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Oil Price and Exchange Rate Nexus: A Vector Error Correction Approach on Nigeria

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ABSTRACT

The goal of this study is to examine the linkages between oil price shocks and exchange rate volatility in Nigeria using monthly data from January 1996 to December 2015. The Johansen cointegration test confirms that a long-run relationship exists between oil price and real exchange rate. The vector error correction (VEC) estimations show that oil price is negatively related to exchange rate in the short-run. The results indicate that when oil price rises by one unit, exchange rate appreciates by 6.5%. We also estimated a long-run causation which reveals that when oil price rises by 1%, exchange rate depreciates by 58%. Short-run exchange rate gains from oil price increases were more than proportionately lost in the long-run. Furthermore, 1% change in CPI (inflation) results to 28.5% depreciation in exchange rate. The VEC Granger causality test result provided evidence of a unidirectional causality running from oil price to exchange rate.

Keywords: Oil Price, Exchange Rate, Vector Error Correction Model
JEL Classifications: C2, F4, Q43

1. INTRODUCTION

Unarguably, oil is the mainstay of the Nigerian economy. Revenue from oil accounts for about 80% of total government revenue and about 90% of Nigeria's foreign exchange earnings. The panic occasioned by oil price fluctuations vibrates through the financial system. Dependence on oil has deteriorating effects on Nigeria's growth expectations (PWC, 2016). The vulnerability of the economy to external economic shocks was even more highlighted during the 2007/2008 global economic and financial crisis. Kale (2016) posits that the economy is more or less entering into a period of uncertainty in the milieu of changing economic and financial market paradigms. Before the petroleum industry came into prominence, the Nigerian economy was largely dependent on the agricultural sector. The very nature of the economy changed dramatically with the growth of the petroleum industry which, according to Onodugo et al. (2015), powered a mono-cultural economy. A mono-cultural economy has been defined as an economic system that is reliant on the existence of only one major economic product (Dode, 2012).

Shaari et al. (2013) argue that crude oil is one of the key commodities that generate growth in an economy. In the Nigerian context, however, huge gains from oil led to the neglect of other real sectors of the economy. Growth of the petroleum industry impeded the development of such other sectors as agriculture, solid minerals, and manufacturing. Consequently, the responsiveness of the Nigerian economy to external shocks and volatilities in the international oil market has been adverse and significant. And one of the direct effects of these disturbances is on the exchange rate. Fall in international oil price is, by a considerable measure, a fall in government revenue and decline in foreign exchange earnings for the country. A decline in foreign exchange supply with growing demands for foreign exchange would, ultimately, create some distortions in the foreign exchange market with the natural law of demand and supply playing out.

Some of the discourses on the effects of oil supply shocks on the economy have assumed that oil price changes are exogenous and are mainly determined by the actions of the Organisation of Petroleum Exporting Countries (OPEC). The unprecedented increase in oil prices in 1973 and 1979, for instance, was attributed to OPEC's decision to cut the supply of oil at that time. Hence, major historical experiences appear to confirm the assumption of exogeneity of oil price changes which, to a large extent, cause researchers to link changes in oil price with shocks to its supply. Based on this assumption, studies have sought to ascertain the effects of oil supply shocks by examining how the economy responds to a change in the price of oil (Trehan, 1986). Due to the recent oil price shock, economists have extensively attempted to analyse the energy market. Global imbalance, on the other hand, keeps building up thereby prompting researchers to devote their efforts to examining exchange rate issues (Cuaresma and Breitenfellner, 2008). Studies that explored the relation between oil price and the exchange rate of the currency in which oil is traded seem to support the argument that oil price and the fluctuation of US dollar are inversely related. This is believed to be so due to the fact that commodity prices are largely quoted in US dollars (Novotný, 2012). We domesticate this empirical argument in Nigeria's peculiar historical episode with the aim of determining the extent to which changes in the prices of oil has affected exchange rate as well as the causal relationship between the two variables.

2. LITERATURE REVIEW

Exchange rate and terms of trade have been widely acknowledged as the key channels through which the dollar price of oil is transmitted to the real economy. The predominant invoicing currency in the international oil trade remains the US dollars. The movements of the US dollar are, therefore, generally believed to have predictive powers over the prices in the international energy market. Zhang (2013) infers that since 2002, the dollar price of oil appeared to rise with the depreciation in the US dollar - a co-movement that is evident in the long-run. According to Nguyen (2015), demand and supply of oil is affected by the fluctuations in the invoicing currency which typically entails that crude oil prices are prone to be vulnerable to the movements of the trading currency. It can be inferred that a depreciation of the US dollar is associated with a rise in the dollar price of oil.

Besides exchange rate, there is the Terms of trade effect which, according to the international trade theory, entails that when the price of an export whose demand is inelastic rises, it leads to increase in the demand of the exporting county's currency thereby pushing up the value of such currency. In most cases, earnings from exports increase considerably without a significant effect on import costs. In other words, favourable (unfavourable) terms of trade impact on the oil exporter (importer) triggers upward (downward) pressure on that country's currency. The terms of trade impact arises from the impact on nominal value export revenues, not the actual quantities of units traded (Dale, 2009). Coudert et al. (2013) argue that the link between terms of trade and real exchange rates are nonlinear and depend on the volatility in the oil market. Abed et al. (2016) posit that if output prices of tradable and non-tradable exports are responsive to rise in oil prices, then increases in oil prices will potentially result in either the appreciation or depreciation of the exchange rate. Where the non-tradable sector is more (less) energy-driven compared to the tradable sector, its output price rises (falls) while the real exchange rate appreciates (depreciates).

We examine, in this section, various empirical investigations related to the linkages between oil price and exchange rate in various jurisdictions. Muhammad et al. (2011) investigated the oil price - exchange rate nexus for Nigeria using daily data from 2007 to 2010. The generalised autoregressive conditional heteroscedasticity (GARCH) and exponential GARCH models were employed to examine the responsiveness of nominal exchange rate to oil price changes. Their findings indicate that over the study period, a rise in oil prices leads to a depreciation of the Nigerian Naira vis-à-vis the US dollar. Nguyen (2015) explored the short and long run relationship between real crude oil prices and currencies of the world's major oil exporting countries from 2000 to 2015. The study found bidirectional causality in the case of CAD/USD and West Texas Intermediate crude oil prices irrespective of diverse frequency. The result revealed that a unidirectional effect runs from NOK/USD to Brent price at weekly and daily data, while no causal effect exists in the case of Mexico. However, the out-of sample forecast experiment indicates that either crude oil price or exchange rate cannot serve as efficient predictor for the other (Fratzscher et al., 2014). In the case of Turkey, Ozturk et al. (2008) found that international real crude oil prices were Granger causal for the USD/YTL real exchange rate.

Ogundipe et al. (2014) examined the effects of oil price on exchange rate volatility in Nigeria using annualised data from 1970 to 2011. The Johansen Co-integration technique was employed to determine the long run relationship between the variables while the vector correction mechanism was used to examine the speed of adjustment of the series from the short run dynamics to the long run equilibrium. It was found that a proportionate change in oil price leads to a more than proportionate change in exchange rate volatility in Nigeria; which implies that exchange rate is susceptible to changes in oil price in Nigeria.

Evidence from selected Middle East and North African countries confirmed the dynamic relationship among oil price shocks and exchange rate volatility and suggests that oil price is a key determinant of the strength of a currency as well as its volatility (Abed et al., 2016). Similarly, Blokhina et al. (2016) examined the relationship between oil price and exchange rates in the Russian Federation. The regression model applied in the study suggests that there is a close interrelation between the currency rate of dollar to ruble and oil prices. Selmi et al. (2012) contend that, in small open economies, such interaction depends largely on switching regime and argue that the relationship between oil prices and exchange rate is more volatile and more persistent for the importing country than in the exporting country (Dawson, 2003; Dauvin, 2013; Rickne, 2009; Husain et al., 2015).

Zhang (2013) examined the cointegration between the real price of oil and the real effective exchange rate (REER) using monthly data. Contrary to the conclusion from previous literature, the results showed that there is no long-run relationship between oil price and the value of US dollar. However, there appeared to be cointegration between the variables when the effects of two structural breaks in November 1986 and February 2005 were controlled for. Aguilar (2013) also stressed the influence of structural breaks on oil price and exchange rate relation in the Canadian case (Ghosh, 2016). In a related study, Al-Ezzee (2011) assessed the relationship between the growth of real gross domestic product (GDP), real exchange rate, and oil prices in Bahrain from 1980 to 2005. Cointegration techniques employed in the study suggest that a long run relationship exists between the growth of real GDP, International oil prices, and real exchange rate. Using the Johansen vector autoregressive (VAR)-based co-integration technique, Shaari et al. (2013) confirmed that there is a long-run association between crude oil prices and exchange rate in Malaysia. Using the VAR modeling and cointegrating technique, Trung and Vinh (2009) also provided evidence that petroleum products prices and exchange rate are cointegrated in the context of Vietnam.

In their paper, Kaushik et al. (2014) studied the effect of oil price change on the real exchange rate between the Indian rupee and the U.S. dollar using quarterly time series data from 1996 to 2012. While the null hypothesis of no cointegration was rejected, the error correction model estimation revealed that there is no significant effect of oil price change on the real exchange rate between the Indian rupee and the U.S. dollar within the period covered by the study. The findings in Aziz and Bakar (2011) however differ with the above postulation in their comparative study between net oil exporting and net oil importing countries. Their findings indicated that there is a significant positive impact of real oil price on real exchange rate for net oil importing countries. This implies that increase in oil price leads to real exchange rate depreciation in the net oil importing countries. However, in a panel that consists of net oil exporting countries, no evidence of long run relationship between real oil price and real exchange rate was found (Benhabib et al., 2014; Hasanov, 2010). The empirical evidence in Berument et al. (2014) reveals that, in the long-run, a 1% increase in exchange rate (depreciation) increases crude oil prices less than a 1% increase in crude oil prices does. However, a reverse scenario was discovered in the short-run where a 1% increase in exchange rate increases oil prices more than a 1% increase in crude oil prices does.

3. DATA AND METHODOLOGY

Data for the study are monthly data on Nigeria for the period 1996-2015 with 240 observations. Oil price data was sourced from the World Bank while the REER and the inflation rate were collated from the Central Bank of Nigeria Statistical bulletin 2014 and 2015 editions. Oil price and exchange rate data are our variables of interest while the inflation rate is introduced as a conditioning variable. Augmented Dickey-Fuller (ADF) unit root test will be employed to determine the stationarity of the series and the Multiple-Break point tests to ascertain the break date(s) for each of the variable. Johansen cointegration test will be employed to estimate the cointegrating relationships among the variables while the vector error correction (VEC) model will be used to estimate the multivariate short-run dynamic causation. VEC-Granger causality test will be used to determine the direction of causality between oil price shocks and exchange rate volatility. Other validity and stability tests will be run to confirm the stability of our model and the reliability of estimation results.

The primary regression model for this study is patterned after the model represented in Selmi et al. (2012) which examined the interaction between oil price uncertainty and exchange rate volatility in Morocco and Tunisia. The model took the following form:

$$r_{RER_t} = \alpha + \beta r_{OILP_t} + \mu_t \quad (1)$$

Where RER = real exchange rate, α = intercept, β = coefficient, OILP = oil price, and μ = error term.

The above model is modified to form our baseline long-run model thus;

$$REER_t = \beta_0 + \beta_1 OILP_t + \beta_2 INF_t + \varepsilon_t \quad (2)$$

Where t denotes time, REER is real effective exchange rate, OILP is oil price, INF is inflation rate, β_0 is constant, β_1 and β_2 are parameter estimates, and ε is error term. For our key variables of interest, REER and OIL, the general VAR framework describing the dynamic relationships between these two interrelated variables, under the assumption that they are stationary at level, yields the following system of equations:

$$REER_t = \beta_{10} + \beta_{11} REER_{t-1} + \beta_{12} OILP_{t-1} + v_t^{reer} \quad (3)$$

$$OILP_t = \beta_{20} + \beta_{21} REER_{t-t} + \beta_{22} OILP_{t-1} + v_t^{oilp} \quad (4)$$

However, in an instance where the levels or log-levels of our time-series are not stationary, they can attain stationarity in their differences. Where our variables are I(1) (i.e., stationary after first differencing) and are cointegrated, we modify the general VAR model in equations 3 and 4 and introduce the VEC model allow for cointegrating relationships between the I(1) series. VEC system equation can be represented thus:

$$\Delta REER_t = \Delta REER_{t-1} + \beta_{12} \Delta OILP_{t-1} + v_t^{nreer} \quad (5)$$

$$\Delta OILP_t = \Delta REER_{t-t} + \beta_{22} \Delta OILP_{t-1} + v_t^{noilp} \quad (6)$$

Where Δ is the differencing operator and v_t measures the unpredictable variations in the variables which are largely due to the white noise process.

4. RESULTS AND ANALYSES

Statistical description of the variables is demonstrated in Table 1. The REER averaged 82.94 Nigerian Naira to the US dollar between January 1996 and December 2015. REER was at maximum at 162.81 in September 2007, and lowest in January 1998 at 17.27 to the US dollar. Oil price averaged 55.08 US dollars per barrel, and was highest at 132.55 US dollars in July 2008 and lowest in December 1998 at 10.41 US dollars.

Figure 1 presents the trends of series and reveals that oil price and REER are highly volatile and greatly unstable over the study period. The consumer price index (CPI), however, maintained a steady upward movement over time.

Table 2 presents results of the ADF unit root test and the structural breakpoint test for our monthly time-series data. The result indicates that none of the variables are stationary at their level form. After first differencing however, they became stationary. The evidence shows that all the variables are I(1). The breakpoint test revealed that real exchange rate has structural breaks in April 2001 and May 2008. Structural breaks for oil price were in March 2003 and November 2010. Since our series are all integrated of order one, we will test for the presence of long-run relationship with the aid of Johansen cointegration technique.

Results presented in Table 3 indicate that there are 3 cointegrating equations among our time-series. The evidence of these number of cointegtation equations are same both for the Trace statistic and the Max-Eingen statistic. In other words, it is evident that there is a long-run relationship among REER, oil price and CPI over the study period.

Table 1: Descriptive statistics

Stat.	REER	OILP	CPI
Mean	82.93985	55.07917	78.46727
Median	80.18923	47.63000	70.80035
Maximum	162.8147	132.5500	180.1454
Minimum	17.27309	10.41000	21.19138
SD	39.71277	33.58906	46.84523
Observations	240	240	240

Source: Authors' 2017, REER: Real effective exchange rate, CPI: Consumer price index, SD: Standard deviation

4.1. Long-run Dynamic Estimation

The result of the long-run estimation is presented and indicates that oil price has significant positive effect on real exchange rate (REER) while the CPI has significant negative effect on real exchange rate (Table 4). In the long-run, 1% increase in oil price leads to a 58% increase (depreciation) in REER in the Nigerian case.

4.2. Short-run and Long-run Dynamic Effect

Results of the VEC model and the system equations are represented in Table 5. The result shows that oil price is negatively and insignificantly related to REER. A unit change in oil price leads to 6.5% appreciation in REER whereas the CPI has a reverse

Figure 1: Graphical representation of variables

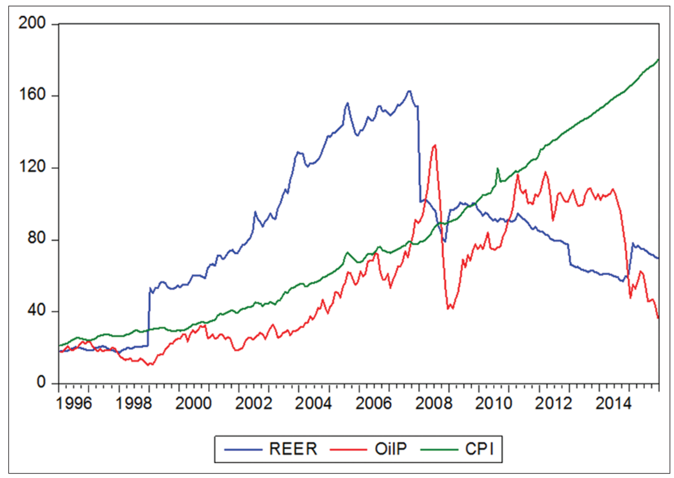


Table 2: Unit root test and structural breakpoint test results

Variables	Level		First difference		Multiple breakpoint test	
	ADF-statistic	5% critical values	ADF-statistic	5% critical values	Break test	Break dates
REER	−1.628122	−2.873440	−14.28852	−2.873492	1 versus 2	2001M04, 2008M05
OILP	−1.934298	−2.873492	−9.565077	−2.873492	1 versus 2	2005M03, 2010M11
CPI	4.022419	−2.873440	−15.71969	−2.873492	1 versus 2	2003M09, 2010M08

Source: Authors' 2017, ADF: Augmented Dickey-Fuller, REER: Real effective exchange rate, CPI: Consumer price index

Table 3: Johansen cointegration test results

Sample (adjusted): 1996M07 2015M12
Included observations: 234 after adjustments
Trend assumption: Linear deterministic trend
Series: D(REER) D(OILP) D(CPI)
Lags interval (in first differences): 1-4
Unrestricted cointegration rank test (trace)

Hypothesized Number of CE(s)	Eigenvalue	Trace statistic	Critical value 0.05	P**
None*	0.245646	123.2471	29.79707	0.0000
At most 1*	0.129498	57.28383	15.49471	0.0000
At most 2*	0.100681	24.83152	3.841466	0.0000

Unrestricted cointegration rank test (maximum eigenvalue)

Hypothesized Number of CE(s)	Eigenvalue	Max-Eigen statistic	Critical value 0.05	P**
None*	0.245646	65.96324	21.13162	0.0000
At most 1*	0.129498	32.45230	14.26460	0.0000
At most 2*	0.100681	24.83152	3.841466	0.0000

Trace and max-eigenvalue tests indicate 3 cointegrating equations at the 0.05 level. *Denotes rejection of the hypothesis at the 0.05 level, **MacKinnon-Haug-Michelis (1999) P-values. REER: Real effective exchange rate, CPI: Consumer price index, SD: Standard deviation

Table 4: Results of long-run regression estimate (baseline model)

Dependent variable: REER				
Variable	Coefficient	Standard error	t-statistic	P
C	64.36967	4.866014	13.22842	0.0000
OIL	0.583872	0.115721	5.045495	0.0000
CPI	−0.173181	0.082975	−2.087146	0.0379
R^2	0.827299			
F-statistic	44.778532			
Durbin-Watson stat	1.822027			

Source: Authors' 2017. REER: Real effective exchange rate, CPI: Consumer price index

Table 5: VEC model estimation (system equation) result

Dependent variable: D(REER)
Method: Least squares (Gauss-Newton/Marquardt steps)
Sample (adjusted): 1996M03 2015M12
Included observations: 238 after adjustments
D(REER) = C(1)*(REER(−1)-9.05381562949*OILP(−1)-0.417187505376
*CPI(−1)+450.189078908)+C(2)*D(REER(−1))+C(3)*D(OILP(−1))+C(4)*D(CPI(−1))+C(5)

Variables	Coefficient	Standard error	t-statistic	P
C(1)*(REER(−1)	0.003690	0.001064	3.468683	0.0006
C(2)*D(REER(−1))	0.012809	0.066529	0.192536	0.8475
C(3)*D(OILP(−1))	−0.065403	0.062208	−1.051355	0.2942
C(4)*D(CPI(−1))	0.285220	0.267406	1.066621	0.2872
C(5)	0.031992	0.352529	0.090750	0.9278
R^2	0.759303	Mean dependent variable		0.216219
Adjusted R^2	0.643154	S.D. dependent variable		4.831616
SE of regression	4.726215	Akaike info criterion		5.964911
Sum squared residual	5204.545	Schwarz criterion		6.037858
Log likelihood	−704.8244	Hannan-Quinn criterion.		5.994310
F-statistic	3.672196	Durbin-Watson statistic		2.024713
P (F-statistic)	0.006382			

Source: Authors' 2017, REER: Real effective exchange rate, CPI: Consumer price index

effect meaning that 1% change in CPI (inflation) results to 28.5% depreciation in exchange rate.

4.3. Granger Causality Test

The VEC-Granger causality test results in Table 6 reveals that there is a unidirectional causality running from oil price (OILP) to REER. The second panel shows that there is no feedback effect. This outcome means that for real exchange rate to be forecasted (or predicted), past information on oil price is essential.

4.4. Diagnostic Tests

Autocorrelation test results in Table 7 indicate that there is no autocorrelation problem in the series up to lag 5. The absence of serial correlation traits is, therefore, a good sign and confirms the DW-stat value in Table 5 supporting this evidence.

4.5. Stability Test

Figure 2 indicated that our model passed the stability test. The blue dots lie inside the circle indicating that our model is stable.

5. CONCLUSION

The dynamic relation between exchange rate volatility and fluctuations in oil prices remains a topical issue and has generated intense debate among academics and diverse vested interests in the global energy market. Though Nigeria is acclaimed to be among the largest oil producing countries in the world, the country is, however, a net oil importer – a significant quantity of oil consumed in the country is refined overseas. In this study, we did a VEC modeling of oil price shocks and exchange rate volatility in Nigeria. The Johansen cointegration test confirms that a long-run relationship exist between oil price and real exchange rate. The VEC estimation showed that in the short-run, oil price has negative effect on exchange rate. It reveals that when oil price rises by 1%, real exchange rate appreciates by 6.8%.

Table 6: VEC granger causality test results

VEC granger causality/block Exogeneity Wald tests
Sample: 1996M01 2015M12
Included observations: 237

Excluded	Chi-square	df	P
Dependent variable: D(REER)			
D(OILP)	9.692531	2	0.0079
D(CPI)	1.390159	2	0.4990
All	10.74066	4	0.0296
Dependent variable: D(OILP)			
D(REER)	0.911640	2	0.6339
D(CPI)	0.383107	2	0.8257
All	1.250148	4	0.8698

Source: Authors' 2017, REER: Real effective exchange rate, CPI: Consumer price index, VEC: Vector error correction

We also estimated a long-run causation which reveals that oil price has significant positive effect on REER. This implies that

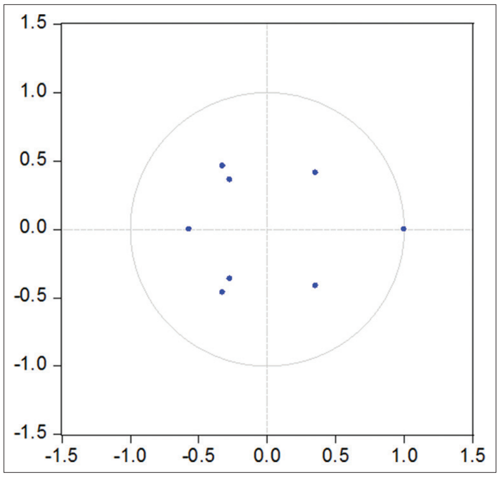
Table 7: Serial correlation LM tests

VEC residual serial correlation LM tests
Null hypothesis: No serial correlation at lag order h
Date: 01/07/17 time: 00:08
Sample: 1996M01 2015M12
Included observations: 237

Lags	LM-statistical	P
1	13.86832	0.1271
2	13.91521	0.1254
3	13.44125	0.1436
4	13.54818	0.1393
5	5.905772	0.7493

P from Chi-square with 9 df. Source: Authors' 2017, VEC: Vector error correction

Figure 2: Inverse root stability test result



Source: Authors' 2017

an increase in oil price leads to depreciation in real exchange rate. The evidence revealed that when oil price rises by 1%, REER depreciates by 58%. The VEC-Granger causality test result showed evidence of a causal relationship between oil price and exchange rate. Causality was found to run from oil price to exchange rate. There was no evidence of a feedback system. We concluded from the empirical results that the Nigerian economy is highly vulnerable to volatilities in the international energy price.

REFERENCES

Abed, R.E.L., Amor, T.H., Nouira, R. (2016), Asymmetric effect and dynamic relationships between oil prices shocks and exchange rate volatility: Evidence from some selected MENA countries. Middle East Economic Association, 15th The International Conference Doha, Qatar, March, 1-24.

Aguilar, C.G.A. (2013), Oil Prices and the CAD/USD Exchange Rate. Universite Laval, Maîtrise En économique Maître ès Arts (M.A.) Québec. p1-93.

Al-Ezzee, I. (2011), Real influences of real exchange rate and oil price changes on the growth of real GDP: Case of Bahrain. International Conference on Management and Service Science IPEDR, 8, 155-163.

Aziz, M.I.A., Bakar, N.A. (2011), Oil price and exchange rate: A comparative study between net oil exporting and net oil importing countries. European Journal of Economics, Finance and Administrative Sciences, 42, 14-27.

Benhabib, A., Kame, S.M., Maliki, S. (2014), The relationship between oil price and the Algerian exchange rate. Topics in Middle Eastern and African Economies, 16(1), 127-141.

Berument, M.H., Sahin, A., Sahin, S. (2014), The relative effects of crude oil price and exchange rate on petroleum product prices: Evidence from a set of Northern Mediterranean countries. Economic Modelling, 42, 243-249.

Blokhina, T.K., Karpenko, O.A., Guirinskiy, A.V. (2016), The relationship between oil prices and exchange rate in Russia. International Journal of Energy Economics and Policy, 6(4), 721-726.

Coudert, V., Couharde, C., Mignon, V. (2013), Revisiting commodity currencies. CEPII Working Paper, 40, 1-23.

Cuaresma, J.C., Breitenfellner, A. (2008), Economics and statistics crude oil prices and the euro-dollar exchange rate: A forecasting exercise. University of Innsbruck Working Papers in Economics and Statistics, 8, 1-29.

Dale, O. (2009), What is the relationship between the exchange rate and oil prices? Economic Insight, 1-9.

Dauvin, M. (2013), Energy prices and the real exchange rate of commodity-exporting countries. Centre D'études Prospectives Et d' Informations Internationales, Document de Travail, 28, 1-34.

Dawson, J.C. (2003), The effect of oil prices on exchange rates: A case study of the Dominican republic. The Park Place Economist, 14, 23-30.

Dode, B.R.O. (2012), Economic recession: Problems and prospects. Global Journal of Human Social Science Sociology, Economics and Political Science, 12(11), 41-47.

Fratzscher, M., Schneider, D., Van Robays, I. (2014), Oil prices, exchange rates and asset prices. ECB Working Paper Series, 1689, 1-44.

Ghosh, T. (2016), Oil price, exchange rate and the Indian macro economy oil price, exchange rate and the Indian macro economy. Working Paper, Indira Gandhi Institute of Development Research, 13, 1-18.

Hasanov, F. (2010), The impact of real oil price on real effective exchange rate: The case of Azerbaijan. DIW Berlin Discussion Papers, 1041, 1-28.

Husain, A.M., Arezki, R., Breuer, P., Haksar, V., Helbling, T., Medas, P., Sommer, M. (2015), Global implications of lower oil prices. IMF Discussion Note, 15, 1-41.

Kale, Y. (2016), Pushing Nigeria's Economic Diversification Forward: Issues and Options, 7th Stanbic IBTC Bank Investors Conference: Unlocking Nigeria's Potential Growing through Diversification, February, 1-16.

Kaushik, N., Nag, R., Upadhyaya, K.P. (2014), Oil price and real exchange rate. International Business and Economics Research Journal, 13(4), 809-814.

Muhammad, Z., Suleiman, H., Kouhy, R. (2011), Exploring oil price-exchange rate nexus for Nigeria. FIW Working Paper, 44(71), 1-24.

Nguyen, M. (2015), The relationship between oil prices and exchange rates evidences from Norway, Canada and Mexico. A Thesis Written as a Part of the Master of Science in Economics and Business Administration at NHH, 1-84.

Novotný, F. (2012), The link between the Brent crude oil price and the Us dollar exchange rate. Prague Economic Papers, 2, 220-232.

Ogundipe, O.M., Ojeaga, P., Ogundipe, A.A. (2014), Oil price and exchange rate volatility in Nigeria oil price and exchange rate volatility in Nigeria. IOSR Journal of Economics and Finance, 5(4), 1-10.

Onodugo, C.I., Amujiri, B.A., Ndibe, B. (2015), Diversification of the economy: A panacea for Nigerian economic development. International Journal of Multidisciplinary Research and Development, 2(5), 477-483.

Ozturk, I., Feridun, M., Kalyoncu, H. (2008), Do oil prices affect the USD/YTL exchange rate: Evidence from Turkey. Privredna Kretanja I Ekonomska Politika, 115, 49-61.

PWC. (2016), What next for Nigeria's economy? Navigating the rocky road ahead PwC's economic scenarios for 2015 and 2016 Nigeria: In the eye of the storm. PWC Economics AND Policy, Nigeria Economy Watch, 5, 2-18.

Rickne, J. (2009), Oil prices and real exchange rate movements in oil-exporting countries: The role of institutions. IFN Working Paper, 810, 1-32.

Selmi, R., Bouoiyour, J., Ayachi, F. (2012), Another look at the interaction between oil price uncertainty and exchange rate volatility: The case of small open economies. Procedia Economics and Finance, 1(12), 346-355.

Shaari, M.S., Hussain, N.E., Rahim, H.A. (2013), The effects of oil price changes and exchange rate volatility on unemployment: Evidence from Malaysia. International Journal of Research in Business and Social Science IJRBS, 2(4), 72-83.

Trehan, B. (1986), Oil prices, exchange rates and the U.S. Economy: An empirical investigation. Economic Review, the Federal Reserve Bank of San Francisco, 4, 25-43.

Trung, L.V., Vinh, N.T.T. (2009), The impact of oil prices, real effective exchange rate and inflation on economic activity: Novel evidence for Vietnam. Discussion Paper Series RIEB Kobe University, 9, 1-31.

Zhang, Y. (2013), The links between the price of oil and the value of US dollar. International Journal of Energy Economics and Policy, 3(4), 341-351.