) and upper bound 1(1) at 5% level of significance (3.23 and 4.35); it shows that there is long run relationship between dependent variable and independent variables, that is it shows there is long run relationship between oil price and exchange rate, inflation rate and interest rate from 1981 to 2021 in Nigeria; and it also shows that this model has passed cointegration test.

4.5 Short run Co-efficient Results

Table 4.5 Short run Co-efficient Relations

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LOIL_PRICE(-1))	-1.174	0.467	-2.514	0.045
D(EXCH_RATE(POS))	-0.010	0.006	-1.685	0.143
D(EXCH_RATE(NEG))	-0.018	0.008	-2.052	0.085
D(INFL_RATE(POS))	-0.017	0.004	-3.470	0.013
D(INFL_RATE(NEG))	-0.018	0.008	-2.221	0.068
D(INT_RATE(POS))	-0.086	0.063	-1.360	0.222
D(INT_RATE(NEG))	-0.096	0.034	-2.786	0.031
CointEq(-1)	-0.814	0.300	-2.710	0.035

Source: Computed by the Researcher using E-Views 9

The table 4.5 showed the short run co-efficient relationships between the global oil prices and exchange rate, inflation rate and interest rate from 1981 to 2021 in Nigeria. The result also indicates one period lag Error Correction Term (ECT) which must be ensure that it is negative and less than one it is statistically significance. Therefore, the above results at CointEq(-1) is ensure negative and less than one (-0.814), and it is statistically significant (0.035) which passed three (3) basic criteria that have to be statistically significance going by probability value here, it has be to less than 0.05 (0.035), it has be to negative and less than one(1). İt is however shown that if our value (-0.814) multiply by 100%, it show that there high speed of adjustment from short-run to the long-run; and if there is any disequilibrium in this system, it shows the high speed of adjustment from the short run to the long run. However, the model has a good fit if we look at R-square value at 0.96, if we multiply R-square value by 100%, then we can have 96 % to show high speed adjustment from the short run and long run if there is any disequilibrium in the system. The F-statistics value is at 5.07, probability value is at 0.02 which is less than 0.05, and Durbin-Watson statistics is at 2.20 which is not greater than 2 by approximation. The result, is however, depicted that there was negative relationship between oil price and exchange rate, inflation rate and interest rate at -0.010, -0.017 and -0.086; while the probabilities of inflation rate and interest rate are significant since the p-values are less than 0.05 at 5 percent level of significance.

4.6 Long run Co-efficient Results

Table 4.6 Long run Co-efficient Relations

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EXCH_RATE	-0.009	0.010	-0.845	0.430
INFL_RATE	-0.009	0.013	-0.716	0.500
INT_RATE	-0.457	0.263	-1.737	0.132
C	12.627	5.117	2.467	0.048

Source: Computed by the Researcher using E-Views 9

The table of 4.6 indicated that the long run co-movement relationships between the oil prices and exchange rate and inflation rate from 1981 to 2021 in Nigeria. In the long run, it shows that the exchange rate is not a statistically significance going by probability value at 0.430; the same thing with other variables like inflation rate and interest rate that they are not statistically significance going by their probability values at 0.500 and 0.132 for inflation rate and interest rate. There are negative relationships between the global oil prices and exchange rate, inflation rate and interest rate at -0.009, -0.009 and -0.457 respectively going by their coefficient values in the long run. Meaning that an increase in oil price at global oil market leads to depreciation of exchange and rise of interest rate as well as increase in inflation rate thereby leading to fall in oil revenue in which most of oil revenue accrued do not complement the increase in oil price globally since the country spends these oil revenues generated through financing imported fuels and other goods and services.

5.0 Conclusion and Policy Recommendations

Based on the findings of this study, the study is carried out to investigate whether or not a dynamic relationship exists between oil price shocks and exchange rate and inflation rate, and to examine the various oil price shocks with the implications on the Nigerian economy; and hence the study adopts the NARDL model to examine the effect of oil shocks on exchange rate and inflation rate. İt therefore, affirmed that oil price shocks negatively affect average variables (exchange rate, inflation rate and interest rate) of macro economy significantly in the both short run and long run dynamic interactions. However, the result also indicates one period lag Error Correction Term (ECT) which must be ensures that it is negative and less than one it is statistically significance. Therefore, the above results at CointEq(-1) is ensure negative and less than one (-0.814), and it is statistically significant (0.035) which passed three (3) basic criteria that have to be statistically significance going by probability value here, it has be to less than 0.05 (0.035), it has be to negative and less than one(1). In the long run, it shows that the exchange rate is not a statistically significance going by probability value at 0.430; the same thing with other variables like inflation rate and interest rate that they are not statistically significance going by their probability values at 0.500 and 0.132 for inflation rate and interest rate. There are negative relationships between the global oil prices and exchange rate, inflation rate and interest rate at -0.009, -0.009 and -0.457 respectively going by their coefficient values in the long run.

5.1 Policy Recommendation

The following were recommended: first, efforts geared towards developing the oil sector locally as it will bring about positive response on exchange rate and inflation rate thereby making refined fuels available by producing them locally so as to appreciation of exchange rate, controlling inflation, increase in oil revenue and oil GDP to complement government expenditure in Nigeria. Second, to facilitate the monetary authority in achieving lower inflation and stable exchange rate towards economic growth targets counter-cyclical fiscal

policies and effectively binding fiscal rules should be formulated and implemented by Nigerian government.

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