European Journal of Sustainable Development (2023), **12**, 2, 119-134 ISSN: 2239-5938
Doi: 10.14207/ejsd.2023.v12n2p119

Oil Price Fluctuation, Business and Economic Growth Effect: Evidence from Nigeria

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Abstract
Nigeria's economic and business climate vulnerabilities are largely instigated by oil price fluctuation through oil market and production alterations. The study scrutinises oil price fluctuation symmetric effect on the business climate, economic growth and macroeconomic indicators using daily data from 2012–2022. To accomplish this goal, the structural vector autoregressive (SVAR) and autoregressive distributed lag (ARDL) methodologies were adopted and incorporated to examine the long- short-run symmetric effect using realised volatility as an indicator of oil price fluctuation. Findings revealed long-short run persistent oil price shock effect on macroeconomic indicators, economic growth and business climate. To reduce the oil demand-supply chain risk exposure and disruption. Economic diversification and investments in trade and non-trade sectors are recommended. A significant nexus between oil prices and macroeconomic indicators was observed using the SVAR model when there is shocks in oil price.

Keywords: oil price; exchange rate; symmetric; SVAR, ARDL, economic growth, macroeconomic indicators

JEL: H56, G11, G14, G15, C13; E10; G15; F31

1. Introduction

The disruption in the global oil demand-supply chain caused by the COVID-19 pandemic and the macroeconomic recovery indicators observed in the 1st quarter of 2022 renewed fresh global economic opportunities, which lend credence to the IMF's World Economic Outlook (WEO) prediction of a global growth increase between 4.4% and 4.9% in 2022. The Russian invasion of Ukraine presents another cascading effect on the already battered and convalescing oil market. The ripple effect of this invasion significantly derailed the predicted business and economic transformation trajectory for low- and middle-income countries (LMICs). Due to the uncertainties surrounding oil supply demand for importing and exporting countries, the performance of the macroeconomic indicators of the exchange rate, interest rate, balance of trade, and money supply (M3) is important.

The performance of these macroeconomic indicators and the business climate in Nigeria are strongly allied with the oil supply-demand gap, connoting economic vulnerability to oil price fluctuations. Oil price fluctuations have a global impact on production,

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transportation, and market costs of goods and services. According to Brinin et al. (2016), such fluctuations exacerbate macroeconomic and business uncertainties, particularly under imperfect market conditions. Because of its uncertain effect on macroeconomic amplification, Dehn (2001) revealed that oil is a dominant commodity in the global market, hence price volatility is inevitable. In oil-importing nations, the price fluctuation is considered "bad news" because scarce national resources are transferred to the oil-exporting countries, but for exporting nations like Nigeria, which depend massively on oil earnings for socioeconomic, financial, and infrastructural development, it is considered "good news" (Udo et al., 2021 a; Saddiqui et al., 2018). On the contrary, a unit decline in oil prices without an immediate cut in government expenditures translates to a massive budget deficit with a considerable effect on macroeconomic performance (see Figure 1).

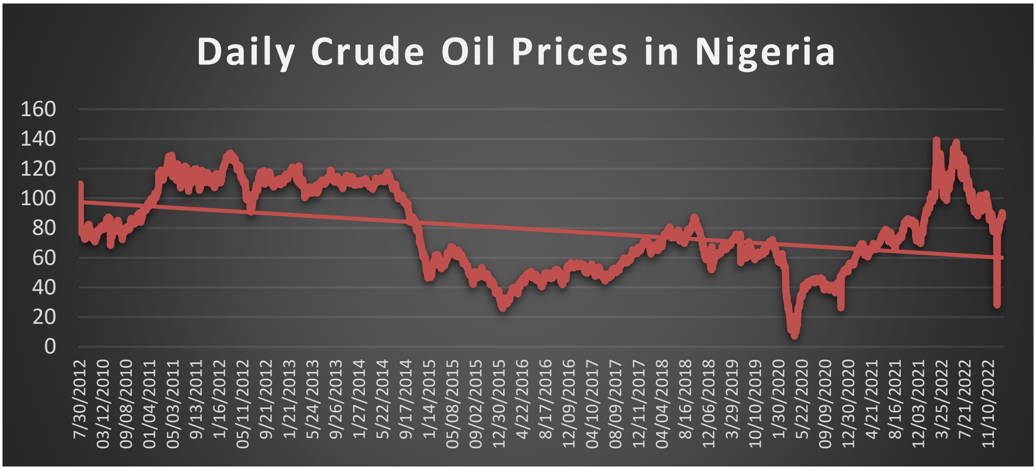

Figure 1: Daily Crude Oil Prices in Nigeria (2006Q1-2022Q4)
Source: Authors Computation (2023)

Oil price fluctuation is a direct result of alterations in market fundamentals (supply-demand) and is accompanied by a matching production decline (see Figure 2). According to Yousefi and Wirjanto (2004), Majid (2006), and Amuzegar (2001), positive oil price fluctuations significantly impact the exchange rate through the accumulation of foreign exchange earnings and output expansion vis-à-vis negative price fluctuations. Chen and Chen (2007) from the G7 countries, Czech and Niftiyev (2021) from Azerbaijan and Kazakhstan, and Conrad and Jagessar (2018) from Trinidad and Tobago all contributed to these findings.
Bloom, (2009); Guo and Kliesen, (2005) also revealed that oil price fluctuations and output decline respond to a supply chain disruption, aggregate demand expansion, or other speculative channels that lead to an increase in oil demand (Udo et al., 2021b; Kolawole, 2022). Hamilton (2003) and Udo et al. (2021b) argued that oil price fluctuations are based on supply-side movement in the oil market and other non-market factors such as pipeline vandalism, oil bunkering, corruption, and insecurity, among others. These factors directly affect the business climate and production output. On the contrary, Kilian (2008, 2009) argued that oil price fluctuations are based on the aggregate demand side, such as the

recent scarcity caused by the punitive sanctions against Russia to de-escalate the Ukraine crisis, with Europe and America searching for alternative energy sources.

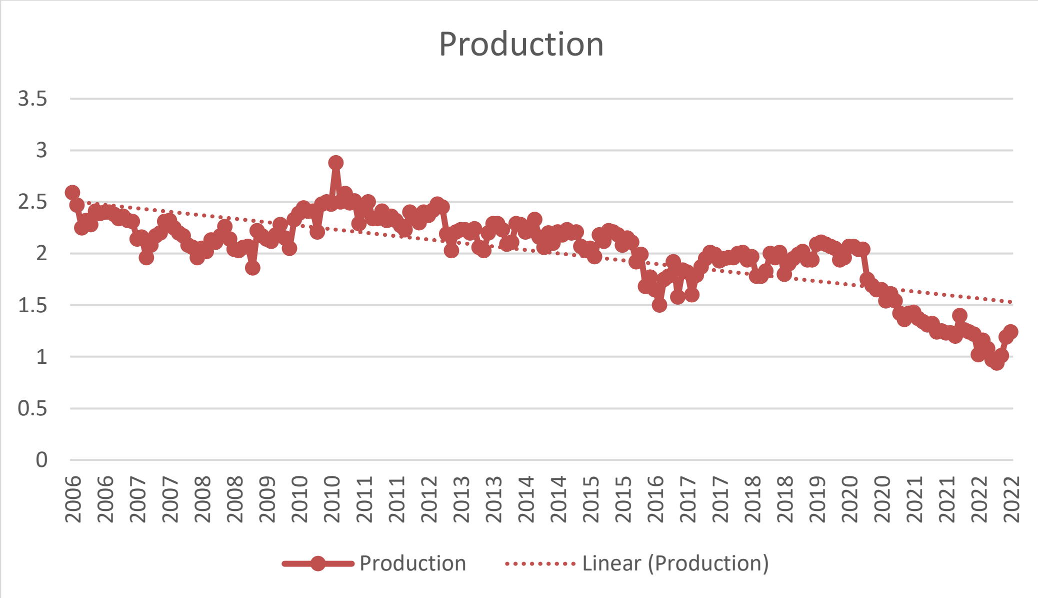

Figure 2: Oil Output in Thousand Barrels Per Day
Source: Authors (2023).

The empirical findings of Mbasua, Muhammad, and Abia (2016), Udoh, Abner, Udo, and Lovlyn (2019), Bradstock (2022), and Kolawole (2022) in oil-producing countries, particularly Nigeria, also revealed that insufficient diversification, massive reliance on oil earnings for the development, increasing global energy demand, declining oil-production capacity, incessant oil supply interruption and oil price shocks significantly influence growth globally. This study holistically filled the knowledge gap by scrutinising oil price fluctuation effect on the overall economic growth through various macroeconomics indicators, especially the real exchange rate in Nigeria, as its primary objective, while also expanding the study frontiers to empirically examine the symmetric effect.

This study hypothesised that oil price shocks has symmetric effect on the business climate, economic growth and macroeconomic indicators instigated via real exchange rate (appreciation) short run and (depreciation) in the long run. The uniqueness of this study stems from the incorporation of the diverse models to collaborate or contravene the findings of earlier studies. Earlier studies of Al Rasasi et, al (2016) and Al Rasasi et al. (2018) on the nexus concentrated on oil price, revenue, economic growth and government expenditures reported mixed results. According to Ron, Kilian, and Vigfusson (2013), oil price volatility proxy may not capture oil price uncertainty; hence, the mixed and inconclusive theoretical and empirical findings.

In this study, the nonparametric realised volatility was used, which is independent of the model or distributional assumptions. Previous studies bank on GARCH model-based measures oil price volatility. The study employed high-frequency (daily) data, to examined the shocks. Theoretically, the eclectic model was adopted to test oil price fluctuations symmetric effect on economic growth and macroeconomic indicators. The SVAR model is a multivariate structure and one of the most effective models for testing the interdependence among variables and their structural inference relating to fundamental economic theory to scrutinise the dynamic effects (Khan & Ahmed, 2011).

2. Related Literature

The nexus between oil prices and economic growth over the decades has attracted several empirical and theoretical findings. The revolutionary study of Darby (1982) and Hamilton (1983) on oil prices effect on the American economy revealed mixed results. As such, Darby (1982) reported a non-significant nexus, while Hamilton (1983) observed a significant causal nexus between oil prices, unemployment and GDP. The finding of Darby (1982) and Hamilton (1983) however, spawned a slew of empirical and theoretical studies on oil price fluctuations and macroeconomic nexus. In oil-dependent nations like Nigeria, global crude oil price fluctuations significantly expose macroeconomic indicators to shocks. In US-China Olayungbo (2019) using the generalised impulse response functions (GIRF), investigated the trade war effect on oil-exporting African countries of Algeria, Angola, Egypt, Gabon, Nigeria, and Tunisia. Results shows a positive foreign GDP shocks were observed as a result of trade relations between selected oil-exporting African countries and the United States and China.

In advanced and emerging economies, of China and other emerging Asian countries Chudik et al. (2021) observed a minor effect of COVID-19 pandemic, in the United Kingdom and other advanced economies, a dip and sustained effect was observed. In Nigeria, a causal nexus between oil prices and the trade balance was observed (Ozlale & Pekkurnaz 2010).

On the oil price fluctuation causal effect on exchange rate Mohammed et al. (2019); Ozsoz and Akinkunmi (2012); and Olayungbo (2019) in Nigeria observed a positive nexus. Samhi and Mohamed (2018) in Algeria, Nusair and Olson (2019) in seven Asian countries of (Indonesia, Japan, Korea, Malaysia, the Philippines, Korea, and Thailand), Tasar (2018) in Romania, Farzanegan and Markwardt (2009), Gbatu et al. (2017) Kousar et al. (2019) and Widarjono et al. (2020) also substantiate this finding reporting a positive nexus.

On the contrary, Eagle (2017); Turhan et al. (2013) reported a non-significant nexus between oil prices and exchange rates. Using the vector autoregressive model to examine the dynamic link. Lv et al. (2018) in Angola, Hassan et, al (2012), Tiwari, et al (2013) in India also substantiate and contribute to these results. Using the Garch-Bekk model in Ghana, Zankawah and Stewart (2020) reported mixed results, Murshed and Tanha (2020) a*nd Rahman and Majumder (2020), reported a negative nexus in countries where the oil price is regarded a critical factor of production. In this regard, Ghalayini (2011) revealed that in oil-importing countries' earnings anchors squarely on the elasticity of oil price and the extent of persistence depreciation, supporting a negative nexus.

On oil price volatility Amany El-Anshasy et al. (2017), Van Eyden et al. (2019), and Khan et al. (2021) reported a negative effect on GDP growth and freight rates. In cross-country studies using diverse techniques Agu and Nyatanga (2021), Sarmah and Bal (2021), Adesete and Bankole (2020) Apere (2017) observed a causal nexus between increase oil price and inflation rate. In Nigeria Olayungbo and Ojeyinka (2021); Raifu, Aminu, and Folawewo (2020) substantiate this report, reporting a causal nexus between oil price, domestic petroleum prices and unemployment rate. The findings of Udo et al. (2021), revealed variation in both oil-exporting-importing nations. In oil exporting nations Yoshino et al. (2016) observed significant oil price influence effect on macroeconomic indicators through export and fiscal channels. The findings of Yoshino et al. (2016) are consistent with the Taylor Rule, supporting a positive flow between oil price increase, capital inflows and domestic currency appreciation. While interest rates and the general price level decline with the monetary policy reaction. On the fiscal channel, an oil price increase implies a tax increase, fiscal surplus, government expenditure, and GDP growth (see Figure 3).

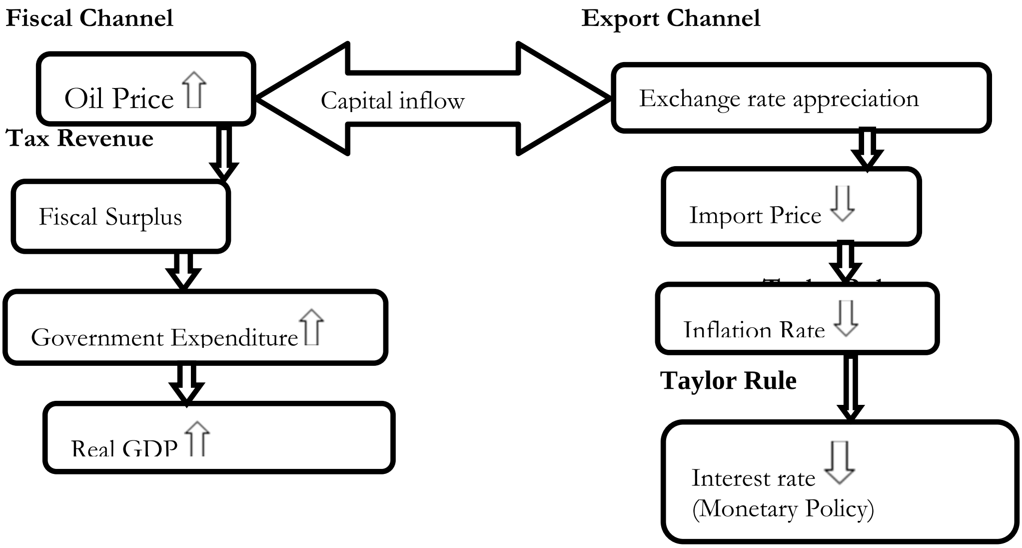

Figure 3: Oil Prices Transition Channels in Oil Exporting Nations
Source: Yoshino and Alekhina (2016)

Table 1. Empirical Nexus Between Oil Price and Macroeconomic Variables.

Author	Scope	Methodology	Results
Trade Balance and Exchange Rate Nexus			
Danmola and Olateju (2013)	Nigeria 1980-2010	OLS	Positive
Udoh et al. (2012)	Nigeria 1986-2010	Cointegration test, ECM	Negative
Zheng (2012)	Thailand and China (1997-2011)	GLS	Positive nexus in Thailand's export to China and non-significant nexus with exchange and GDP.
Oil Price and Trade Balance			
Tiwari and Olayeni (2013)	India (1980-2011)	Wavelet analysis	Negative

Hassan and Zaman (2012)	Pakistan (1975-2010)	ARDL	
Oil Price and Exchange Rate			
Shafi et al. (2013)	France (1971-2012)	ECM	Positive
Benhabib et al. (2014)	Algeria (2002-2013)	VAR	
Al-Ezzee (2011)	Bahrain (1980-2005)	VECM	

Methodology

Data and variables

Daily time series dataset spanning from January 2012-December 2022 was adopted in this study to effectively capture oil price uncertainty shocks. As it provides a large number of observations that is in volatility analysis. The estimated model utilized daily crude oil prices as reported by the Central Bank of Nigeria (CBN) 2022.

Measuring Uncertainty

Oil price uncertainty measured using the realised volatility (RV_t) was constructed using daily crude oil prices. Andersen, et, al (2001; 2003) posit that the realised volatility is an unbiased estimator of volatility return. The model is expressed as: $RV_{(Dt)} = \sum_{d=1}^{Dt} (C_{td} - C_{td}\text{-}1)^2$... (Eq1)

Where: $RV_{(Dt)}$ = past realised oil variance. D_t = positive integer of aggregate daily period of return (d) in a month (t). (C_{td} - C_{td}-1) = logarithmic change (c) daily closing crude oil prices (d). The $RV_{(Dt)}$ is presented in (Figure 4).

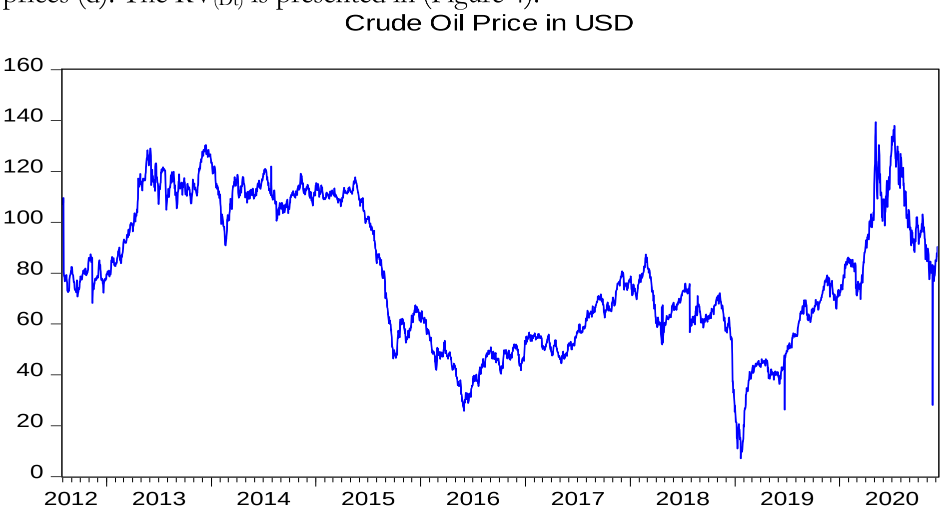

Figure 4: The Realised Oil Volatility

From the RV presented in Figure 3, the dip in 2018Q1 is associated with the after-effect of the 2017-2018 recession in Nigeria. In 2019Q2 the Covid-19 pandemic also instigates another dip. The spike in 2020Q1 is associated with positive economic recovery from the pandemic and the dip in 2020Q4, 2021Q4, and 2022Q1 is associated with the recent Russia and Ukraine crises negatively influencing global oil supply-demand.

Empirical Model

The study adopted the eclectic model to scrutinise oil prices the symmetric effect on economic growth and macroeconomic indicators. The log-linear ad hoc model is expressed as:

$RGDP_t = \beta_0 + \beta_{1t}RV + \beta_{2t}INFL + \beta_{3t}EXCH + \beta_{4t}TRB + \beta_{5t}M3 + \varepsilon t$ ………….(Eq 2)

Where: $RGDP_t$ = economic growth; (RV_t) = oil price uncertainty constructed from daily crude oil prices. Inflation ($INFL_t$); Trade balance (TRB_t); Money ($M3_t$); real effective exchange rate ($EXCH_t$); and interest rate (INR_t) are sourced from the CBN statistical bulletin.

According to the theoretical and empirical literature on the Dutch disease, a unit increase in oil price positively influences economic growth through the real exchange rate (appreciation). The ARDL following Pesaran and Shin's (2001) framework was adopted to test for long-short run symmetric effect.

The unrestricted error correction model can be specified as:

$\Delta RGDP_{qt} = \alpha_0 + \sum_{i=1}^{p} \alpha_i \Delta RGDP_{qt-i} + \sum_{i=0}^{p} b_i \Delta L_n LRV_{qt-2} + \sum_{i=0}^{p} c_i \Delta L_n EXCH_{qt-3} + \sum_{i=0}^{p} d_i \Delta L_n INFL_{qt-4} + \sum_{i=0}^{p} d_i \Delta L_n TRB_{qt-5} + \sum_{i=0}^{p} e_i \Delta L_n M3_{qt-6} + \delta_1 RGDP_{qt-1} + \delta_2 L_n RV_{qt-2} + \delta_3 L_n EXCH_{qt-3} + \delta_4 I_n INFL_{qt-4} + \delta_5 I_n TRB_{qt-5} + \delta_6 I_n M3_{qt-6} + \mu_{qt}$………………… (Eq3).

Further, Eq. (3) is expressed in matrix form to test the long-short-run symmetric nexus.

Decision Rules for the Bound Tests Process

a. long run, the null hypothesis (H_0) is no cointegration [H_0: γ_{11}-γ_{65} = 0].
b. Alternative hypothesis (H_1) there is cointegration [H_0: γ_{11}- $\gamma_{65} \neq 0$].
c. Short-run, the null hypothesis (H_0) is no short-run relationship [H_0: μ_{11}-μ_{65} = 0],
d. Alternative hypothesis (H_1), there is a short-run relation [H_0: μ_{11} to $\mu_{65} \neq 0$]

$$(1-B)\begin{bmatrix}\Delta RGDP\\ \Delta RV\\ \Delta EXCH\\ \Delta INFL\\ \Delta M3\\ \Delta TRB\end{bmatrix} = \begin{bmatrix}a_{01}\\ a_{02}\\ a_{03}\\ a_{04}\\ a_{05}\\ a_{06}\\ a_{07}\end{bmatrix} + \sum_{i=1}^{k} 1 - B \begin{bmatrix}\Delta RGDP\\ \Delta RV\\ \Delta EXCH\\ \Delta INFL\\ \Delta M3\\ \Delta TRB\end{bmatrix}_{t-i} X \begin{bmatrix}\mu_{11} & \mu_{12} & \mu_{13} & \mu_{14} & \mu_{15}\\ \mu_{21} & \mu_{22} & \mu_{23} & \mu_{24} & \mu_{25}\\ \mu_{31} & \mu_{32} & \mu_{33} & \mu_{34} & \mu_{35}\\ \mu_{41} & \mu_{42} & \mu_{43} & \mu_{44} & \mu_{45}\\ \mu_{51} & \mu_{52} & \mu_{53} & \mu_{54} & \mu_{55}\\ \mu_{61} & \mu_{62} & \mu_{63} & \mu_{64} & \mu_{65}\end{bmatrix} + \begin{bmatrix}\Delta RGDP\\ \Delta RV\\ \Delta EXCH\\ \Delta INFL\\ \Delta M3\\ \Delta TRB\end{bmatrix}_{t-i}$$

$$+ \begin{bmatrix}\gamma_{11} & \gamma_{12} & \gamma_{13} & \gamma_{14} & \gamma_{15}\\ \gamma_{21} & \gamma_{22} & \gamma_{23} & \gamma_{24} & \gamma_{25}\\ \gamma_{31} & \gamma_{32} & \gamma_{33} & \gamma_{34} & \gamma_{35}\\ \gamma_{41} & \gamma_{42} & \gamma_{43} & \gamma_{44} & \gamma_{45}\\ \gamma_{51} & \gamma_{52} & \gamma_{53} & \gamma_{54} & \gamma_{55}\\ \gamma_{61} & \gamma_{62} & \gamma_{63} & \gamma_{64} & \gamma_{65}\end{bmatrix} X \begin{bmatrix}\omega\\ \omega\\ \omega\\ \omega\\ \omega\\ \omega\end{bmatrix}_{t} \text{………………… (Eq3)}$$

Where Δ = first difference operator, the coefficients μ_1-μ_5 and γ_0 -γ_5 = short-run and long-run elasticities, respectively.

$\alpha 0$ = constant term and ωt = white noise.

The acceptance or rejection of the null hypothesis is based on the f-statistic and the critical value.

Structural Vector Autoregressive (SVAR) approach.

The SVAR model is specified as:

$Y_t = \beta + \sum_{i=1}^{p} A_i Y_{t-1} + \varepsilon t$ ………………………. (Eq4)

where y_t = 6-vector of endogenous variables capturing the degree of change in RV_t, $RGDP_t$, $INFL_t$, $EXCH_t$, TRB_t and $M3_t$. β = coefficients of the 6 vectors intercept. ε_t = oil price shocks RV_t according to $\varepsilon t = A_{0t}^{-1}$. Equation (4) re-expressed using SVAR oil price shocks model:

$A_0 y_t = A_0\beta + \sum_{i=1}^{p} A_0 A_i Y_{t-1} + \varepsilon t$ ………………………. (Eq5)

The response of one variable to a shocks emanating from another variable is measured using the impulse response function (IRF). The SVAR model is employed to differentiate the diverse shocks.

$$\begin{bmatrix} \Delta RGDP \\ \Delta RV \\ \Delta EXCH \\ \Delta INFL \\ \Delta M3 \\ \Delta TRB \end{bmatrix} = \begin{bmatrix} \mu_{11}(H) & 0 & 0 & 0 \\ \mu_{21}(H) & 0 & 0 & 0 \\ \mu_{31}(H) & 0 & 0 & 0 \\ \mu_{41}(H) & \mu_{42}(H) & 0 & 0 \\ \mu_{51}(H) & \mu_{52}(H) & \mu_{53}(H) & 0 \\ \mu_{61}(H) & \mu_{62}(H) & \mu_{63}(H) & \mu_{64}(H) \end{bmatrix} \begin{bmatrix} \Delta RGDP \\ \Delta RV \\ \Delta EXCH \\ \Delta INFL \\ \Delta M3 \\ \Delta TRB \end{bmatrix}_{\varepsilon t} \text{…………… (Eq6)}$$

where μ_i = lag operator H, $(H^K x_t = X_t - K_j)$. μ_{ij} = estimated coefficient j, $\mu_{ij} = \Sigma_k \mu_{ij}$. H^K = sum of the average coefficients for K = 1, 2, …, ϱ, ϱ = degree of polynomial μ_{ij} (H). The VAR optimal lag operator for RV_t, $RGDP_t$, $INFL_t$, $EXCH_t$, TRB_t, and $M3_t$ structural shocks. Applying Cholesky decomposition in an identified structural VAR.

Results and Discussion

4.1. Descriptive statistics

The descriptive statistics results of the variables of interest are reported in Table 2.

Table 2. Descriptive statistics.

	EXCH	INF	M3	RGDP	RV	TRB
Mean	258.76	12.189	19.282	19287.26	78.736	813,227.7
Median	253.49	11.755	19.550	18304.01	75.180	242,3112.0
Maximum	610.090	41.200	22.290	72094.09	139.410	582,2589.0
Minimum	148.880	-6.500	17.540	14504.45	7.150	790,5599.0
Std. Dev.	99.288	5.350	1.138	7230.269	27.691	413,3667.0
Skewness	0.443	1.054	0.120	6.5794	0.0719	-0.549
Kurtosis	2.244	7.080	2.285	4.209	1.886	2.251
Prob…	0.000	0.000	0.000	0.000	0.000	0.000

Source: Authors Computations (2023)

Table 2 revealed that within the period under review, exchange rates fluctuated with the maximum value of \$610.0 to ₦148.8 and the minimum value of \$1 to ₦1. The fluctuation is evidence in oil prices, with a maximum value of \$139.410 and a minimum value of \$7.150. The fluctuation correlates with economic growth, money supply, inflation rate, and trade balance, with maximum values of ₦720,94 billion, ₦22,29 billion, ₦41,20 billion, and ₦582,258 billion, respectively, along with their respective minimum values. The nexus shows the response of the selected macroeconomic variables to oil price fluctuations in Nigeria within the review period.

Unit Root Tests

The unit root of the variables was tested following the Gauss-Markov assumptions for unbiased estimation. Using the Augmented Dickey-Fuller (ADF, Dickey-Fuller 1981) and the Phillips–Perron (PP, Phillips, and Perron 1988).

Table 3. Augmented Dickey–Fuller and Phillip–Perron.

Variables	ADF	PP	Order of Integration	Inference
EXCH	-13.80 (0.0000)***	_13.792 (0.0000)***	I (1)	Stationary
INF	-4.564 (0.0002)***	_4.575 (0.0002)***	I (1)	Stationary
M3	-8.9128 (0.0002)***	-8.8182 (0.0002)***	I (0)	Stationary
RGDP	-12.583 (0.05)*	-17.62 (0.000)***	I (1)	Stationary
RV	-9.5175 (0.0002)***	-8.9468 (0.0000)***	I (0)	Stationary
TRB	-15.4233 (0.0002)***	-16.7910 (0.0002)***	I (1)	Stationary

**** coefficient is significant at 1%, 5% and 10%; **indicates significance at 5% and 10%; * significance at 10%*

Source: Authors Computations (2023)

Result in Table 2 shows that the probabilities of the ADF and PP techniques specify rejection of the null hypothesis of unit root. The variables attained stationarity at the first difference and level of integration.

Table 3 The ARDL Symmetric Estimation

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
LOGRGDP(-1)	1.618	0.086	18.798	0.000
LOGRGDP(-2)	-0.697	0.081	-8.567	0.000
LOGRGDP(-3)	-0.042	0.025	-1.684	0.092
INF	-0.053	0.023	-2.270	0.029
EXCH	-0.214	0.113	-2.118	0.028
EXCH (-1)	0.535	0.054	9.903	0.000
M3	0.023	0.051	0.453	0.660
LOGTRB	-0.0081	0.086	-0.094	0.9249
LOGTRB(-1)	0.022	0.121	0.183	0.8546
LOGTRB(-2)	-0.496	0.120	-4.117	0.0000
LOGTRB(-3)	0.475	0.085	5.567	0.0000
RV	-0.212	0.074	-2.856	0.0081
C	10.755	0.458049	23.48206	0.0000
Other Parameter				
R^2	0.991196	F-Statistics	506.618	
D-W Stat	2.02	Prob.	0.000	
heteroskedasticity test	7.309 (0.000)	BG LM Test	1.597 (0.217)	

Source: Authors Computations (2023)

The ARDL results reported in Table 3 show a negative and non-significant symmetric oil price shock at a 5% level. A 10% symmetric oil price fluctuation has a 0.21% influence on real exchange rate appreciation and a 23% influence on money supply, while a 10% rise in the symmetric oil price effect for the 1st lag causes the real exchange rate to depreciate by 0.53% and is statistically significant at the 5% level. These results collaborate the results of

Muhammad et al. (2012) and Smahi and Mohamed (2018). For 2nd-3rd lagged periods, the symmetric oil price effect depreciates the trade balance by 49% for the 2nd period and 47% for the 3rd period, and economic growth by 69% for the 2nd period and 42% for the 3rd. A 10% increase in the symmetric oil price effect of the first lag period increased economic growth by 1.64% supporting the Dutch disease theory predictions.

The ARDL Short-Long-Run Symmetric Estimate

Based on the ECM result in Table 4, short-run coefficients are statistically non-significant. The CointEq(-1) value of -0.09, correctly signed, is statistically significant at 5% denoting the presence of a long-run nexus. The degree of speed from short-run divergence to long-run symmetry is low, at 9%. Thus, indicating a converging speed of 9% per day within the period under review to long-run equilibrium. The low rate of convergence justifies the ripple influence of oil price fluctuation on the Nigerian economy. The long-run results in Table 5, shows that symmetric oil price fluctuations causes a 31% devaluation in the real exchange rate, 90% trade balance and 65% money supply, account for real exchange rate appreciation. Therefore, domestic prices are influenced by exchange rate appreciation, with a direct impact on trade balance. The F-statistic value of 87.74% in Table 6 is (> (1) value of 3.38) and the (<I (0) value of 2.39) at the 5% level. Inferring the rejection of the null hypothesis of no level relationship.

Table 4 Error Correction Model (ECM)Estimate

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LOGRGDP(-1))	0.0796	0.0353	2.2531	0.0244
D(LOGRGDP(-2))	0.0432	0.0248	1.7384	0.0823
CointEq(-1)*	-0.0986	0.0131	-7.3282	0.0000
Other Parameters				
R^2	0.505	AdjR^2	0.504	
Log-likelihood	1386.803	D-W stat	1.89	

Source: Author Computation (2023)

Table 5 Long-Run Estimates

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOGTRB	-0.9066	0.886	-1.0444	0.306
M3	0.6591	0.3926	1.6787	0.101
RV	-0.0527	0.0185	-2.8486	0.004
INF	-0.0791	0.0393	-2.0127	0.044
EXCH	0.3135	0.0533	5.8807	0.000
C	9.9360	0.1324	75.024	0.000
EC = LOGRGDP - (-0.906*LOGTRB + 0.659*M3 -0.052*RV -0.079*INF +0.313*EXCH + 9.9360)				

Source: Author Computation (2023)

Table 6 F-Bounds Estimate

F-Bounds Test		Null Hypothesis: No levels of relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
			Asymptotic: n=1000	
F-statistic	9 87.74424	10%	2.08	3
K	5	5%	2.39	3.38
		2.5%	2.7	3.73
		1%	3.06	4.15

Source: Authors Computations (2023)

Oil Price Fluctuation Impulse Response

The impulse response explains each variable contributive information in explaining the variations in each other. The decomposition for five periods of the forecast is presented in Table 7. Based on the results using the Cholesky decomposition procedure for variance-covariance matrix factorization under the vector autoregressive framework. The oil price fluctuation's response to itself throughout the period was negative, along with the money supply and inflation rate. The negative period depicts a period of economic insecurity that eroded purchasing power and diminished exchange rate value due to decline in oil earnings instigated by a decline in oil production. On the other hand, the period of positive effect shows a period of economic stability evidenced by exchange rate appreciation, an increase in trade balances, economic growth, and money supply, among others. These appreciations are theoretically expected as positive oil price fluctuation influences money supply over time in Nigeria and diminishes them in oil-importing country.

Oil price shocks effect on inflation rate was persistent and significant over the period. Thus, implying domestic prices adjustment to global oil prices under uncertainty. In summary, oil price shocks substantially instigate macroeconomic variables response variations in Nigeria. The SVAR results reveals oil price shock effect on the economy when there is oil price uncertainty. The permanency of the temporary zero tends in the long run can be accredited to security checks on pipe vandalization, and oil theft among other illegal operations diminishing oil production in Nigeria.

Table 7: Oil Price Fluctuation Impulse Response

Response of LOGRGDP:						
Period	LOGRGDP	LOGTRB	M3	RV	INF	EXCH
1	0.102874	0.000000	0.000000	0.000000	0.000000	0.000000
2	-0.000634	-0.000134	0.000110	-0.001477	-0.002512	0.001468
3	-0.003445	-0.000427	5.83E-05	-0.000627	-0.001983	4.03E-05
4	-1.69E-05	-0.000390	0.000140	-0.000790	-0.001658	-0.000219
5	0.000221	-0.000383	0.000149	-0.000792	-0.001483	-0.000170
Response of LOGTRB:						
Period	LOGRGDP	LOGTRB	M3	RV	INF	EXCH
1	-9.94E-05	**0.025429**	0.000000	**0.000000**	0.000000	**0.000000**
2	-3.87E-05	**0.025186**	-0.002652	**0.006005**	-0.000567	**0.013432**
3	0.002078	**0.025173**	-0.003227	**0.005818**	-0.000581	**0.014180**
4	-0.001928	**0.025043**	-0.003144	**0.005803**	-0.000802	**0.014166**
5	-0.002173	**0.024891**	-0.003049	**0.005820**	-0.000938	**0.014059**

Response of M3:						
Period	LOGRGDP	LOGTRB	M3	RV	INF	EXCH
1	0.000873	-0.038815	**0.116464**	0.000000	**0.000000**	0.000000
2	-0.017751	-0.043462	**0.115190**	-0.003868	**0.000885**	-0.003315
3	-0.011055	-0.043125	**0.115309**	-0.004554	**0.003284**	-0.006675
4	-0.009676	-0.042769	**0.114786**	-0.004538	**0.005324**	-0.006688
5	-0.009009	-0.042416	**0.114111**	-0.004455	**0.007189**	-0.006585
Response of RV:						
Period	LOGRGDP	LOGTRB	M3	RV	INF	EXCH
1	**-0.053433**	**0.041968**	**-0.103958**	1.740179	0.000000	**0.000000**
2	**-0.024744**	**0.079223**	**-0.142217**	1.573729	**-0.007005**	**0.101531**
3	**-0.255819**	**0.081639**	**-0.144573**	1.588374	**-0.019773**	**0.113786**
4	**-0.255652**	**0.086240**	**-0.144644**	1.579909	**-0.027234**	**0.113080**
5	**-0.252085**	**0.090951**	**-0.143838**	1.572275	**-0.034967**	**0.114816**
Response of INF:						
Period	LOGRGDP	LOGTRB	M3	RV	INF	EXCH
1	-0.012178	**0.061386**	-0.018110	2.08E-05	**2.277154**	**0.000000**
2	-0.047529	**0.083196**	-0.007770	-0.040660	**2.399020**	**0.011281**
3	-0.061745	**0.081805**	-0.008644	-0.037355	**2.205966**	**0.021403**
4	-0.051519	**0.078774**	-0.009695	-0.036803	**1.985955**	**0.022767**
5	-0.047768	**0.075608**	-0.010294	-0.035944	**1.781002**	**0.023039**
Response of EXCH:						
Period	LOGRGDP	LOGTRB	M3	RV	INF	EXCH
1	0.003386	-0.020285	-0.026281	**0.089786**	-0.001555	**0.225063**
2	0.022985	-0.019221	-0.036653	**0.083730**	0.000535	**0.230998**
3	-0.042331	-0.019264	-0.037018	**0.083213**	-0.001542	**0.230376**
4	-0.043754	-0.019611	-0.037576	**0.083275**	-0.002511	**0.229329**
5	-0.041208	-0.019775	-0.038076	**0.082801**	-0.003598	**0.228959**

Source: Author (2023)

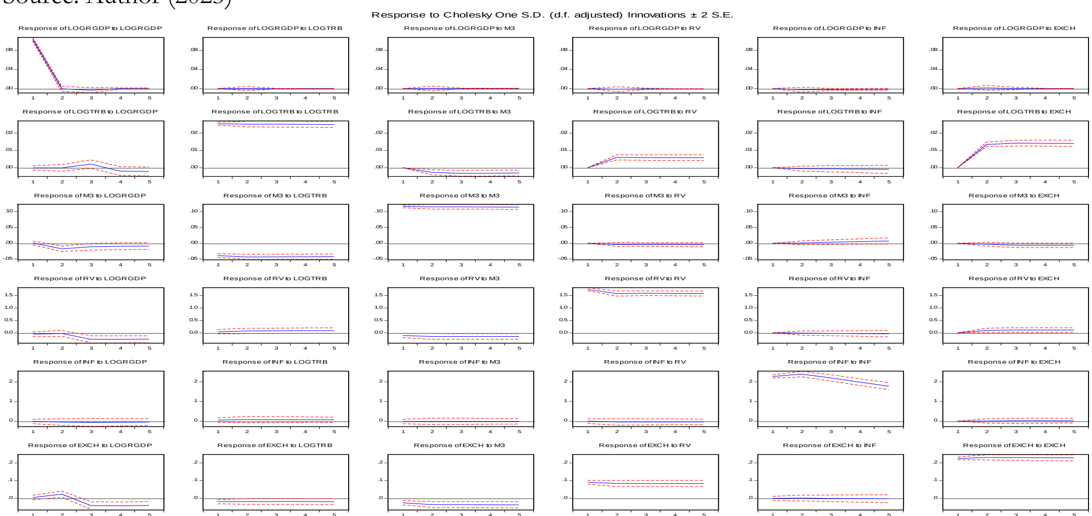

Figure 5: Oil Price Fluctuation Impulse Response Graph
Source: Authors Computations (2023)

The impulse response graph reported in Figure 5 above shows that each of the variables responds differently to another variable or itself for a definite period after the incidence of one-standard-deviation shock. These shocks collaborate with shocks reported in the previous empirical literature (Joseph & Festus, 2013; Kutu & Ngalawa, 2016). A positive one standard deviation increase in oil prices, defines "oil price fluctuation". A sharp surge in the price indicate a significant increase in the inflation rate, money supply, and real exchange rate, among others. Contrasting the findings of Kutu and Ngalawa (2016), the positively sustained shocks can be attributed to internal economic shock absorber mechanisms such as non-oil sector investment and small and medium-scale investment in Nigeria. Similarly, from the negative sustained shocks throughout the period, it can be deduced that high dependence on oil revenues and fluctuations in oil prices significantly influence the economy.

These results are substantiated by the findings of Mohammed et al. (2019), Baumeister and Hamilton (2019; 2020), Nouria et al. (2018), Raji et al. (2018), Garcia et al. (2018), and Tasar (2018), among others.

Conclusion

The study empirically scrutinises oil price fluctuation symmetric effect on economic growth. These symmetric effect are evolving and debate by economists, academics, and policymakers are still evolving. According to economic literature, a symmetric oil price shock stimulates macroeconomic indicators, particularly the appreciation/depreciation of real exchange rates and economic growth. This study takes a departure from other studies examining the symmetric effect nexus by adopting the eclectic ARDL and SVAR models to test the nexus from 2012–2022 using daily oil prices. The ECM_{t-1} and bounds results revealed a long-run nexus among the variables. The ECM_{t-1} is correctly signed, at 5% level, and the value of (0.09%) is the daily speed of convergence from the short-run divergence to the long-run symmetry. The results of this study substantiate earlier findings in economic literature reporting, real exchange rate and economic growth appreciation or depreciation as a function of price shocks. In the 21st century, Nigeria's macroeconomic objective of price and exchange rate stability hinges on precautionary measures adoption against oil price fluctuations to stimulate stable economic prosperity. It is imperative to diversify the economy to mitigate the problem of Dutch disease and stimulate investment in trade and non-trade sectors of the economy.

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