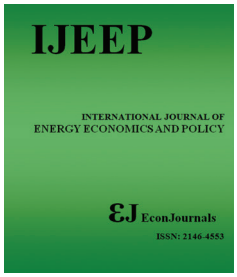

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Moving from Symmetric to Asymmetric Nexus between Oil Price, Exchange Rate and Government Spending in Developing Economy with Focus on Economic Sustainability

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ABSTRACT

Over the past few decades, many developing countries, especially Nigeria, have continuously grappled with sustaining their economies financially despite huge proceeds from the exportation of crude oil and other mineral resources. Leading to under-performance and inefficiencies in these economies. This forms the backdrop for this study, which investigates the link between the oil price, exchange rate, and government spending in Nigeria. To achieve this, the research analysed annual frequency data between 1981 and 2022 using auto-regressive distributed lag (ARDL) and Non-Linear Auto-regressive distributed lag (NARDL) models after checking for unit-root properties. Findings show that oil price (both in linear and non-linear investigations) correlated positively but cannot explain government spending. The exchange rate has a direct and significant linear and non-linear influence on government spending. Given these findings, policies on government spending should be channeled towards sustainable economic diversification to prevent future shocks in the exchange rate and oil price.

Keywords: Sustainable Economic Growth, SDG-8, Dynamic Multiplier, Oil Price, Resource Curse, Shock Evolution
JEL Classifications: C32, E3, E4

1. INTRODUCTION

Globally, one of the major sources of energy, has remained oil over the last four decades, constituting about 33% of the total energy use in the world (BP Statistical Review of World Energy, 2017). In Nigeria, oil has been one of the major revenue sources and has accounted for more than 75% income from crude oil export since its 1956 discovery at Oloibiri (Akinleye and Ekpo, 2013; Odularu, 2008). However, previous studies have observed the interplay and the behavioural pattern of oil price and exchange rates with their significant effects on government spending tendencies. A declining exchange rate encourages export growth, and a rising exchange rate discourages import growth. Therefore, a swing in oil prices caused by currency depreciation may result in an enormous shift in revenue from import-dependent to export-dependent nations (Manasseh et al., 2018; Aliyu, 2009).

An acknowledged rationale in the literature is that oil wealth with stable exchange rate should generate income for oil exporting emerging countries, which in turn should boost government spending. Nigerian government, on several occasions, have persistently adjusted her expenditure based on the relative

modifications in both currency rate and price of oil (Oluwagbade et al., 2023; Orhewere and Ogbeide-Osaretin, 2020). The spending of the government exhibits a propensity to vary in accordance with fluctuations in oil prices (Adedokun, 2018).

No doubt, the price of oil has been subjected to various fluctuations over time as a result of external factors such as OPEC, COVID-19, shale oil, and the activities of pipeline vandals. The price of crude has recently dropped sharply between July 2014 and March 2020, which has severely impacted Nigeria's economy. This is especially true in terms of foreign reserves, the value of local currency, and government revenue. As a result, the government's ability to meet its financial obligations has been weakened, and there is a significant deficit in infrastructure development (Osundina and Osundina, 2014).

The available research findings on global and Nigerian economy indicate that the correlation between government spending and variations in oil prices, as reported in existing research, yields a combination of good and negative outcomes (Oluwagbade et al., 2023). In spite of the growing new discoveries of proven crude oil reserves hovering between 37 and 42.5 billion barrels with production capacities between 2.1 and 3 million barrels a day, Nigeria is still faced with the challenge of funding for sustainable economic growth (Dauda, 2017).

For instance, available statistical data as shown in Figure 1 indicated that the price of Forcados oil reached its maximum ($114.21) in 2012 and minimum ($12.63) in 1998. The official exchange rate and government spending were both at minimum (0.67 and $11.4 respectively) in 1981 and maximum (426 and $44,431.2 respectively) in 2022.

Based on the forgoing, the research seeks to find the linkages among changes in oil-price, currency rate and public expenditure through the following reasons as regards economic development in Nigeria. First, studies on emerging oil exporting countries, especially Nigeria, are inadequate that relate oil price, exchange rate and government spending. The reason why proceeds from oil revenue may not have significant effect on public expenditure may lie with the non-examination of the intermediating function of the rate of exchange.

Second, the reasons for mixed views in literature may lie on the tool of analysis and or in the asymmetrical relationships amongst these variables. Several previous studies have analysed the dependence of the country on revenue from crude oil (Babatunde et al., 2020; Onyeiwu, & Oladimeji, 2018; Aregbeyan and Fasanya, 2017; Adeniyi et al., 2011; Olomola and Adejumo, 2006; Ayadi, 2005). Only a few studies have provided evidence that an asymmetrical link exists between crude oil prices and government expenditures (Muhammad et al., 2023).

Finally, this study is needed as a tool for policy formulations as it will reconcile the conflicting findings in the literature regarding exchange rate–oil price, oil price-government spending and the dynamic relationship that exist among them.

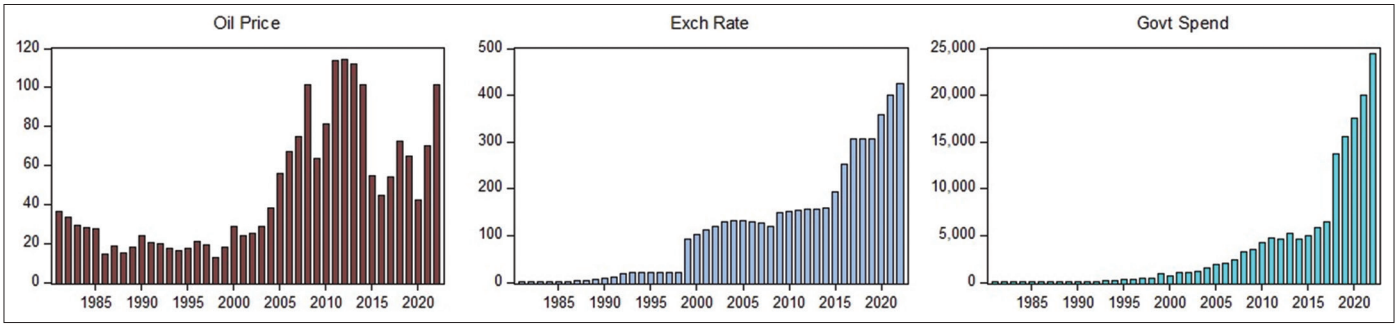
Therefore, this study is necessary as it analyses the nexus among oil price-exchange rate-government spending. Specifically, to: Investigate the linear response of government spending to oil price and exchange rate changes; examine non-linear influences of oil price fluctuations on public spending; and investigate government spending response to nonlinear changes in exchange rate in Nigeria.

The remainder of this study are organised in the following manner: part two covers the literature on the theoretical underpinning and reviews of empirical research regarding the relationships amongst the price of oil, exchange rate and government spending. Methodology to the research is provided in section three. The fourth portion includes econometric evaluation of the results and findings. Finally, summary and recommendation originating in the investigation form section five.

2. REVIEW OF RELATED LITERATURE

Prior research relating to volatility in oil-price, variations in currency rate, and government spending has shown inconclusive and divergent findings. There is evidence from various studies (Abu et al., 2022; Aluthge et al., 2021; Erdogan et al., 2020; Jibir and Aluthge, 2019') suggesting that oil-price changes impact positively on government spending. Also, fluctuations in government expenditure are related to parameters like oil subsidy (Namovsky, 2018). Some researchers have concluded that volatility in oil prices do not substantially affect government spending (Mohammad and Sani, 2020; Adedokun, 2018). Several sources in the literature recommend that there is a connection between oil price volatility and changes in currency rate (Suleman, 2012; Olomola and Adejumo, 2006). Also, it has been argued

Figure 1: Percentage change in "oil price, exchange rate and government spending"



Source: Computation from E-views 13 by the author, 2023

that uncertainties in interest rates have a role to play in the in determining oil price (Qadan and Cohen, 2024) and real economy (Qadan et al., 2023; Anis, 2020). However, certain studies argue that an asymmetrical link between crude-oil price and government expenditure exist (Muhammad et al., 2023).

2.1. Empirical Reviews

Empirically, many scholars have looked extensively at the link exchange rate has with oil price by noting their symmetrical and asymmetrical connections. Abubakar (2019), for instance, considered the asymmetric dynamics in exchange rate and oil price utilising TAR, MTAR and SVAR, he opined no asymmetric connection within exchange rate-oil price nexus although observed favourable symmetrical shocks to both oil price-exchange rate nexus in Nigeria. Similarly, non-linear and linear connection were examined in currency rate-energy prices nexus by Wang and Wu (2012). They examine daily data spanning from January 2, 2003, to June 3, 2011, using linear Granger causality and Diks and Panchenko's nonlinear causality. Findings of their study revealed a single causal direction running from oil prices towards the currency rate during the pre-2008 crisis period, but after this period, a non-linear, two-directional causality was discovered between the exchange rate and the price of oil.

Abiodun and Emmanuel (2020) examined and assessed the implications of oil revenue on spending by the government in Nigeria for the time frame spanning 1980-2018 and using ARDL model, their study showed that non-oil revenue, oil revenue, exchange rate, and public spending connect directly. Similar short-run investigation by Brahmasrene et al. (2014) were analysed based on the US exchange rates and Crude oil prices from five country sources. They employ VAR methods on monthly data set between January 1996 and December 2009. Findings from their result revealed a unidirectional cause from exchange rate to oil prices, but medium and long-term fluctuations in oil prices were significantly observed to affect the undulating currency rate.

Lizardo and Mollick (2010) analysed nations exporting and importing oil using panel data. their results indicated that increasing oil price had exchange rate appreciating influence on nations exporting oil while devaluing currency of nations with oil import. In a comparable line, Syed et al. (2012) applied SVECM methodology and observed that favourable changes to oil price have a declining short run influence on exchange rate.

Along a similar vein, Tiwari et al. (2013) investigated the impact of oil prices on Romania's actual exchange rate using Wavelet modelling. The outcome shows that the price of oil has a big influence on the exchange rate over the long and short term. Beckmann and Czudaj (2013) also used the Markov-Switching VECM approach and found that the nominal oil prices are the source of time-varying causality patterns that flow from the nominal exchange rate angle. Using the TAR and MTAR models, Ahmad and Hernánadez (2013) investigated the long-term asymmetric swings in the price of oil and the exchange rate of 12 important producing and consuming countries. Their study's conclusions showed that asymmetries existed in Brazil, Nigeria, and the UK even with modification after a positive shock to oil prices than a negative one.

In a different study, Adedokun (2018) evaluated the influence of oil revenue (hence oil price) shocks on the dynamic connection between revenue from government and spending by government employing SVAR and VECM from 1981 to 2014. His findings suggested that shocks to oil price and changes in public spending are not connected in the short period. His result further revealed that revenue from oil surges indicates a very important prediction ability. In addition, he also presents evidence of short-run budgetary synchronization-hypothesis involving the revenues from oil and total government spending. Similar research has investigated OECD nations on the link within oil price and bilateral currency rate. Chen, et al. (2016) revealed that U.S. currency rate against 16 OECD nations differ greatly which is contingent on changes influenced by demand-supply aggregate (but not with oil price shocks) accounting for approximately 10-20% deviations in rates of exchange in long-term.

With the use of an error-correction model and multivariate co-integration analysis, Hamdi and Sbia (2013) investigate the links in the dynamic form between economic growth, public expenditure and oil income in Bahrain Kingdom. The outcome demonstrates that oil income continues to be the primary driver of the nation's economy and the primary means of funding public spending. Similarly, variance decomposition and impulse response functions analyses approaches were executed by Farzanegan (2011) to study the dynamic influence of oil-price-shocks on various categories of Iranian government spending. His analysis demonstrates that whereas components of social spending have no significant reaction to shocks in oil prices or income but spending on security and military in Iran do.

Manasseh et al. (2018) studied fluctuations in oil price and how exchange rate responds to these changes with the use of yearly data which spans between 1970 and 2013. They employed EGARCH and their results, however, revealed the exchange rate displaying fluctuations of 16%. Their study also indicated that an increase of 10% in the price of oil makes the currency rate rise to about 19% in the long run. Evidence from their research showed that oscillation in oil price market does not explain the market in exchange rate in Nigerian economy. Notwithstanding, they opined that favourable links exist between economic performance, exchange rate and oil price.

Suleman (2012) analysed the connection in oil prices and exchange rates within the Nigerian economy by employing information spanning the years 2007 to 2011. The study uses exponential-GARCH and GARCH methods in analysing oil price fluctuations effect on the currency nominal rate. His results showed that increasing oil price caused the Nigerian naira to decrease in value compared to the US currency. Trung and Vinh (2011), similarly, examined the influence of inflation, oil prices and exchange rate on GDP in Vietnam by employing a VAR method. Data from each month between 1995 and 2009 was utilised. Their findings indicate that actual exchange rate and price of crude oil exert a substantial and statistically significant influence on activities in

the economy. The study found Vietnam's economy being affected greatly by fluctuations in the value of the money than by changes in the oil price.

In 2016 by Obi et al. demonstrates that the interest rate disparity is both considerably relevant in giving an explanation about exchange rate fluctuations. Nevertheless, Varela (2007) revealed an indirect but valid effect of currency rate fluctuation on output. Effect of these changes in exchange rate has no bearing with the level of productivity. In 2013, Oyeyemi additionally explored the expansionary crude oil-price-shock effects on Nigeria. They did so utilising multiple OLS model. The research revealed that small shock in world market through oil price creates an extended impact on growth in the economy. To this point, he advised for policymakers and the government officials to conceive of strategies that can broaden production assets of a country to offer up increasing potential for influx of revenue to the country. Using the variance decomposition approach, Olomola and Adejumo (2006) assert in a similar study that REXR is susceptible to shocks in oil prices in Nigeria. Also, further examination demonstrates that the surge in oil prices affects the government spending decisions considerably through its currency rate. Influence was minor in the 4th period, while 8th and 10th contributed roughly 10% and 17% correspondingly to difference in the local supply of currency.

Muhammad et al. (2023) assess the response of Nigeria's public spending to the positive and negative oil-price shocks between 1981 and 2019 using N-ARDL model. Their study revealed that both the negative and positive changes in oil-price have favourably exerting influence on government spending, however, exchange rate as an intervening variable does not have any significant effect on total government expenditure. Their study also revealed the presence of nonlinear link in crude oil price on government expenditure. They recommended that policy makers have to focus on deepening the sector of oil and gas with more interest on policies that will bring stability in the structure of the Nigerian macroeconomy, by specifically focusing on another sources income and ensuring governance has fiscal discipline.

Using impulse response function, variance decomposition and vector autoregressive model (VAR), Raouf (2021) examined how changes in oil prices affected government expenditure components in oil-exporting and oil-importing states between 1980 and 2018. His work highlighted how oil price shocks affect both capital and ongoing government expenditures, whereas the great bulk of earlier research concentrated on how these shocks affect government spending. It was discovered that in the two groupings of nations, shocks to the oil-price had a favourable influence on government recurrent spending. Under the nations that export oil, it has a favourable impact on government capital spending; in nations that import oil, it has a negative impact. According to Raouf (2021), oil money has a significant impact on the yearly government budgets of several nations worldwide. Without a question, oscillation in oil prices significantly has effects on government decisions about how much money to spend on investment or consumption. The findings show that in nations that export oil, the money received from rising oil prices contributes to both an acceleration of economic development and a rise in current and capital spending-put another way, the government will utilise this money to expand spending and investment.

However, for nations that import oil, rising oil prices will have two distinct effects on growth rates: first, they will limit the amount of money that can be used to purchase the raw materials needed for production, and second, they will limit the amount of money that can be invested. Qwader (2018) used yearly data from 1992 to 2015 to examine how changes in oil prices affected several aspects of the Jordanian budget through the application of ordinary least squares. The primary findings show that upward movement in oil prices is statistically significant and beneficial to government expenditure, tax revenue, and foreign assistance. Shocks to price of oil is also statistically significant but inversely influencing budget deficits.

Erdogan et al. (2020) investigated the connection arising from oil price volatility and military spending in the GCC (Oman, Saudi Arabia, Bahrain, Kuwait United Arab Emirates and Qatar) utilising ARDL techniques. The results indicate that cointegrating link exist between military spending and oil price across all nations. Furthermore, the long-term findings demonstrated that military spending is favourably impacted by oil price volatility in every nation save Bahrain. Their error correction result revealed that oil prices and military spending are inversely correlated. These results showed that military spending in GCC nations has not decreased despite fluctuations in oil prices. Only military spending is recorded in relation to all government spending on budget execution. Furthermore, the analysis solely considers the OPEC spot price as a possible oil price. Adedokun (2018) used structural VAR (SVAR) to analyse information from data between 1981 and 2014 so as to examine the dynamic connection arising from shocks to oil-price on the income and expenditure of Nigeria's government. The short-term fluctuations in government spending could not be predicted by oil price shocks, according to the SVAR results. However, oil revenue has a very significant short- and long-term predictive power on government spending. Information about causal link was not shown by the structural VAR (SVAR) used in this investigation.

Using the VIX style and the CBO's 10-year Treasury Note Volatility Futures Index (VXTYN), Qadan and Cohen (2024) examined how interest rate uncertainty affected US crude oil prices between 2003 and 2020. Their findings are strong and show that dropping oil prices and future high volatility in those prices are predicted by increasing interest rate volatility. Likewise, Qadan et al. (2023) use VIX-style TLT ETF (iShares 20+year Treasury Bond ETF) techniques to quantify interest rate volatility and its impact on the US real economy from July 2003 to September 2021. They conclude that changes in interest rates are a reliable indicator of downturns in important economic sectors such as retail sales, industrial output, and producer and consumer pricing.

2.2. Summary of Literature

Mixed views still exist in the literature regarding the relationship between oil price, currency exchange and public spending. For instance, Babatunde et al. (2020), Aregbeyan and Fasanya (2017),

Adeniyi et al. (2011), Olomola and Adejumo (2006), and Ayadi (2005) opined that Nigeria and other emerging crude oil exporting economies mostly rely on tax-revenue from crude oil to finance their cooperate responsibilities. Other studies conclude that oil price has a big influence on the value of a country's currency (Muhammad et al., 2023; Raouf, 2021; Abiodun and Emmanuel, 2020; Brahmasrene et al., 2014; Tiwari et al., 2013; Suleman, 2012; Syed et al., 2012; Lizardo and Mollick, 2010). Some argued otherwise that there is no appreciable difference in exchange rate between economies exporting oil and non-oil exporting nations (Manasseh et al., 2018). Still, a few argued that exchange rate channel does not explain the changes in government spending (Muhammad et al., 2023; and Chen et al., 2016).

Also, it has been argued that uncertainties in interest rate have a role to play in the in determining oil price (Qadan and Cohen, 2024) and real economy (Qadan et al., 2023). Although, studies have a broad agreement that oil price with exchange rates could cointegrate and jointly form a linear combination to determine variability in the effect of government policy (Abubakar, 2019) only few provided suggestive decisions as to how nonlinearity in oil prices and exchange rate can affect government spending (Muhammad et al., 2023). Table 1A outlines a summary synopsis on the related literature appended in the appendix section.

3. METHODOLOGY AND DATA

3.1. Data Collection Procedures and Limitations

The study area is Nigeria and will cover from 1981 to 2022 using annual data series. As a country specific study that focus on Nigeria, the selection of the data range is as a result of the significance of the period in relation to the study as it spans through periods of major recent oil booms and recessions during which Nigeria experienced some levels of variations in oil revenue and fluctuations in exchange rates which affected government spending. Also, the reason for selecting the data period is premised on data accessibility specifically as it covers periods when the records for government spending begun in Nigeria.

Data was sourced through secondary data published in the Statistical Bulletins of these organisations such as: World Development Indicator (WDI, 2023); Energy Institute (2023), and Central Bank of Nigeria (Central Bank of Nigeria, 2023). This allows the study the opportunity of having first-hand information on the data which is free from manipulations and or missing figures. The data are measured as follows: OILPF is crude oil price of the Nigerian Forcados; OEXGR represent official (Dollar to Naira) exchange rate; and GOVTS denotes total government spending.

The research covers only 42 years period due to data availability in Nigeria. This research also lacks historical quarterly data for the study period.

3.2. Theoretical Foundation

This research utilizes "the theory of wealth transmission channel" proposed by Krugman (1983) and Golub (1983) and modified by Abed et al. (2016). The concept of "the transmission of the balance of payment channel in the oil price to exchange rate" was introduced by Krugman (1983). According to Krugman (1983) and Golub (1983), this transmission channel-also referred to as "wealth transmission channel"-moves wealth, as oil prices appreciates, from nations that import oil to those that export it Abed et al. (2016). A favourable shock to the value of oil causes the currency of a nation that imports oil to loss value in relation to that of the nation that exports. Nonetheless, the degree of dependent on oil measures the amount of value lost in currency. Conversely, in economies exporting oil, the value of its legal tender tends to increase relative to her oil importing counterpart, although the extent of this appreciation is dependent on the country's imports of products other than oil (Fratzscher et al., 2014).

Scholars that support the elasticity related-channel of oil price-exchange rate hinge basically on the propensity at which import demand of oil for a country varies. Abed et al. (2016) argue that if there is oil price rise and the demand for import for oil is elastic, oil demand can decline which can lead to currency appreciation or at least clear out the impact of this oil-price rise. However, if demand for oil import is non-elastic, decline in currency value may occur in the oil-importing nation due to increase in oil-price.

Based on these theoretical points of views, the following Cobb-Douglass equation is specified as:

$$Govts = f(oilpf, oexgr) \quad (1.1)$$

Where *oilpf* represents crude oil price of the Nigerian Forcados; *oexgr* signifies official (Dollar to Naira) exchange rate; and *govts* denotes government spending.

This equation (1.1) forms the bases of the research in equation

3.3. Econometric Techniques and Data Analysis

This research uses ADF and PP unite-root tests to ascertain the stationarity properties of the data variables. Afterwards the ARDL and N-ARDL methods are used in the research to estimate the variables. Unlike some other models like VAR, the ARDL framework is a helpful tool for concurrently evaluating the short- and long-run impacts of variables and how these variables affect each other. It helps with collinearity and model misspecification problems and operates with mixed orders of lags.

Equation of the research in equation (1.1) can be modified as:

$$\Delta govts_t = \hbar + \tau(\Delta oilpf_t) + \alpha\ (\Delta oexgr_t) \quad (1.2)$$

Wherein:

Δ = difference operator, $\Delta oilpf_t$ represents crude oil price of the Nigerian Forcados; $\Delta oexgr_t$ signifies change in official (Dollar to Naira) exchange rate; and $\Delta govts_t$ denotes total government spending, $\hbar$ represent the constant term.

Equation (1.2) can be remodified econometrically as:

$$\Delta govts_t = \hbar + \tau(\Delta oilpf_t) + \alpha\,(\Delta oexgr_t) + \varepsilon_t \quad (1.3)$$

Where ε_t denotes error term.

3.3.1. Linear ARDL test

ARDL model from equation (1.3) can be specified as:

$$\Delta govts_t = \hbar + \sum_{i=1}^{p} a_{1i}\Delta govts_{t-i} + \sum_{i=1}^{q} a_{2i}\Delta oilpf_{t-i} + \sum_{i=1}^{r} a_{3i}\Delta oexgr_{t-i} + \lambda govts_t + \tau oilpf_t + \alpha oexgr_t + \varepsilon_t \quad (1.4)$$

Where: λ, τ, and α represents long-run parameters of government spending, oil-price and Dollar to Naira exchange rate. α_{1i}, α_{2i} and α_{3i} represent the short-run parameters of government spending, price of oil-price and Dollar to Naira exchange rate. $\sum$ shows summation signs that correspond to the region of short-run estimates, while the part of equation (1.4) that does not have a summation sign represents the region of long-run estimates. The order processes are represented by *p*, *q* and *r*.

3.3.2. Non-linear ARDL test

This study adopts the specification of Non-linear ARDL (N-ARDL) techniques developed by (Shin et al., 2014; Umar and Dahalan, 2016). NARDL makes distinction between long and short-term changes of explained and the explanatory variables. NARDL method allows combination of different integration orders, and it also allows incorporating the likelihood of non-linear negative and positive variations in independent variables and their influence on the explained variables, unlike that of ARDL. Additionally, it resolves multicollinearity challenges via the selection of proper lag order. Further, the NARDL technique offers a graph of cumulative dynamic multipliers that are used to track trends in readjustment to independent variables after the positive and negative shocks.

Arising from the equation (1.4) Non-Linear ARDL can be specified as

$T_t^+ = (T_{1t}^+, T_{2t}^+)$ and $T_t^- = (T_{1t}^-, T_{2t}^-)$. The VAR order (ρ)

$$T_t^+ = \lambda + \gamma_1 T_{t-1}^+ + ... + \gamma_p T_{t-1}^+ + e_t^+ \quad (1.5a)$$

$$T_t^- = \partial + \delta_1 T_{t-1}^- + ... + \delta_p T_{t-1}^- + e_t^- \quad (1.5b)$$

Where T_t^+ and T_t^- in equations (1.5a and 1.5b) respectively indicate positive and negative vectors. ∂ and λ are vectors of constant parameters for the negative and positive equations shown respectively. In the context of integrated variables analysis, the symbol γ *and* δ represents a vector of parameters that need to be estimated. Also e_t^+ and e_t^- denotes the corresponding vectors representing the positive and negative error parts for the stationary variable's changes as well as the cumulative total of the positive and negative shocks.

4. RESULTS PRESENTATION AND DISCUSSION

According to the PP and ADF results, all of the variables have no unit root and exercise stationarity at level (Table 1).

4.1. Linear ARDL Test amongst Oil Price, Exchange Rate and Government Spending ARDL Bound Test

Table 2 indicates long term connection amongst oil-price, currency rate and government spending. F-statistic (26.4) value exceeds (at 1%) the upper limit of the critical value (7.3). We therefore accept the alternative hypothesis of long-term link and reject the null of no long-term relationship (no cointegration) in the equilibrium relationship between spending by government, exchange rate and oil price.

4.1.1. ARDL cointegration series

Further cointegration test using the result of the cointegration series model specified as: *CE* = *GOVTS*(−1) − (0.145729**OILPE* + 0.177552**OEXGR*) indicated that all the variables cointegrate

Table 1: Unit root result

Variable	ADF level	Order (1)	PP level	Integration order	
				Order (1)	Order
GOVTS	−7.6873***		−7.5846***		I (0)
OILPF	−5.1154***		−5.6620***		I (0)
OEXGR	−6.0549***		−6.0513***		I (0)

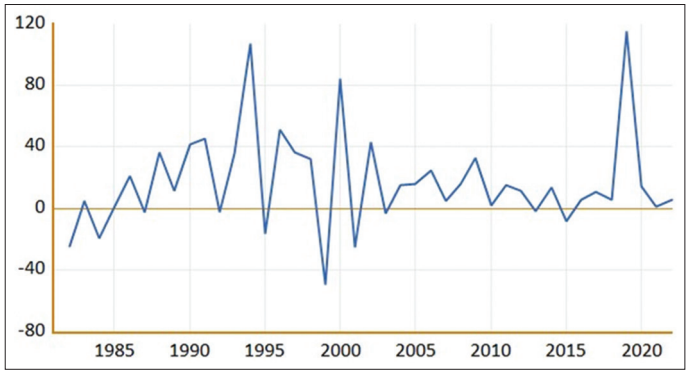
Source: Computation from E-views 13 by the author, 2023. ***1% significance level

Table 2: ARDL bound test result

Explained: GOVTS	HO: No levels relationship amongst variables		
F-stat	26.393528***		
Critical Values	Level	I (0)	I (1)
-	10%	3.373	4.377
	5%	4.133	5.260
	1%	5.893	7.337

Source: Computation from E-views 13 by the author, 2023. ***1% significance level

Figure 2: Auto-regressive distributed lag cointegrating series



Source: Computation from E-views 13 by the author, 2023.
*Coefficients are derived from the conditional error correction regression

in the longer term. This can, is shown in Figure 2 indicating that our series cointegrate during the study period. This result supports the ARDL Bounds test in Table 2.

4.1.2. Result of linear ARDL

The empirical results for the linear ARDL in Table 3 show that the price of the Nigerian Forcados oil is positively correlated but cannot explain the level of government spendings during long and short run periods. This conforms with resource-curse and Dutch disease syndrome as emphasized by Olomola and Adejumo (2006) and Ayadi (2005) that shocks to price of oil are known to exacerbate Dutch disease syndrome.

The official exchange rate displays favourable and significantly linear influence on government spending in shorter (0.2080) and longer run (0.1776) periods at 1% and 5% significance levels correspondingly. This signals that a percentage increase in exchange rate will bring about 20% and 18% positive changes in government spending during short and long run. Also, the coefficient (21.4240) of the constant in the model is highly significant and positive (P = 0.00) indicating that government spending will increase by 21.42% even when oil price and exchange rate were zero. Additionally, error correction term (−1.171610) is significant and negative but exhibit more than 100% (specifically about 117%) adjustment to revert back to its equilibrium. This suggests that the equilibrium is reached in a progressively less fluctuating form (supporting the views of Narayan and Smyth, 2006).

Table 3: Linear auto-regressive distributed lag error correction result

Explained: GOVTS				
Explanatory variables	**OILPF**	**OEXGR**	**C**	**ECT***
Short period				
Coefficient	0.1707	0.2080	21.4240	
P	0.2671	0.0105	0.0005	
Long period				
Coefficient	0.1457	0.1776		−1.1716
P	0.2658	0.0160		0.00

Source: Computation from E-views 13 by the author, 2023. ***1% significance level. ARDL cumulative dynamic multiplier

Table 4: N-ARDL bounds test result

Explained: GOVTS	**HO: No levels relationship amongst variables**		
F-stat		12.723238***	
Critical Values	**Level**	**I (0)**	**I (1)**
-	10%	2.427	3.395
	5%	2.893	4.000
	1%	3.967	5.455

Source: Computation from E-views 13 by the author, 2023

4.1.3. ARDL cumulative dynamic multiplier (CDM)

ARDL CDM measures government spending's response to a unite change in positive symmetric cumulative differences in oil-price and currency rate over the research period. The marginal contribution of oil price on government spending over 40 year period is shown in Figure 3a, while the marginal contribution of exchange rate on government spending is shown in Figure 3b. These cumulative dynamic multipliers are important as they give helpful perspectives into the long-run impacts of alterations in currency rate and oil-price on the response to government spending.

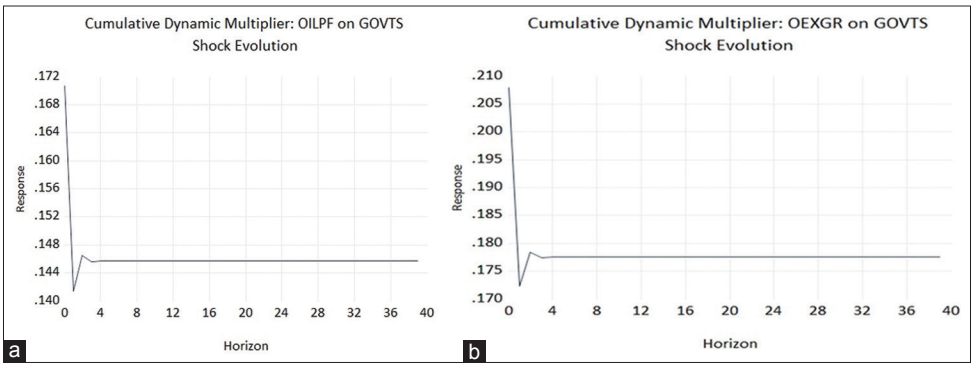
4.1.4. Test for N-ARDL bounds

Table 4 is the test for Non-linear Bounds of ARDL indicating the asymmetric long-run relationships amongst oil-price, currency rate and government spending in the model. The F-stat (12.72) is more than both the upper and lower limits of critical value (5.46) and (3.97) at 1% level of significance. Since long-run equilibrium link amongst oil-price, exchange rate, and government spending has been established, the study accepts the alternative hypothesis and rejects the null-hypothesis of no cointegration. Also, the N-ARDL cointegrating series result in Figure 4 support the bounds test that the non-linear series generated from the linear model cointegrate in the long run.

4.1.5. N-ARDL results

Findings from the empirical results provided in Table 5 disclosed that both short and long-term changes (positive and negative) in oil-

Figure 3: (a) auto-regressive distributed lag (ARDL) cumulative dynamic multiplier (oil price on government spending). (b) ARDL cumulative dynamic multiplier (exchange rate on government spending)



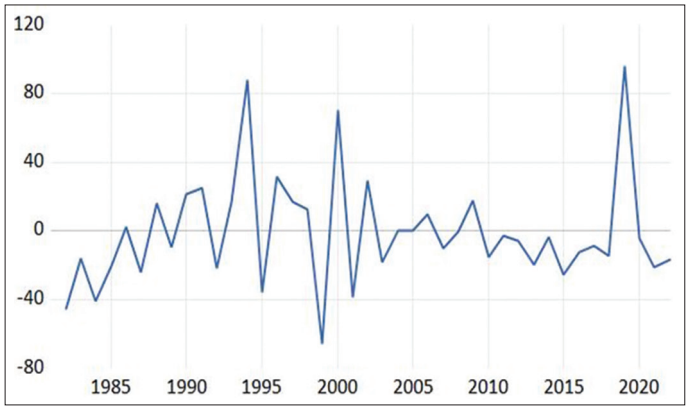
Source: Computation from E-views 13 by the author, 2023

price are insignificant but favourably relate to government spending. This does not negate the earlier linear result.

The positive values of exchange rate have significant and favourable asymmetric impact on government spending during short (0.1842) and longer run (0.1549) terms at 5% significance. This connotes that a percentage favourable changes in exchange rate will bring about 18.4% short-run and 15.49% long-run changes in government spending. Consequent upon these positive changes in exchange rate, the negative changes also have positive short-run (0.2185) and long-run (0.1870) impact on government spending. This portends that with weaker domestic currency, government does not have any incentive to spend more as a way of stimulating the economy due to expensive imports so as to potentially improving the trade balance. This result reflects the increasing funding of government spending through borrowing (about 10.73% quarterly growth in public debt-National Bureau of Statistics, NBC 2023) and the increasing dominance of non-oil revenues over the past few years averaging 93.37% 2022 (NBC 2023).

Additionally, error correction term (−1.1685) is negatively significant but exhibit more than 100% (about 117%) adjustment to revert back to its equilibrium. This suggests that the equilibrium is reached in a progressively less fluctuating form (supporting the views of Narayan and Smyth, 2006).

Figure 4: N-auto-regressive distributed lag cointegrating series

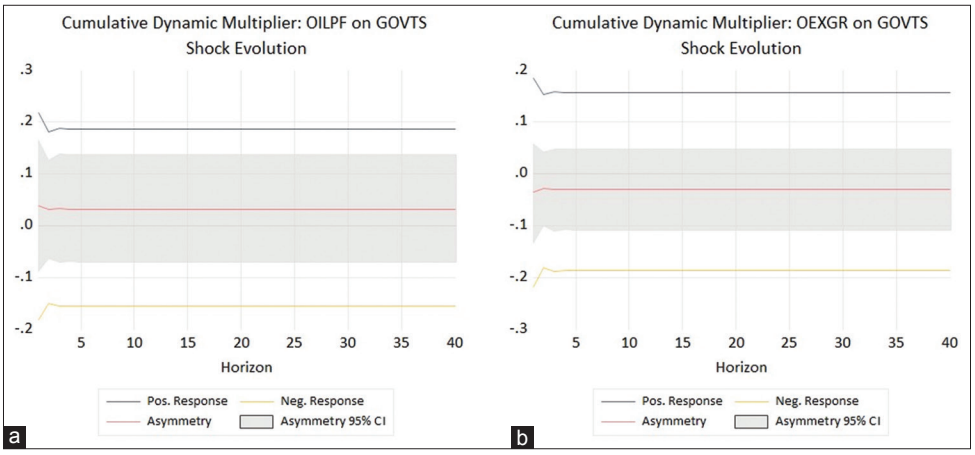


Source: Computation from E-views 13 by the author, 2023

4.1.6. N-ARDL cumulative dynamic multiplier (CDM)

Figure 5a and b depicts shock evolution and dynamic multiplier effect which measure government spending's response to a unite change in positive asymmetric cumulative differences and negative asymmetric cumulative difference in oil-price and currency rate, and the response to a unit negative change in cumulative differences in the negative asymmetric cumulative difference. The marginal contribution of non-linear price of oil over government spending over 40 year period is shown in Figure 5a, while the marginal contribution of the rate of exchange over government spending is shown in Figure 5b. The upper and the lower limits represent government spending's response to changes in the asymmetric positive and negative values of oil-price (in Figure 5a) and exchange rate (in Figure 5b). Shaded region is the region of

Figure 5: (a) Oil price on government spending. (b) Exchange rate on government spending



Source: Computation from E-views 13 by the author, 2023

Table 5: Non-linear auto-regressive distributed lag error correction result

	Explained: GOVTS					
Explanatory variables	**OILPF+**	**OILPFt−**	**OEXGRt+**	**OEXGRt−**	**C**	**ECT***
Short period						
Coefficient	0.2188	0.181	0.1842	0.2185	26.7664	
P	0.2098	0.275	0.042	0.0132	0.0083	
Long period						
Coefficient	0.1872	0.1549	0.1577	0.1870		−1.1685
P	0.2097	0.2725	0.0506	0.02		0.00

Source: Computation from E-views 13 by the author, 2023. ***1% significance level

asymmetry at 95% confidence interval. The line (red) depicts line of asymmetric which falls within the bounds.

5. CONCLUSION

The study examined the nexus amongst the Nigerian Forcados's oil price, exchange rate and government spending in Nigeria within 1981 and 2022 annual year period. In order to effectively carry out this study and achieve its objectives, the study employed the ARDL and N-ARDL models after checking the variables stationarity properties using Phili-Perron (PP) and ADF unit root tools.

The empirical results based on this research show that, for the non-linear and linear study, the price of the Nigerian Forcados oil positively correlated but cannot explain the level of government spendings during long and short run periods. Notwithstanding, the rate of exchange has positive and significant linear and non-linear impact on the way government of Nigeria spends to achieve her macroeconomic objectives. This result reflects the increasing funding of government spending through borrowing (about 10.73% quarterly growth in public debt) and the increasing dominance of non-oil revenues over the past few years averaging 93.37% in 2021 and 2022.

Given these findings, the research concludes that fluctuations in the Nigerian Focardos oil-price correlated positively but not enough to explain government spendings, and that exchange rate has strong link with government spending. Overall, since government spending is crucial in reshaping economic and social landscape of modern economies, much of the policies on spending should be channeled towards economic diversification to prevent the challenges that comes with fluctuations in currency rate.

REFERENCES

Abed, R.E., 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), 1-10.

Abiodun, E.A., Emmanuel, O. (2020), Government expenditure and oil revenue in Nigeria. East African Scholars Journal of Economics, Business and Management, 3(5), 420-426.

Abu, N., David, J., Sakanko, M.A., Amaechi, B.O.O. (2022), Oil price and public expenditure relationship in Nigeria: Does the level of corruption matter? Economic Studies (Ikonomicheski Izsledvania), 31(3), 59-80.

Abubakar, A.B. (2019), Oil price and exchange rate nexus in Nigeria: Are there asymmetries. CBN Journal of Applied Statistics, 10(1), 1-15.

Adedokun, A. (2018), The effects of oil shocks on government expenditures and government revenues nexus in Nigeria (with exogeneity restrictions). Future Business Journal, 4(1), 219-232.

Adeniyi, O., Oyinola, A. and Omisakin, O. (2011), Oil Price Shocks and Economic Growth in Nigeria: Are Thresholds Important? OPEC Energy Review, 35, 308-333.

Ahmad, A.H., Hernandez, R.M. (2013), Asymmetric adjustment between oil prices and exchange rates: Empirical evidence from major oil producers and consumers. Journal of Financial Markets, Institutions and Money, 4(27), 306-317.

Akinleye, S.O., Ekpo, S. (2013), Oil price shocks and macroeconomic performance in Nigeria. Economía Mexicana Nueva Época, 2, 565-624.

Aliyu, S.U.R. (2009), Impact of oil price shock and exchange rate volatility on economic growth in Nigeria: An empirical investigation. Research Journal of Internatıonal Studıes, 2(1), 4-15.

Aluthge, C., Jibir, A., Abdu, M. (2021), Impact of government expenditure on economic growth in Nigeria, 1970-2019. CBN Journal of Applied Statistics, 12(1), 139-174.

Anis, A. (2020), Governance of public spending avenues by oil prices, oil revenues, and GDP in Saudi Arabia: Proportionate sensitivity and trend analysis. Investment Management and Financial Innovations, 17(4), 152-164.

Aregbeyan, O., Fasanya, O.I. (2017), Oil price volatility and fiscal behaviour of government in Nigeria. Asian Journal of Economics Modelling, 5(2), 118-134.

Ayadi, F.O. (2005), Oil price and Nigerian economy. OPEC Reviews, 3(29), 199-217.

Babatunde, D., Olayeni, R.O., Falade, O.E. (2019), Dynamic relationship among oil wealth, capital accumulation and economic growth in Nigeria. IFE Journal of Economics and Finance, 4(8), 1-10.

Beckmann, J., Czudaj, R. (2013), Oil prices and effective Dollar exchange rates. International Review of Economics, 27(1), 621-636.

BP Statistical Review of World Energy. (2017), 66th ed. Available from: https://statisticalreviewofworldenergy [Last accesses on 2023 Jul 06].

Brahmasrene, T., Huang, J., Sissoko, Y. (2014), Crude oil price and exchange rates: Causality, variance decomposition and impulse response function. Energy Economics, 44(1), 407-412.

Central Bank of Nigeria. (2023), Statistical Bulletin Central Bank of Nigeria. 2022 Statistical Bulletin: Public Finance Statistics. Nigeria: Central Bank of Nigeria.

Chen, H., Liu, L., Wang, Y., Zhu, Y. (2016), Oil price shocks and US dollar exchange rates. Energy, 112, 1036-1048.

Dauda, R.S. (2017), Poverty and economic growth in Nigeria: Issues and Policies, Journal of Poverty, 21(1), 61-79.

Energy Institute. (2023), Statistical Review of World Energy. Available from: https://www.energyinst.org/statistical-review

Erdogan, S., Cevik, E.I., Gedikli, A. (2020), Relationship between oil price volatility and military expenditures in GCC countries. Springer Environmental Science and Pollution Research, 27(26), 45-55.

Farzanegan, M.R. (2011), Oil revenue shocks and government spending behavior in Iran. Energy Economics, 33(6), 1055-1069.

Fratzscher, M., Schneider, D., Robay, I.V. (2014), Oil Prices, Exchange Rates and Assets Prices. European Central Bank Working Paper. No 1689.

Golub, S. (1983), Oil prices and exchange rates. The Economic Journal, 93(371), 576-593.

Hamdi, H., Sbia, R. (2013), Dynamic relationships between oil revenues, government spending and economic growth in an oil-dependent economy. Economic Modelling, 35(2), 118-125.

Jibir, A., Aluthge, C. (2019), Modelling the determinants of government expenditure in Nigeria. Cogent Economics and Finance, 7(1), 162-172.

Krugman, P. (1983), Oil shocks and exchange rate dynamics. In: Exchange Rates and International Macroeconomics. Chicago: University of Chicago Press.

Lizardo, R.A., Mollick, A.V. (2010), Oil price fluctuations and US dollar exchange rates. Energy Economics, 32(2), 399-408.

Manasseh, C.O., Ogbuabor, J.E., Abada, F.C., Okoro, O.E., Egele, A.E., Onwumere, J.U. (2018), Analysis of oil price oscillations, exchange

rate dynamics and economic performance. International Journal of Energy Economics and Policy, 9(1), 95-106.
Mohammad, A.R., Sani, Y. (2020), Asymmetric impact of oil price shock on government educational expenditure: Evidence from Nigeria. International Journal of Intellectual Discourse, 3(1), 397-409.
Muhammad, A., Bala, U., & Adamu, M. (2023). Asymmetric effect of oil price on government expenditure in Nigeria. International Journal of Intellectual Discourse, 6(1), 87-97.
Namovsky, S. (2018), The impact of oil prices on trade. Review of International Economics, 27(1), 21-41.
Narayan, P., Smyth, R. (2006), What determines migration flows from low-income to high-income countries? An empirical investigation of Fiji-U.S. migration 1972-2001. Contemporary Economic Policy, 24, 332-342.
National Bureau of Statistics. (2023), Nigerian Gross Domestic Product Report Quarter 4. Nigeria: National Bureau of Statistics.
Obi, B., Awujola, A., Ogwuche, D. (2016), Oil price shock and macroeconomic performance in Nigeria. Journal of Economics and Sustainable Development, 7(24), 137.
Odularu, G.O. (2008), Crude oil and the Nigerian economic performance. Oil and Gas Business, 2(2), 1-19.
Olomola, P.A., Adejumo, A.V. (2006), Oil price shock and macroeconomic activities in Nigeria. International Research Journal of Finance and Economics, 3(1), 28-34.
Oluwagbade, I.O., Efuntade, A.O., Efuntade, O.O. (2023), Evaluating the effect of oil price volatility on capital expenditure of federal government in Nigeria. Saudi Journal of Business and Management Studies, 8(7), 158-170.
Onyeiwu, C., Oladimeji, O.P. (2018), Impact of oil price on Nigerian economy. International Journal of Economics, Commerce and Management, 6(4), 252-265.
Orhewere, B., Ogbeide-Osaretin, E.N. (2020), Oil price shocks and their impacts on capital expenditure in Nigeria. Economica, 16(2), 227-238.
Osundina, K.C., Osundina, J.A. (2014), Capital accumulation, savings and economic growth of a nation-evidence from Nigeria. Global Journal of Interdisciplinary Social Sciences, 3(3), 151-155.
Oyeyemi, A.M. (2013), The growth implications of oil price shock in Nigeria. Journal of Emerging Trends in Economics and Management Sciences, 4(3), 343-349.
Qadan, M., Cohen, G. (2024), Uncertainty about interest rates and crude oil prices. Financial Innovation, 10(1), 9-25.
Qadan, M., Shuval, K., David, O. (2023), Uncertainty about interest rates and the real economy. The North American Journal of Economics and Finance, 68(1), 101978.
Qwader, A. (2018), Impact of oil price changes on certain budget variables, government and tax revenues, external grants, and government expenditures in Jordan. International Journal of Economics and Finance, 10(7), 150.
Raouf, E. (2021), Oil price shock and government expenditure. International Journal of Energy and Economic Policy, 11(15), 78-84.
Shin, Y., Yu, B., Greenwood-Nimmo, M. (2014), Modelling asymmetric cointegration and dynamic multipliers in a nonlinear ARDL framework. In: Horrace, W., Sickles, R., editors. The Festschrift in Honor of Peter Schmidt: Econometric Methods and Applications. Berlin: Springer. p281-314.
Suleman, M.T. (2012), Stock market reaction to good and bad political news. Asian Journal of Finance and Accounting, 4(1), 290-299.
Syed, A.B., Alfred, A.H., Perry, S. (2012), Oil prices, exchange rates and emerging stock markets. Energy Economics, 34(1), 227-240.
The World Bank, World Development Indicators (2023), Global Economic Monitor. Washington, D.C. Available from: https://databank.worldbank.org/Exchange-Rates/id/1cbfe8a1
Tiwari, A.K., Mutascu, M.L., Albulescu, C.T. (2013), The influence of the international oil prices on the real effective exchange rate in Romania in a wavelet transform network. Energy Economics, 40(2), 714-733.
Trung, V., Vinh, N. (2011), The Impact of Oil prices, Real Effective Exchange Rate and Inflation on Economic Activity: Novel Evidence for Vietnan. Discussion Paper Series DP2011-09.
Umar, M., Dahalan, J. (2016), An application of asymmetric toda yamamoto causality on exchange rate-inflation differentials in emerging economies. International Journal of Economics and Financial Issues, 6(2), 420-426.
Varela, G. (2007), Real Exchange Rate Volatility and Output: A Sectoral Analysis. Available from: https://www.eclac.cl/redima
Wang, Y., Wu, C. (2012), Energy prices and exchange rates of the US Dollar: Further evidence from linear and non-linear causality analysis. Economic Modeling, 29(6), 2289-2297.

APPENDIX

Table 1A: Summary of literature synopsis

Author and year	Variables and their relationship	Method	Findings
Abubakar (2019)	Asymmetric dynamics in exchange rate and oil price	TAR, MTAR and SVAR,	No asymmetric connection within exchange rate-oil price nexus although observed favourable symmetrical shocks to both oil price-exchange rate nexus in Nigeria.
Wang and Wu (2012).	Currency rate-energy prices nexus	Non-linear and linear Granger causality	A single causal direction running from oil prices towards currency rate during the pre-2008 crises period, but after this period, a non-linear two-directional causality was discovered between exchange rate and price of oil.
Abiodun and Emmanuel (2020)	Oil revenue and spending by the government	ARDL model	Non-oil revenue, oil revenue, exchange rate, and public spending connect directly. Similar short-run investigation by
Brahmasrene et al. (2014)	Exchange rate to oil prices	VAR	A unidirectional cause from exchange rate to oil prices, but medium and long-term fluctuations in oil prices were significantly observed to affect the undulating currency rate.
Lizardo and Mollick (2010)	Fluctuations in oil price and U.S. dollar exchange rates	VAR and VECM	Increasing oil price had exchange rate appreciating influence on nations exporting oil while devaluing currency of nations with oil import.
Syed et al. (2012)	Oil price and exchange rate.	SVECM	Favourable changes to oil price have a declining short run influence on exchange rate.
Tiwari et al. (2013).	Investigated the impact of oil prices on Romania's actual exchange rate using	Wavelet modelling.	The outcome shows that the price of oil has a big influence on the exchange rate over the long and short terms
Beckmann and Czudaj (2013)	Exchange rate and oil price	Markov-switching VECM approach	Found that the nominal oil prices are the source of time-varying causality patterns that flow from the nominal exchange rate angle.
Ahmad and Hernánadez (2013).	Long-term asymmetric in the price of oil and the exchange rate	TAR and MTAR models,	Asymmetries existed in Brazil, Nigeria, and the UK even with modification after a positive shock to oil prices than a negative one.
Adedokun (2018)	Oil revenue and the dynamic connection between revenue from government and spending by government	SVAR and VECM	Shocks to oil price and changes in public spending are not connected in the short period. Revenue from oil surges indicate a very important prediction ability. In addition, there is short-run budgetary synchronization-hypothesis involving the revenues from oil and total government spending.
Chen et al. (2016)	OECD nations on the link within oil price and bilateral currency rate.		U.S. currency rate against 16 OECD nations differ greatly which is contingent on changes influenced by demand-supply aggregate (but not with oil price shocks) accounting for 10-29% deviations in rates of exchange in long-term.
Hamdi and Sbia (2013).	Dynamic between economic growth, public expenditure and oil income in Bahrain	Error-correction model and multivariate co-integration analysis,	Oil income continues to be the primary driver of the nation's economy and the primary means of funding public spending
Farzanegan (2011)	Dynamic influence of oil-price-shocks on various categories of Iranian government spending.	Variance decomposition and impulse response functions analyses approaches	Whereas, components of social spending have no significant reaction to shocks in oil prices or income, spending on security and military in Iran do.
Manasseh et al. (2018)	Fluctuations in oil price and how exchange rate responds to these changes	EGARCH	Exchange rate displaying fluctuations of 16%. An increase of 10% in the price of oil makes currency rate rise to about 19% in the long run. Oil price market does not explain the market in exchange rate in Nigerian economy. Favourable links exist between economic performance, exchange rate and oil price.
Suleman (2012) His.	The connection in oil prices and exchange rates in Nigerian.	Exponential GARCH	Results showed that increasing oil price caused the Nigerian naira to decrease in value compared to the US currency
Trung and Vinh (2011)	The influence of inflation, oil prices and exchange rate on GDP in Vietnam.	VAR	Exchange rate and price of crude oil exert a substantial and statistically significant influence on activities in the economy. The study found Vietnam's economy being affected greatly by fluctuations in the value of the money than by changes in the oil price
Oyeyemi (2013)	The expansionary crude oil-price-shock effects on Nigeria economy.	Multiple OLS model and variance decomposition.	Small shock in world market through oil price creates an extended impact on growth in the economy.
Obi et al. (2016).	Oil price shock and macroeconomic performance in Nigeria	VAR	Demonstrates that the interest rate disparity is both considerably relevant in giving an explanation about exchange rate fluctuations.

(Contd...)

Table 1A: ***(Continued)***

Author and year	Variables and their relationship	Method	Findings
Varela (2007).	Real exchange rate volatility and output: A sectoral analysis	Panel VAR	An indirect but valid effect of currency rate fluctuation on output. Effect of these changes in exchange rate has no bearing with the level of productivity.
Olomola and Adejumo (2006)	Oil price shock and macroeconomic activities in Nigeria	VAR	Assert in a similar study that REXR is susceptible to shocks in oil prices in Nigeria. Surge in oil prices affects the government spending decisions considerably through its currency rate.
Muhammad et al. (2023)	Assess the response of Nigeria's public spending to the positive and negative oil-price	N-ARDL	Study revealed that both the negative and positive changes in oil-price have favourably exerting influence on government spending, however, exchange rate as an intervening variable does not have any significant effect on total government expenditure. Their study also revealed the presence of nonlinear link in crude oil price on government expenditure.
Raouf (2021)	Examined how changes in oil prices affected government expenditure components in oil-exporting and oil-importing states.	VAR	In the two groupings of nations, shocks to the oil-price had a favourable influence on government recurrent spending. Under the nations that export oil, it has a favourable impact on government capital spending; in nations that import oil, it has a negative impact.
Raouf (2021).	Oil price shock and government expenditure.	VAR	Oil money has a significant impact on the yearly government budgets of several nations worldwide. Oscillation in oil prices significantly have effects on government decisions about how much money to spend on investment or consumption.
Qwader (2018)	Oil price changes on certain budget variables, government and tax revenues, external grants, and government expenditures in Jordan	OLS	The primary findings show that upward movement in oil prices is statistically significant and beneficial to government expenditure, tax revenue, and foreign assistance. Shocks to price of oil is also statistically significant but inversely influencing budget deficits.
Erdogan et al. (2020)	Relationship between oil price volatility and military expenditures in GCC countries	ARDL	Military spending is favourably impacted by oil price volatility in every GCC nation. These results showed that military spending in GCC nations has not decreased despite fluctuations in oil prices.
Adedokun (2018)	The effects of oil shocks on government expenditures and government revenues nexus in Nigeria	Structural VAR (SVAR)	The short-term fluctuations in government spending could not be predicted by oil price shocks. However, oil revenue has a very significant short- and long-term predictive power on government spending.
Qadan and Cohen (2024)	Examined how interest rate uncertainty affected US crude oil prices.	VIX style and the CBO's 10-year treasury note volatility futures index (VXTYN),	Drop in oil prices and future high volatility in those prices are predicted by increasing interest rate volatility.
Qadan et al. (2023)	Interest rate volatility and its impact on the US real economy.	VIX-style TLT ETF (iShares 20+year treasury bond ETF)	Changes in interest rates are a reliable indicator of downturns in important economic sectors such as retail sales, industrial output, and producer and consumer pricing.