International Journal of Economics, Business and Management Research

Vol. 6, No.02; 2022

ISSN: 2456-7760

Effects of Oil Price Volatility on Foreign Exchange of Major Oil Producing Countries in Africa

[1]Edewusi, D.G., [2]Duru, C.J.

[1,2]Department of Finance, Faculty of Management Sciences,

Ekiti State University, P.M.B. 5363, Ado-Ekiti, Ekiti State.

doi: 10.51505/IJEBMR.2022.6211 URL: http://dx.doi.org/10.51505/IJEBMR.2022.6211

Abstract

Major oil producing countries in Africa are a mono-product economy, where their main export commodity is crude oil, changes in oil prices has implications on their economy and, in particular, exchange rate. The latter is mostly important due to the multiple dilemma of being an oil producing, oil exporting and oil-importing countries; a situation that emerged in the last decade. Hence, this study explored oil price volatility on foreign exchange of major oil producing countries in Africa; the study specifically examined the effect of oil price volatility, inflation, and money supply on foreign exchange of major oil producing countries in Africa. The ex-post facto research design was used in the study as time series data spanning from 1999 to 2020. Data obtained was estimated using the Non-Linear Autoregressive Distributed Lag (NARDL). Findings from the study suggested that NARDL long run and short run estimate discovered that that the effect of oil price volatility is adverse and precarious for foreign exchange of the two countries; inflation exerts a positive significant effect on the foreign exchange in the short run, but positively insignificant effect on the foreign exchange of the two countries in the long run; Nigeria, the effect of broad money supply on foreign exchange was negatively significant in the short run but negatively insignificant in the long run and in Angola, the effect of broad money supply on foreign exchange was positively significant in the short run but positively insignificant in the long run. Premised on these findings, the study concluded that oil price volatility exerts noticeable effect on foreign exchange of Nigeria and Angola. Hence, the study advocated that that resources should be channeled to the real sectors of the major oil producing countries in Africa; major oil producing countries in Africa should avoid those activities or introduction of policies that would lead to the reduction in the purchasing power of their currency and the license for the production of crude oil in the major oil producing countries in Africa should not be placed in fewer hands so as to encourage competition.

Keywords: Oil Price Volatility, Inflation, Money Supply, Foreign Exchange, Nigeria, Angola

Introduction

Through means of diverse mechanisms, oil price capriciousness noticeably affects the global economy including redistribution of wealth from the consumer (flow of payments) to producers of oil (receipts of payments). Over the years, crude oil has become a veritable medium of energy generation in most countries (emerging and advanced) of the world and as a result of this, the changes in international oil price has had a great influence on the cost of production of goods and services, consumer confidence, inflation, exchange rate and financial market (Omojimite &

Vol. 6, No.02; 2022

ISSN: 2456-7760

Akpokodje, 2010; Sathyanarayana, Harish & Gargesh, 2018). Besides, oil price increases can translate into higher transportation, production and heating costs which can put a drag on corporate earnings, affect price stability, firm profitability and countries financial system of developing and developed countries (Sanya & Oloruntunyi, 2017).

Additionally, as an important part of most African economy, oil occupies a crucial position as it influence on countries socio-political and economic fortunes cannot be overemphasized. In Nigeria specifically, ever since the oil boom of the 1970s, the country has experienced a paradigm shift from her reliance on agriculture and light manufacturing to crude oil exploration and the focus on oil has also brought a decline in the productivity of other sectors of the economy which has also given rise to massive drift from the rural areas to cities, neglecting their primary occupations of fishing and farming, a phenomenon known as 'Dutch Disease' (Igbinovia & Igbinovia, 2019). Also, in other part of Africa, more than half of Angola economic activity is made of crude oil related activities which represents more than 95% of its exports and at least 75% of the state budget revenues (Henry, 2019).

Basically, Angola and Nigeria are considered the two largest oil producers in Africa and oil exports are the main source of foreign exchange for both countries and until recent time, exchange rate stability was a key ingredient of the disinflation strategy in both oil producing and exporting African countries (Aron, MacDonald & Muellbauer, 2014). However, as international oil prices continues to suffer a significant decline and foreign exchange revenues became more limited, Angola Kwanza and the Nigerian naira are also facing depreciation pressures and in response to the economic situation, the national bank of Angola and Central Bank of Nigeria abandoned their exchange rate intervention (anchor) and allowed their currencies to depreciate at least to a reasonable extent, together with a gradual drawdown of international reserves. At the same time, fiscal and monetary policies have been tightened and despite these policy actions, depreciation still pressurizes the value of both currencies.

Practically, the policy makers in both producing and exporting African countries are faced with difficulty of policy choice. On one hand, letting the currency depreciate further would help rebalance the foreign exchange market and reduce the loss of international reserves while, on the other hand, preventing the currency to weaken further would help accommodate inflation given exchange rate pass-through effects (Beckmann & Schussler, 2016). Theoretically, exchange rate has also been identified as the primary channel through which changes in oil prices are transmitted to the real economy and this is so because, with oil price in US dollars, volatility of oil prices may have knock-on effects on the dollar value of oil exporting and importing economies as well as conversion rate of domestic currency to dollars. To buttress this statement, Bangura, Boima, Pessima and Kargbo (2021) postulated that when oil prices rise, oil exporting economies may experience exchange rate depreciation while oil exporting economies may experience an appreciation in their exchange rate vice versa. More so, international crude oil prices have been identified to have both demand and supply side impacts on exchange rate. The supply side impact is based on the fact that oil is a major intermediate product of production process in most economies and therefore, any increase in oil price would affect production negatively by increasing the factors of production of non-tradable goods and ultimately lead to

Vol. 6, No.02; 2022

ISSN: 2456-7760

an appreciation in exchange rate. On the demand side, spike in international oil prices reduces the purchasing power of consumers, thereby reducing the demand for non-tradable as well triggering a fall in prices and ultimately leading to a depreciation of the domestic currency (Igbinovia & Ogiemudia, 2021).

Prior to the crisis of global meltdown, there was stability in exchange rate with high oil price in the Nigerian economy, the arrival of the 2008 financial crisis nosedive oil price and exchange rate caved-in above 20%. Also, the recent economic destabilization as a result of the outbreak of coronavirus (COVID-19) pandemic contributed immensely to the decline in the international oil price during some certain period and also sent both political and economic shock to countries around the world. Narayan, Phan and Sharma (2019) also provided an understanding that a decline in oil price reduces cost of production, influences foreign exchange and increases the economic performance of most developing economy.

Basically, the impact (positive/negative) which oil price volatility could have on any economy depends on what part of the divide such economy falls into and of course the nature of such price change (either increase or decrease). However, the larger percentage of oil producing countries in Africa qualifies as both an oil exporters and importers by reason of the fact that most exports crude oil, but imports refined crude oil products (Sanya & Oloruntuyi, 2017). Therefore, making a conclusive and authoritative statement on the impact of oil price volatility on their foreign exchange become so controversial (Iyoha & Oriakhi, 2013). Similarly, several researchers have also tried to provide an empirical understanding on the effect of oil price volatility on foreign exchange and other macroeconomics related factors in cross country and country specific. For instance, Igbinovia and Ogiemudia (2021) examined the relationship between oil price volatility and exchange rate volatility in Nigeria. In Sierra Leone, Bangura, Boima, Pessima and kargbo (2021) focused on the relationship between modeling returns and volatility transmission from crude oil prices to Leone-US Dollar exchange Sierra Leone. Kutu, Alori and Ngalawa (2021) assessed the Exchange rate response to oil price and political shocks in Nigeria. In Russia, Li (2020) investigated the influence of international crude oil price fluctuation on Russian exchange rate.

Omolade, Ngalawa and Kutu (2019) conducted a study on crude oil price shocks and macroeconomic performance in Africa's oil-producing countries (Algeria, Nigeria, Egypt, Angola, Gabon, Equatorial Guinea and Congo Republic). Abed, Amor, Nouira and Rault (2016) provided an empirical understanding on the Asymmetric effect and dynamic relationship between oil price shocks and exchange rate volatility across selected MENA countries (Tunisia, Morocco, Egypt, Jordan, UAE, Qatar and Saudi Arabia). (See also, Henry 2019; Ahmed, Qaiser & Yaseen, 2016). To this end, the major part of the previous studies has been focused on country specific investigation; this implies that cross sectional investigation is widely open for discussion.

Furthermore, numerous estimation techniques have been adopted in tracking the relationship between oil price and foreign exchange per time in literature; more importantly the GJR-GARCH, GARCH, EGARCH have been adopted in capturing the volatility in oil price (Bangura, Boima, Pessima and kargbo, 2021; Abed, Amor, Nouira and Rault, 2016; Lawal, Somoye and

Vol. 6, No.02; 2022

ISSN: 2456-7760

Babajide, 2016; Ahmed, Qaiser and Yaseen, 2016). Observable, the various approaches employed by these studies can only track the volatility of exchange rate; however, the effect of the volatility is usually determined using a different technique which may not adequately capture the effect of the change. Hence, the researcher sets out to explore the effect of oil price volatility on foreign exchange of major oil producing countries in Africa using the Non-linear Autoregressive Distributed Lag (NARDL) which is scarcely noticed in literature; the technique tracked the volatility of oil price alongside the effect of the variation.

2. Literature Review

Oil Price Volatility

Ogiri, Amadi, Uddin and Dubon (2015) observed that volatility is the measure of the tendency of oil price to rise or fall sharply within a period of time, such as a day, a month or a year. Mgbame, Donwa and Onyeoweni (2015) defines volatility as the standard deviation in a given period and noted that volatility has a negative and significant impact on economic growth instantly, while the impact of oil price changes delays until a year. In a nutshell, volatility is a measurement of the fluctuations (rise and fall) of the price of commodity. Budina and Wijnbergen (2018) opined that the relative boom of the oil sector encouraged excessive government spending; and this resulted in inflation and real exchange rate appreciation. The Organization of Petroleum Exporting Countries (OPEC) attributed the current global crude oil price volatility to continue uncertainty, stemming from the slow pace of global economic growth, continued Eurozone debt crises, high unemployment in advanced economies and the risk of inflation in developing countries. Eagle (2017) explained that oil price fluctuations can lead to a business cycle which is more pronounced in the 1970s thereby creating increasingly erratic with volatility more erratic since 2002. Keji (2018) opined that oil price collapse is said to be the level of distortions that disrupt the smooth flow of goods and services between the demand and supply across the market; which requires active knowledge of efficient energy policy to reinstate stability.

Influential Factors behind Oil Price Volatility

According to Boheman and Maxum (2015), when imbalances in global oil supply and demand occur, there will be an occurrence of volatility in the market. In the following section, influential primary factors that directly or indirectly create imbalances in supply and demand are as follows:

Direct Effects

According to Tang, Wu and Zhang (2010), as quoted by Boheman and Maxum (2015), the world's production capacity following fundamental economics is defined such that an increased oil supply leads to a lowering of price. An interesting aspect related to oil is that its supply is limited to a certain degree, as it is a non- renewable resource. Since the beginning of the 1990s until 2008, no new substantial oil fields were found, and no development within transportation and refining occurred. Consequently, during this period, little improvements were made in the production capacity, making it inadequate compared to the pace of the world's consumption. Nevertheless, in recent years the discovery of new extraction methods for shale oil has significantly affected the oil market. Through the use of cracking and horizontal drilling, it has become easier to extract oil from known but until recently not economically feasible reserves, which led to a substantial increase in oil supply (Boheman & Maxum, 2015).

Vol. 6, No.02; 2022

ISSN: 2456-7760

The Global Economic Growth

Global demand for crude oil directly affects its price, a relationship that can easily be seen by analyzing historical events. Yan (2019) describes how growth leads to an increase in demand for crude oil that may outperform the supply and result in an increase in the oil price. Again, when the world's economic growth and the oil demand stagnated, it resulted in plummeted prices (IFS, 2015). Hence, one can conclude that there exists a clear link between demand and fluctuations in international oil prices.

Indirect Effects

Practices in the future market

Speculations about the future also contribute to price disruptions. The future price of international oil works as a benchmark price when evaluating the current price. For this reason, the spot oil price is significantly affected by the opportunistic factors on the future market (Adeniyi, Oyinola & Omisakin, 2011).

Dollar Exchange Rate Fluctuations

In 1974, the oil price was officially linked with the United States dollar (USD), meaning that most international oil trades were after that invoiced, delivered and settled in USD. Hence, fluctuation in the dollar exchange rate has a direct impact on the global oil price as well as oil policies in exporting and consuming countries (Yan, 2019).

Geopolitical Turbulence

Geopolitical risks add a risk premium to the international crude oil price, making the price higher. Numerous world oil reserves are situated in politically troubled areas, and many of the world's key oil suppliers are regarded as turbulent countries such as Iran, Iraq, Nigeria, Venezuela and Russia. There are both direct and indirect impacts of political and social conflicts affecting the oil price (Umer, 2016).

Organization of Petroleum Exporting Countries (OPEC)

OPEC was founded in 1960, and today it consists of 12 member countries that are considered to be among the leading oil-exporting nations in the world. The organization was established by Iran, Iraq, Kuwait, Saudi Arabia and Venezuela. Today, it also consists of Algeria, Angola, Libya, Nigeria, Ecuador, Qatar and the United Arab Emirates (Ullah, Islam, Alam & Khan, 2017). OPEC is considered to be an oil cartel even though its primary aim was to create a more stable oil market for both consumers and producers. This is accomplished by avoiding market price fluctuations by controlling a substantial share of the total crude oil supply (Ullah, Islam, Alam & Khan, 2017).

Exchange Rate

Exchange rate is the price of a country’s currency in terms of another country’s currency (Ahuja, 2013). Ndubuaku, Onwuka, Onyedika and Chimezie (2019) views exchange rate as the current market price for which one currency can be exchanged for another. The exchange rate

Vol. 6, No.02; 2022

ISSN: 2456-7760

determines how much a country's currency is worth in terms of another country's currency. According to Ahuja (2013), a country may operate the floating or fixed exchange rate system. The floating or flexible exchange rate system allows a currency to adjust freely as determined by the demand for and supply of foreign exchange. The fixed exchange rate is determined by the government through the Central Bank which buys and sells the required quantities of foreign exchange in order to eliminate excess demand or supply.

Oil Price Volatility and Foreign Exchange

For oil exporting countries all things being equal, an increase in the prices of oil should be considered positive while for oil importing countries should be considered as negative and vice versa if there is an abate in the prices of oil. However, the challenge for oil producing nations such as Nigeria is regarded as huge due to the combine effects of the increase in oil price and exchange rate fluctuations on macroeconomic economic stability and economic growth. Nigeria relies heavily on the revenue from oil exports, but, at the same time extensively imports refined petroleum and other related products. Evidence, for instance, shows that Government spending, which hitherto, before 1999 remained well below N0.5 trillion, hit N1.02 trillion mark in 2001 and N1.5 trillion in 2004. The figures for 2006 and 2007 stood at N2.04 and N2.45 trillion respectively. Additionally, the Nigeria's total visible trade between 2000 and 2007, in the oil sub sector total imports – with fuel importation as one of the major factors, accounts for an average of 22.4 percent. Specifically, the sub sector which accounts for 17.5 percent in 2001 and rose to 28.5 percent in 2005. The figures, however, stood at 27.3 percent and 21.2 percent in 2006 and 2007 respectively (Aliyu, 2009).

3. Methodology

In exploring the impact of oil price volatility on foreign exchange of major oil producing countries in Africa, the study adapted and modified the multiple regression model of Henry, (2019) which employed real exchange rate (RER) as a function of volatility of oil price (VCOP), money supply (M_1), gross domestic product (Y_1), interest rate differentials (INRD) and consumer price index (CPI). The model is stated below:

$$RER = f(VCOP, M_1, Y_1, INRD, CPI) \quad \text{---------- 3.1}$$

For the purpose of this study, volatility of crude oil price, money supply and consumer price index will be replaced with crude oil price, broad money supply and inflation rate respectively, while, gross domestic product and interest rate differentials will be dropped totally. Specifically, there is need for the modification of the above model so as to ensure the capturing of high and low volatility in crude oil price, broadly capturing of money supply as well as inflation rather than consumer price index. Hence, real exchange rate (RER), crude oil price (COP), inflation rate (INFR) and broad money supply (BMOS) are considered appropriate to examine the long-run and short-run effect of high and low oil price volatility on foreign exchange of major oil producing countries in Africa (Nigeria and Angola). Thus, the model for this study takes the following form:

Functional Form

Vol. 6, No.02; 2022

ISSN: 2456-7760

$$RER = f(COP, INFR, BMOS) - 3.2$$

For econometrical purpose this model will be restructured as:

$$RER = \beta_0 + \beta_1 COP + \beta_2 INFR + \beta_3 BMOS + \mu - - - - - - - - - - - - - - - - - - 3.3$$

Where:

RER = Real Exchange Rate
COP =Crude Oil Price
INFR =Inflation Rate
BMOS = Broad Money Supply
μ =Error term or stochastic term.
β_0 = intercept or constant parameter estimate
β_1-β_4 = explanatory variables

The NARDL Model

Recently, Shin Yu and Greenwood-Nimmo (2014) advance a Nonlinear Auto-Regressive Distributed Lag cointegration approach (NARDL) as an asymmetric extension to the well-known Auto-Regressive Distributed Lag model of Pesaran and Shin (1998) and Pesaran, Shin and Smith (2001) to capture both long run and short run asymmetries in a variable of interest. Given the multiple regression model in equation 3.3, it will be impossible to capture the asymmetric impact of oil price volatility. To begin with, the first step in the asymmetric cointegrating relationship under the NARDL specification by Shin, Yu and Greenwood-Nimmo (2014) method is to decompose the oil price in Eqn. (3.3) into partial sum processes as follows:

$$RER_t = \theta_0 + \theta_1^+ COP_t^+ + \theta_2^- COP_t^- + \theta_3 INFR_t + \theta_3 BMOS_t + \mu - - - - - - - - - 3.4$$

Where RER is exchange rate and $\theta = (\theta_0, \theta_1, \theta_2, \theta_3, \theta_4,)$ is a cointegrating vector or a vector of long run coefficients to be estimated. The asymmetric impact of oil price volatility will be accounted for by the inclusion of the positive volatility COP_t^+ and negative volatility COP_t^-. Where the COP_t^+ and COP_t^- are partial sums of positive and negative changes in COP_t respectively:

$$COP_t^+ = \sum_{i=1}^{t} \Delta cop_i^+ = \sum_{i=1}^{t} \max(\Delta cop_i, 0) - - - - - - - - - - - - - - - - - - - 3.5$$

and

$$COP_t^- = \sum_{i=1}^{t} \Delta cop_i^- = \sum_{i=1}^{t} \min(\Delta cop_i, 0) - - - - - - - - - - - - - - - - - - - 3.6$$

From the above specification, the magnitude of the long-run relationship between positive shocks in oil price and exchange rate is shown by θ_1, whereas the long run relation between negative shock in oil price volatility and exchange rate is captured by θ_2. Both coefficients are expected to have positive sign, but they are not anticipated to have similar magnitude, i.e. $\theta_1 > \theta_2$, since positive volatility in oil price will have higher effect on value of currency as compared to the exchange rate effect of negative volatility in oil price (Ibrahim, 2015).

Vol. 6, No.02; 2022

ISSN: 2456-7760

Description of Research Variables

The variables for the study are classified into dependent and independent variables. The dependent variable is foreign exchange rate which will be proxy by exchange rate. While, the independent variable is oil price volatility will be proxied by oil price, inflation rate and broad money supply.

Table: 3.2. Description of Variables

Variable	Independent/Dependent Variable	Proxy	Abbreviations
Foreign Exchange	Dependent Variable	Real Exchange Rate	RER
Oil Price	Independent Variable	Crude Oil Price	COP
Inflation	Independent Variable	Inflation Rate	INFR
Money Supply	Independent variable	Broad Money Supply	BMOS

Source: Researcher's Construction (2021)

4. Data Analysis and Discussion

Descriptive Analysis (Nigeria and Angola)

Table 4.1: Descriptive Statistics

	NIGERIA					ANGOLA				
Variable	**Mean**	**Skewness**	**Kurtosis**	**Jarque Bera**	**Prob**	**Mean**	**Skewness**	**Kurtosis**	**Jarque Bera**	**Prob**
RER	5.085	0.827	2.554	2.693	0.260	3.258	-0.480	1.776	2.218	0.329
COP	3.999	-0.435	2.215	1.258	0.533	3.999	-0.435	2.215	1.258	0.533
INFR	4.381	-1.217	5.352	10.504	0.005	2.605	-0.392	2.429	0.862	0.649
BMOS	3.290	0.986	2.727	3.634	0.162	2.951	-0.552	1.631	0.835	0.242

Source: Authors Computation (2022)

Table 4.1 reveals the descriptive statistics of variables relating to Nigeria which is based on 22 observations collected over the period from 1999 to 2020. As reported in the table, average real exchange rate (RER) of Nigeria and Angola for the period under study position at 5.01 and 3.45 percent respectively with minimum and maximum value of 4.53 and 2.59 percent and 5.94 and 3.82 percent respectively. Also, average crude oil price (COP), inflation rate (INFR) and broad money supply (BMOS) of Nigeria and Angola maintained 4.06 percent, 4.49 percent and 2.01 respectively for Nigeria and 4.06 percent, 2.57 percent and 3.11 respectively for Angola. Also, minimum and maximum value reported on table 4.1 positions at 2.89 and 4.72 percent for COP, 1.03 and 6.36 percent for INFR, and 1.99 and 5.78 percent for BMOS. Besides, for Angola it maintained 2.89 and 4.72 percent for COP, 1.68 and 3.21 percent for INFR, and 2.42 and 3.31 percent for BMOS respectively. More so, Skewness statistics reported for Nigeria demonstrated that that RER and BMOS was skewed to the right, while COP and INFR was skewed to the left, while for Angola all the variables are skewed to the left. Also, values obtained as regards

Vol. 6, No.02; 2022

ISSN: 2456-7760

Kutorsis for both countries are less than 3 which indicates a platykurtic distribution, while, Nigeria INFR which is greater than 3 indicates a leptokurtic distribution. Conclusively, reported Jarque-Bera normality distribution test probability values showed that all Nigeria variables are normally distributed except Nigeria inflation rate that was abnormally distributed.

Comparatively, average of all the variables relating to Nigeria was higher than average of all the variables relating to Angola except average broad money supply of Angola that was greater than average broad money supply of Nigeria. However, minimum value of all the variables relating to Angola were greater than minimum value of all the variables relating to Nigeria, except minimum value of Nigeria real exchange rate that was greater than minimum value of Angola real exchange rate. Additionally, maximum value of all the variables relating to Nigeria was greater than maximum value of all the variables relating to Angola. Furthermore, all the variables relating to Angola was skewed to the left, while out of all the variables relating to Nigeria; crude oil price and inflation rate was similarly skewed to the left, while Nigeria real exchange rate and broad money supply was contrarily skewed to the right. However, all the variables relating to Nigeria and Angola showed similar platykurtic distribution except Nigeria inflation rate that disclosed leptokurtic distribution. Likewise, all the variables relating to Nigeria and Angola were normal distributed except Nigeria inflation rate that was abnormally distributed.

Correlation Analysis

Table 4.2: Correlation Matrix

	NIGERIA				**ANGOLA**			
Variables	RER	COP	INFR	BMOS	RER	COP	INFR	BMOS
RER	1.0000				1.0000			
COP	0.3017	1.0000			0.5784	1.0000		
INFR	-0.1405	-0.7597	1.0000		-0.6930	-0.7597	1.0000	
BMOS	0.6642	0.6145	-0.4266	1.0000	0.4101	0.5262	-0.5603	1.0000

Source: Authors Computation (2022)

Estimates from table 4.2 demonstrate the summary of correlation between the variables relating to Nigeria. The correlation between Nigeria real exchange rate (RER), crude oil price (COP), inflation rate (INFR) and broad money supply (BMOS) which ranged from -0.7597 to 0.6642 indicated that the variables employed in the study are not linearly correlated (i.e.< 0.80). Hence, the outcome is sufficient to announce no presence of multicolinearity in the model. The above table also reflects estimates obtained for Angola which suggests that real exchange rate (RER), crude oil price (COP), inflation rate (INFR) and broad money supply (BMOS) which ranged from -0.7597 to 0.5784 indicated that the variables employed in the study are not linearly correlated (i.e.< 0.80). Hence, the outcome is sufficient to announce no presence of multicolinearity in the model. Comparatively, both correlation relationship between Nigeria and Angola exchange rate (RER), crude oil price (COP), inflation rate (INFR) and broad money supply (BMOS) are sufficient enough to announce that there is no multicolinearity in the model relating to Nigeria and Angola.

Vol. 6, No.02; 2022

ISSN: 2456-7760

Unit Root Test

Table 4.3: Summary of Unit Root Test Results

	NIGERIA					ANGOLA				
	At Level		At First Difference			At Level		At First Difference		
Variable	PP Stat.	Crit. Value	PP Stat	Crit. value	Order	PP Stat.	Crit. Value	PP Stat	Crit. value	Order
RER	0.6265	-2.6461	-3.0045	-2.6504	I(1)	-3.1352	-3.0123	-4.0639	-3.0206	I(0)
COP	-2.2701	-2.6461	-3.8835	-2.6504	I(1)	-2.2701	-3.0123	-3.8835	-3.0206	I(1)
INFR	-1.9810	-2.6461	-3.8735	-2.6504	I(1)	-2.1242	-3.0123	-3.2110	-3.0206	I(1)
BMOS	-3.2548	-2.6461	-3.5550	-2.6504	I(0)	-1.1511	-3.0123	-3.7000	-3.0206	I(1)

Source: *Authors Computation (2021)*

Unit root test shown in table 4.3 indicated that the model under Nigeria, only broad money supply (BMOS) is stationary at level since the calculated PP statistics of the variable at level is greater than the critical value, while real exchange rate (RER), crude oil price (COP) and inflation rate (INFR) are stationary at first difference because the PP statistics of the variables at first difference are greater than the critical values. Also, the model under Angola indicated that real exchange rate (RER) is stationary at level since the calculated PP statistics of the variable at level is greater than the critical value, while the variables of COP, INFR and BMOS are stationary at first difference because the PP statistics of the variables at first difference are greater than the critical value.

However, relatively it is crystal clear that the variables under Nigeria and Angola are stationary at mixed order of integration and the economic implication of this is that any shock or disturbance (e.g. government policy) to the variables will not be sustained for a long period of time meaning such shock will die off in a short while. Thus, following the confirmation of the variables being integrated at mixed order of integration [i.e. I(0) and I(1)], Non-Linear Autoregressive Distributed Lag (NADRL) bound cointegration test was adopted to capture the presence of cointegration as against Johansen cointegration.

NARDL Bound Test for Cointegration

Table 4.4 NARDL Bound Test Result

	NIGERIA				ANGOLA				
	Critical Value Bounds				Critical Value Bounds				
Null Hypothesis	F-Stat	Sig	Lower Bound I(0)	Upper Bound I(1)	F-Stat	Sig	Lower Bound I(0)	Upper Bound I(1)	Decision
No co-integration	**8.8016**	10%	2.45	3.52	**28.6708**	10%	2.45	3.52	There is co-integration
		5%	2.86	4.01		5%	2.86	4.01	
		2.5%	3.25	4.49		2.5%	3.25	4.49	
		1%	3.74	5.06		1%	3.74	5.06	

Source: *Author's Computation, (2021)*

Vol. 6, No.02; 2022

ISSN: 2456-7760

From table 4.4 revealed above, result of the computed F-statistics of 8.801624 was obtained for Nigeria is obviously greater than the any of the upper and lower bound level of significance and this implies that the coefficients of the long run equation is not equal to zero and is sufficient enough to reject the null hypothesis of no cointegration. Furthermore, the same estimation revealed that the result of the computed F-statistics of 28.67081 for Angola is obviously greater than the any of the upper bound level of significance and this implies that the coefficients of the long run equation is not equal to zero and is sufficient to announce that there is a co-integration between the dependent and independent variables. In relative terms, this implies that the alternative hypothesis of the existence of a unique cointegration relationship between foreign exchange and the independent variables of crude oil price, inflation rate and broad money supply is upheld across the two models relating to Nigeria and Angola. Also, this means that the null hypothesis of no co-integration is rejected under the two models. In the light of this conclusion, this study employed the Non-Linear Autoregressive Distributed Lag (NARDL) long run and short run Error Correction Model (ECM) which captured the long run and short run relationship between oil price volatility and foreign exchange of major oil producing countries in Africa (Nigeria and Angola).

Long Run Estimation Coefficients

Table 4.5: NARDL Long Run Coefficients

Dependent Variable: *RER*

	NIGERIA				**ANGOLA**			
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	Prob.	Coefficient	**Std. Error**	**t-Statistic**	**Prob.**
COP_POS	0.0489	0.1661	0.2945	0.7758	1.6645	1.9746	0.8429	0.4211
COP_NEG	-0.8101	0.1805	-4.4879	0.0020	-1.7548	1.6810	-1.0438	0.3238
INFR	0.1699	0.1706	0.9960	0.3484	5.0375	5.6558	0.8906	0.3963
BMOS	-0.5000	0.3649	-1.3700	0.2079	4.5386	5.8678	0.7734	0.4591
C	0.040864	0.016178	2.525806	0.0355	0.026870	0.047001	0.571693	0.5854

Source: *Author's Computation, (2021) from Eview 10, Statistical Package*

The result in table 4.11 indicates the non-linear autoregressive distributed lag model with long-run elasticities of variables relating to Nigeria. It was discovered that high volatility in oil price (COP_POS) exerts a positive but insignificant effect on real exchange rate of Nigeria (RER) in the long run at 5% level of significant with reported coefficient estimate 0.0489($p=0.78>0.05$). On the other hand, the study found that low volatility in oil price (COP_NEG) exerts positive and significant effect on real exchange rate (RER) of Nigeria in the long-run at 5% level of significant with reported coefficient estimate -0.8101($p=0.00<0.05$). Additionally, inflation rate (INFR) exert a positive but insignificant effect on real exchange rate of Nigeria (RER) in the

Vol. 6, No.02; 2022

ISSN: 2456-7760

long-run at 5% level of significant with reported coefficient estimate 0.1699(p=0.35>0.05). Conclusively, broad money supply (BMOS) exert a negative and insignificant effect on real exchange rate of Nigeria (RER) in the long-run at 5% level of significant with reported coefficient estimate -0.5000(p=0.21>0.05).

As demonstrated in the same table, results of the non-linear autoregressive distributed lag model with long-run elasticities for variables relating to Angola suggests high volatility in oil price (COP_POS) exerts a positive but insignificant effect on real exchange rate of Angola (RER) in the long run at 5% level of significant with reported coefficient estimate 1.6645(p=0.42>0.05. Contrarily, low volatility in oil price (COP_NEG) exerts positive but insignificant effect on real exchange rate (RER) of Angola in the long-run at 5% level of significant with reported coefficient estimate -1.7548(p=0.32>0.05). Similarly, inflation rate (INFR) exerts a positive but insignificant effect on real exchange rate of Angola (RER) in the long run at 5% level of significant with reported coefficient estimate 5.0375(p=0.40>0.05). On the other hand, broad money supply (BMOS) exerts a positive but insignificant effect on real exchange rate of Angola (RER) in the long run at 5% level of significant with reported coefficient estimate 4.5386(p=0.46>0.05).

In relative terms, 1% high volatility in international crude oil price will bring about 4.89% minimal increase but insignificant effect on real exchange rate of Nigeria in the long-run. While, 1% high volatility in international crude oil price will bring about 166.45% higher increase but insignificant effect on real exchange rate of Angola in the long run. On the other hand, 1% low volatility in international crude oil price will lead to 81.01% higher increase and significant effect on real exchange rate of Nigeria in the long-run. While, 1% low volatility in international crude oil price will lead to 175.48% higher increase but insignificant effect on real exchange rate of Angola in the long-run. Furthermore, 1% increase in inflation rate of Nigeria will bring about 16.99% minimal increase but insignificant effect on real exchange rate of Nigeria in the long-run. While, 1% increase in the inflation rate of Angola leads to 503.75% higher increase but insignificant effect on real exchange rate of Angola in the long run. Conclusively, 1% increase in broad money supply of Nigeria will bring about 50.00% minimal decrease and insignificant effect on real exchange rate of Nigeria in the long-run. While, 1% increase in the broad money supply of Nigeria leads to about 453.86% higher increase but insignificant effect on real exchange rate of Angola in the long run.

Short Run Error Correction Model (ECM) Estimate (NARDL)

Table 4.6: Short Run Estimates (NARDL Approach)

Dependent Variable: *D (RER)*

	NIGERIA				**ANGOLA**			
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	Prob.	Coefficient	**Std. Error**	**t-Statistic**	**Prob.**
D(RER(-1))	0.742962	0.167484	4.43602	0.0022	1.051433	0.127561	8.24262	0.0001
D(COP_POS)	-0.210933	0.056857	-3.70991	0.0060	-0.240249	0.155861	-1.54143	0.1671
D(COP_NEG)	-0.193605	0.056290	-3.43942	0.0088	-0.051127	0.132929	-0.38461	0.7119
D(INFR(-1))	0.123963	0.027072	4.57899	0.0018	0.394464	0.057683	6.83853	0.0002
D(BMOS(-1))	-0.252912	0.054163	-4.66949	0.0016	0.724882	0.201303	3.60094	0.0087
ECT(-1)	-1.150047	0.310097	-3.70867	0.0060	-1.719539	0.443064	-3.88102	0.0060

Source: *Author's Computation, (2021)*

The above table 4.6 indicates the NARDL short run model for variables relating to Nigeria alongside the error correction term pertaining to the study. Specifically, it revealed that the current period value of high volatility in oil price D(COP_POS) exerts a negative but significant effect on the current period value of real exchange rate of Nigeria D(RER) in the short run at 5% level of significant with reported coefficient estimate -0.2109(0.00<0.05). Contrarily, current period value of low volatility in oil price D(COP_NEG) exert positive and significant effect on the current period value of Nigeria real exchange rate D(RER) in the short run at 5% level of significant with reported coefficient estimate -0.1936(p=0.01<0.05). More so, it was discovered that the previous value of inflation rate in Nigeria at one year lag period D(INFR(-1)) exerts a positive and significant effect on the current real exchange rate D(RER) of Nigeria in the short run at 5% level of significant with reported coefficient estimate 0.1240(p=0.00<0.05). On the other hand, the previous value of broad money supply in Nigeria at one year lag period D(BMOS(-1)) exerts a negative but significant effect on the current real exchange rate D(RER) of Nigeria in the short run at 5% level of significant with reported coefficient estimate -0.2529(p=0.01<0.05).

Again, the error correction term which denotes the speed of adjustment in the long run reported a correct sign (-) and significant value at 5% level of significant for the model which corresponds with theoretical *apriori* expectation. The value of the coefficient for variables relating to Nigeria is -1.1500(p=0.01<0.05) and this result indicates that about 115% disequilibria in real exchange rate of Nigeria in the previous year are corrected in the current year. The significance of the ECM is a confirmation of the existence of a long run relationship between the foreign exchange of major oil producing countries in Africa and the explanatory variables.

Besides, the NARDL short run model for variables relating to Angola alongside the error correction term pertaining to the study. Specifically, the study unraveled that the current period value of high volatility in oil price D(COP_POS) exerts a negative and insignificant effect on the current period value of real exchange rate of Angola D(RER) in the short run at 5% level of significant with reported coefficient estimate -0.2402(0.17>0.05). Contrarily, current period

Vol. 6, No.02; 2022

ISSN: 2456-7760

value of low volatility in oil price D(COP_NEG) exerts positive but insignificant effect on the current period value of Angola real exchange rate D(RER) in the short run at 5% level of significant with reported coefficient estimate -0.0511(p=0.71>0.05). Additionally, the previous inflation rate value of Angola at one year lag period D(INFR(-1)) exerts a positive and significant effect on the current real exchange rate D(RER) of Angola in the short run at 5% level of significant with reported coefficient estimate 0.3945(p=0.00<0.05). On the same vein, the previous value of broad money supply in Angola at one year lag period D(BMOS(-1)) exerts a positive and significant effect on the current real exchange rate D(RER) of Angola in the short run at 5% level of significant with reported coefficient estimate 0.7249(p=0.01<0.05).

Furthermore, the error correction term which denotes the speed of adjustment in the long run reported a correct sign (-) and significant value at 5% level of significant for the model which corresponds with theoretical *apriori* expectation. The value of the coefficient for variables relating to Angola is -1.7195(p=0.01<0.05) and this result indicates that about 172% disequilibria in real exchange rate of Angola in the previous year are corrected in the current year. The significance of the ECM is a confirmation of the existence of a long run relationship between the oil price volatility and foreign exchange of major oil producing countries in Africa.

Relatively, 1% rise in the current high volatility in international crude oil price induce 21.09% decrease but significant effect on the current value of Nigeria real exchange rate in the short run, while, 1% rise in the current high volatility in international crude oil price induce 24.02% decrease and insignificant effect on the current value of Angola real exchange rate in the short run. On the other hand, this implies that 1% increase in the current low volatility in international crude oil price induce 19.36% increase and significant effect on the current value of Nigeria real exchange rate in the short run, while 1% increase in the current low volatility in international crude oil price induce 5.11% increase but insignificant effect on the current value of Angola real exchange rate in the short-run. Again, 1% change in the first previous period value of inflation rate of Nigeria leads to 12.40% increase and significant effect on the current value of Nigeria real exchange in the short-run. Also, 1% change in the first previous period value of inflation rate of Angola leads to 39.44% increase and significant effect on the current value of Angola real exchange rate in the short-run. More so, 1% change in the first previous period value of broad money supply in Nigeria leads to 25.29% decrease but significant effect on the current value of Nigeria real exchange rate Nigeria in the short-run. While, 1% change in the first previous period value of broad money supply in Angola leads to 72.49% increase and significant effect on the current value of Angola real exchange rate in the short-run

Finally, the error correction term which denotes the speed of adjustment in the long run reported a correct sign (-) and significant value at 5% level of significant for the two models relating to Nigeria and Angola correspond with theoretical *apriori* expectation. The value of the coefficient for models relating to Nigeria and Angola indicates that about 115% and 172% disequilibria in real exchange rate of Nigeria and Angola respectively in the previous year are corrected in the current year. The significance of the ECM is a confirmation of the existence of a long run relationship between the foreign exchange of major oil producing countries in Africa and oil price volatility.

Vol. 6, No.02; 2022

ISSN: 2456-7760

Post Estimation Tests

Table 4.7: Post Estimation Results

Linearity Test		
Statistics	***Values***	***Probability***
F-statistic	0.7237 (0.1450)	0.4231 (0.883)
Normality Test		
Statistics	***Values***	***Probability***
Jarque-Bera Stat	1.2713 (0.4933)	0.5296 (0.7814)
Serial Correlation LM Test		
Statistics	***Values***	***Probability***
F-statistic	1.9294 (3.6736)	0.2254 (0.1811)
Heteroscedasticity Test		
Statistics	***Values***	***Probability***
F-statistic	0.4589 (0.8315)	0.8763 (0.6060)

Source: *Author's Computation, (2021) from Eview 10 Statistical Package*

The post-estimation diagnostics results presened in table above revealed that the model of variables relating to Nigeria and Angola (estimates obtained for Angola is enclosed in bracket. At 5% level of significant, has no problems of incorrect specification (linearity test) with F-statistics and probability value of 0.7237 and 0.1450 with probability values of 0.42 and 0.88 for Nigeria and Angola respectively. No problem of instability or abnormal data distribution (normality test) with JB statistics and probability value of 1.2713 and 0.4944 with probability values of 0.53 and 0.78 respectively for Nigeria and Angola. There exists no problem of serial autocorrelations (Breusch-Godfrey Serial Correlation LM Test) with F-statistics and probability value of 1.9294 and 3.6736 alongside probability values of 0.23 and 0.18 respectively. Conclusively, we could announce that there is no problem of heteroscedasticity (Hetereoskedasticity Test) with F-statistics and probability value of 0.4589 and 0.8315 with probability values of 0.88and 0.60 respectively for Nigeria and Angola. Comparatively, the outcome of the post estimation test was sufficient enough to announce that the two models adopted in the study are correctly specified, normally distributed and not serially correlated.

Summary and Implication of Findings

This study empirically investigated the effect of oil price volatility on foreign exchange of major oil producing countries in Africa (Nigeria and Angola) from 1999 to 2020. The independent variable of oil price volatility was proxied by crude oil price (COP), dependent variable of foreign exchange was proxied by foreign exchange (RER), while, inflation (proxy by inflation rate (INFR) and broad money supply (BMOS) were controlled to ensure accurate and un-spurious analysis. Also, diverse estimation techniques were adopted to provide concrete analytical support for the subject matter under review. Specifically, in order to capture the volatility in oil price, Non-Linear Autoregressive Distributed Lag model was adopted and it estimated high and low volatility in oil price as well as its effect on foreign exchange of Nigerian and Angola within the period under study. Additionally, correlation analysis outcome revealed

Vol. 6, No.02; 2022

ISSN: 2456-7760

that there is no presence of multicolinearity in the two model adopted because the all the correlation coefficient are lesser than 0.8.

Furthermore, evidence from Phillips-Perron (PP) unit root test indicated that both model under Nigeria and Angola are stationary at mixed order of integration {i.e. I(0) and I(1)}. Hence, the result of the Phillips-Perron unit root test sufficiently nullified the rule of thumb in accepting Johansen cointegration and validated the acceptance rule of Non-Linear autoregressive distributed lag (NARDL) base on the mixed order of integration. Furthermore, NARDL bound cointegration test was conducted and it disclosed that there is an evidence of long run relationship among the employed variables in the model under Nigeria and Angola. Specifically, the estimated result of the NARDL bound cointegration test indicated that there is sufficient evident to reject the null hypothesis of no cointegration which implies that the variables co-move in the long run both for the model under Nigeria and Angola. Also, this result validated the empirical findings of. Specifically, this empirical outcome is consistent with Bouzid (2012); Aimer (2016) Kibunyi, Nzai and Wanjala (2018) and Ikechi and Anthony (2020) that there exists a long run co-integration relationship between oil price volatility and economic growth of Nigeria.

Additionally, NARDL long run and short run outcome indicated that the effect of the high volatility in crude oil price on Nigerian foreign exchange was negatively significant in the short run but positively insignificant in long run. On the other hand, the effect of the high volatility in crude oil price on Angola foreign exchange was negatively insignificant in the short, but positively insignificant in the long run. Contrarily, low volatility in crude oil price exerts a positive and significant effect on foreign exchange of Nigeria in the short run and long run. While, low volatility in oil price exerts a positive but insignificant effect on foreign exchange of Angola in the short run and long run.

More so, the effect of inflation rate on foreign exchange of Nigeria and Angola was positively significant in the short run, but positively insignificant in the long run. Conclusively, the effect of broad money supply on foreign exchange of Nigeria was negatively significant in the short run, but negatively insignificant in the long run. On the other hand, the effect of broad money supply on foreign exchange of Angola was positively significant in the short run but positively insignificant in the long run.

Evidence from the Non-Linear Autoregressive Distributed Lag Model (NARDL) that capture the asymmetric effect of oil price volatility on foreign exchange of major oil producing countries in Africa (Nigeria and Angola) in the long run and short run indicated that in Nigeria, the effect of Kthe high volatility in crude oil price on foreign exchange was negatively significant in the short run but positively insignificant in the long run. In Angola, the effect of the high volatility in crude oil price on foreign exchange was negatively insignificant in the short run but positively insignificant in the long run. This result is in variance with the *apriori* of positive expectation on foreign exchange of major oil producing countries in Africa (Nigeria and Angola) and comparatively, it implies that Nigeria has exported lesser crude oil during the inception of high volatility in the international crude oil price and as such reduces the demand for foreign currencies that in turn increase the value of the Naira against foreign currencies to large extent,

Vol. 6, No.02; 2022

ISSN: 2456-7760

while in the long run and due to the higher dependency of the Nigeria economy on crude oil, there has been more exportation of crude oil during the high volatility in the international crude oil price and as a result of this, increases the demand for foreign currency that in turn reduces the value of the Naira against foreign currencies to some extent.

However, Angola has exported lesser crude oil during the inception of high volatility in the international crude oil price which has resulted in lesser demand for foreign currencies and in turn increases the value of Angolan Kwanza against foreign currencies to some extent, while in the long run and due to the increase in the production of crude oil, there has been more exportation of crude oil during the high volatility in the international crude oil price which has led to the higher demand for foreign currencies which in turn reduces the value of Angolan Kwanza against foreign currencies to some extent.

On the other hand, in Nigeria, low volatility in international crude oil price exerts a positive and significant effect on foreign exchange of the country in the short run and long run. Contrarily, in Angola, low volatility in international crude oil price exerts a positive but insignificant effect on foreign exchange of the country in the short run and long run. This result is consistent with positive *apriori* expectation and comparatively, it implies that Nigeria has exported more crude oil during the inception and in the long run of low instability in international crude oil price which has increases the demand for foreign currencies and as such reduces the value of Naira against foreign currencies to a very large extent due to the level of its significant. Similarly, Angola has exported more crude oil during inception and long run low instability in the international crude oil price and as a result increases the demand for foreign currencies that in turn reduces the value of Angolan Kwanza against foreign currencies but to some extent due to the level of it's significant.

Furthermore, it was discovered that inflation exerts a positive significant effect on the foreign exchange of Nigeria and Angola in short run but a positively insignificant effect on foreign exchange of Nigeria and Angola in the long run. This result agrees with the positive *apriori* expectation and comparatively, it implies that both at the inception and over time, reduction in the purchasing power of Naira and Angolan Kwanza coupled with the persistent increase in the general price of goods and services due to higher importation of most of the product at higher cost in the major oil producing countries in Africa has led to an increase in the demand for foreign currencies which in turn reduces the value of Naira and Angolan Kwanza against foreign currencies. Also, this discoveries agrees with the empirical findings of Osigwe (2015); Ahmed, Qaiser and Yaseed (2016); Li (2020) but disagrees with the empirical outcome in the studies of Ayeni (2018); Vaz (2019); Omolade, Ngalawa, Kutu (2019); Igbinovia and Ogiemudia (2021).

Conclusively, the effect of broad money supply on foreign exchange of Nigeria was negatively significant in the short run but negatively insignificant in the long run. While, the effect of broad money supply in Angola was positively significant in the short run but positively insignificant in the long run. This outcome is in variance with the positive *apriori* expectation and comparatively, it implies that in Nigeria money in supply at the inception was substantial enough to foster domestic productivity that in turn reduces the demand for foreign currencies to a large extent and as such increases the value of Naira against foreign currencies at the inception. While

Vol. 6, No.02; 2022

ISSN: 2456-7760

in the long run, the level of the insignificant effect on the value of Naira against other foreign currencies could be traced to the insufficient locally made product or lack of encouragement for the consumption of locally made product produced/manufactured from the total money in circulation. In Angola on the other hand, the total money circulation has not been directed for domestic production and as such increases the demand for foreign product and currencies that in turn reduces the value of Angolan Kwanza against foreign currencies. Also, this empirical finding is consistent with the empirical finding of Henry (2019).

Conclusion and Recommendations

This study has empirically investigated the effect of high and low oil price volatility on foreign exchange of major oil producing countries in Africa (Nigeria and Angola). The dependent variable of foreign exchange was captured using real exchange rate; independent variable of oil price volatility was represented with crude oil price while, inflation and broad money supply that has an influence on foreign exchange were held as control variables. Premise upon the results obtained in this study, the study concludes that oil price volatility when segregated into high and low volatility in oil price and its effect of the foreign exchange of major oil producing countries in Nigeria and Angola. In Nigeria, the effect of high oil price volatility on the foreign exchange of the country was negatively significant in the short run but positively significant in the long run. While, in Angola, the effect of high crude oil price volatility on the foreign exchange of the country was negatively insignificant in the short run but positively insignificant in the long run.

On the other hand, in Nigeria, low volatility in oil price exerts a positive and significant effect on the foreign exchange of the country in the short run and long run. While, in Angola, low volatility in oil price exerts a positive but insignificant effect on foreign exchange of the country. Generally, this study concludes that high oil price volatility has a negative effect on foreign exchange of major oil producing countries in Africa in the short run but a positive effect on the foreign exchange of major oil producing countries in Africa in the long run, while low volatility has a positive effect on the foreign exchange of major oil producing countries in Africa both in the short run and long run.

Premise on the discoveries of this study, the following are recommended:

i. Resources should be channeled to the real sectors of the major oil producing countries in Africa so as to ensure more production of domestic product that could reduce the demand for foreign product and currencies.
ii. Major oil producing countries in Africa should avoid those activities or introduction of policies that would lead to the reduction in the purchasing power of their currency.
iii. The license for the production of crude oil in the major oil producing countries in Africa should not be placed in fewer hands so as to encourage competition.

References

Adeniyi O., Oyinlola, A. & Omisakin, O. (2011). Oil price shocks and economic growth in Nigeria: Are thresholds important? *OPEC Energy preview*, *3*(5), 308-333. DOI: 10. 11 11/j.1753 0237 .2011 .00192

Vol. 6, No.02; 2022

ISSN: 2456-7760

Ahmed, R., Qaiser, I. & Yaseen, M. (2016). Nexus between exchange rate volatility and oil price fluctuations: evidence from Pakistan. *Pakistan Journal of Commerce and Social Sciences, 10*(1), 122-148.

Ahuja, H. L. (2013). Exchange rate management on economic growth of Indian. *Modern Economics, 10*(4), 545-560.

Aliyu, S. (2009). Impact of oil price shock and exchange rate volatility on economic growth in Nigeria: an empirical investigation. *Journal of International Studies Issue 1*(10), 4-15.

Aron, J., MacDonald, R. & Muellbauer, J. (2014). Exchange rate pass-through in developing and emerging markets: a survey of conceptual, methodological and policy issues, and selected empirical findings. *Journal of Development Studies, 1*(5), 101-143.

Ayeni, O. D. (2018). Oil price shocks, exchange rate volatility and investment in Nigeria. *Munich Personal RePEc Archive, Paper No. 99462*.

Bangura, M., Boima, T., Pessima, S. & Kargbo, I. (2021). Modeling returns and volatility transmission from crude oil prices to leone-us dollar exchange rate in Sierra Leone: a GARCH approach with structural breaks. *Modern Economy, 1*(2), 555-575.

Beckmann, J. & Schüssler, R. (2016). Forecasting exchange rates under parameter and model Uncertainty. *Journal of International Money and Finance, 6*(9), 267-288.

Boheman, H. & Maxum, J. (2015). Oil price shocks effect on economic growth: OPEC versus non-OPEC economy. *International Journal of Economic and Development, 2*(1), 12-22.

Budina, N. & Wijnbergen, S. (2018). Managing oil revenue volatility in Nigeria: the role of fiscal policy. *International Journal of Finance and Management, 2*(6), 10-37.

CBN. (2014), Statistical Bulletin, Various Edition. Abuja: Central Bank of Nigeria.

Eagle, B. (2017). Oil price volatility and macroeconomy: Tales from top two oil producing economies in Africa. *Journal of Economics and Financial Studies 5*(4), 45-55.

El Abed, R. Amor, T. H. Nouira, R. & Rault, C. (2016). Asymmetric effect and dynamic relationships between oil prices shocks and exchange rate volatility: Evidence from some selected MENA countries. *Topics in Middle Eastern and African Economies, 18*(2), 1-25.

Henry, J. T. (2019). Impact of oil price volatility on exchange rate in Nigeria. *International Journal of Research and Innovation in Social Science, 3*(2), 1-16.

IFS (2015). Macroeconomic impact of oil price levels and volatility in Nigeria. *International Journal of Academic Research in Economics and Management Sciences, 2*(4), 9-20.

Igbinovia, I. M. & Igbinovia, L. E. (2019). Oil price volatility and stock market returns in an emerging economy: evidence from Nigeria. *Sriwijaya International Journal of Dynamic Economics and Business, 3*(3), 193-206.

Igbinovia, L. E. & Ogiemudia, A. O. (2021). Oil Price and Exchange Rate Volatility in Nigeria. *Oradea Journal of Business and Economics, 6*(1), 74-86.

Keji, S. A. (2018). An empirical analysis on the nexus between oil price collapse and economic growth in Sub-Saharan African oil based economies. *Journal Perspektif Penbiayaan dau Pembangunan Daerah 5*(4), 300-313.

Kutu, A. A. & Alori, D. A. & Ngalawa, H. (2021). Exchange rate response to oil price and political shocks: what can Nigeria do? *Journal of Life Economics, 8*(2), 237-246. DOI: 10.15637/jlecon.8.2.08.

Lawal, A. I., Somoye, R. O. C. & Babajide, A. A. (2016). Impact of oil price shocks and exchange rate volatility on stock market behavior in Nigeria. *Binus Business Review, 7*(2), August 2016, 171-177.

Mgbame, C. O., Donwa, P. A. & Onyeoweni, O. V. (2015). Impact of oil price volatility on economic Growth: conceptual perspective. *International Journal of Multidisciplinary Research and Development, 2*(9), 80-85.

Musgrave, R. A. & Musgrave, P. B. (2004). *Public Finance in Theory and Practice* (5thed.). Tata New Delhi: McGraw-Hill Publishing Company Limited.

Narayan, P. K., Phan, D. H. B. & Sharma, S. S. (2019). Does Islamic stock sensitivity to oil prices have economic significance? *Pacific-Basin Finance Journal, 5*(3), 497–512

Ndubuaku, V. C., Onwuka, K., Onyedika, C. & Chimezie, I. C. (2019). Impact of exchange rate fluctuation on selected economic sectors of the Nigerian economy. *Public and Municipal Finance, 8*(1), 21-36.

Ogiri, I. H., Amadi, S. N., Uddin, M. M. & Dubon, P. (2015). Oil price and stock market performance in Nigeria: An empirical analysis. *American Journal of Social and Management Sciences 4*(1), 20-41.

Ogundipe, O. M., Ojeaga, P. & Ogundipe, A. A. (2014). Oil price and exchange rate volatility In Nigeria. *Journal of Economics and Finance, 5*(4), 01-09.

Omojimite, B. U. & Akpokodje, G. (2010). The impact of exchange rate reforms on trade performances in Nigeria. *Journal of Social Sciences, 2*(3), 2-10.

Omolade, A., Ngalawa, H., & Kutu, A. (2019). Crude oil price shocks and macroeconomic performance in Africa's oil-producing countries. *Cogent Economics & Finance, 8*(7), 1-17.

Osigwe, A. C. (2015). Exchange rate fluctuations, oil prices and economic performance: empirical evidence from Nigeria. *International Journal of Energy Economics and Policy, 5*(2), 502-506.

Pesaran, M. H. & Shin, Y. (1998). An autoregressive distributed-lag modelling approach to cointegration analysis. *Econometric Society Monographs, 3*(1), 371–413.

Pesaran, M. H., Shin, Y. & Smith, R. J. (2001). Bounds testing approaches to the analysis of level relationships. *Journal of Applied Econometrics, 1*(6), 289–326

Sanya, O. & Oloruntunyi, A. O. (2017). Oil price volatility and macroeconomic performance in two top net oil producing countries in Africa. *Int. Eco. Res, 8*(3), 59-79.

Vol. 6, No.02; 2022

ISSN: 2456-7760

Sathyanarayana, S., Harish, S. N. & Gargesh, S. (2018). Volatility in crude oil prices and its impact on Indian stock market: evidence from BSE SENSEX SDMIMD. *Journal of Management, 9*(1) 65-87.

Shin, Y., Yu, B. & Greenwood-Nimmo, M. (2014). Modelling asymmetric cointegration and dynamic multipliers in a nonlinear ARDL framework. In *Festschrift in honor of Peter Schmidt*, 281-314. New York, NY: Springer.

Tang, W., Wu, L. & Zhang, Z. (2010). Oil price shocks and their short-and long-term effects on the Chinese economy. *Energy Economics, 2*(6), 2-15.

Ullah, G. M. W., Islam, A., Alam, M. S. & Khan, M. K. (2017). Effect of macroeconomic variables on stock market performance of SAARC countries. *Asian Economic and Financial Review, 7*(8), 770-777.

Umer, M. (2016). Macroeconomic variables impact on stock market performance in the short & long run: A Pakistan perspective. *Research Journal of Finance and Accounting, 7*(11), 10–22.

Vaz, I. O. (2019). Implications of oil price shocks in the key macroeconomic variables of African oil exporting countries. *International Journal of Business and Economics Research 8*(2), 58-64.

Yan, J. A. (2019). Quantmod: quantitative financial modeling framework: R package version. *Contemporary Education and Culture, 9*, 4-15.