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E- ISSN: 3043 – 5463 ISSN: 1595 – 5842 VOLUME 3, ISSUE 2, 2026

RESEARCH ARTICLE

OIL PRICE VOLATILITY AND NIGERIA'S ECONOMIC GROWTH: A DUAL ANALYSIS USING ARDL AND GARCH MODELS

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ABSTRACT

This study used a time series of the Real Gross Domestic Product (RGDP) growth rate and oil prices for the years 1981–2024 to examine the impact of oil price volatility on economic growth in Nigeria. The study employed the Generalized Autoregressive Conditional Heteroskedasticity (GARCH) analysis and the Auto-Regressive Distributed Lag (ARDL) model to determine the volatilities of the prices of gasoline, diesel, kerosene, and currency rates. The findings demonstrated that while negative shocks had a more favorable influence on Nigeria's economic growth, positive oil price shocks had a detrimental effect. In particular, RGDP growth was adversely affected by petrol price volatility, while Nigeria's economic development was positively correlated with gas price volatility. This included the conclusion that short-term currency fluctuations had no appreciable impact on RGDP growth. The study's findings suggested, among other things, that Nigeria's economy be diversified from oil to other industries like manufacturing, technology, and agriculture in order to lessen its apparent susceptibility to changes in oil prices. It also underlined the necessity of developing alternate energy sources, removing fuel subsidies, and expanding local refining capabilities in order to stabilize energy prices.

Keywords: Oil price volatility, GARCH framework, ARDL, Economic growth, Nigeria

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Received: 28/4/2026; **Revised:** 28/6/2026; **Accepted:** 12/7/2026; **Published:** 18/7/2026

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1.0. INTRODUCTION

When oil prices fluctuate significantly over time, it has an impact on key macroeconomic indicators such as investment, industry output, and economic growth (Yu Chen et al., 2024). The state of Bayelsa is home to Oloibiri, the crude oil discovery location in Nigeria. Since 1956, oil has dominated Nigeria's economy and significantly increased the country's GDP. According to data from the National Bureau of Statistics (NBS), the oil sector made for 8.78% of Nigeria's real GDP in the fourth quarter of 2020, up from 7.32% during the same period in 2019. However, Nigeria's economic stability and growth are threatened by the considerable uncertainty caused by oil price fluctuation, which has a detrimental effect on investment and production (CBN Annual Statistical Bulletin, 2022).

Using econometric techniques like GARCH models and stationarity tests, the volatility of oil prices is determined by how much they deviate from the long-term trend. Volatility affects both households and businesses and is a measure of both the frequency and magnitude of price changes over time. A rise in oil prices will result in higher operating costs for businesses, higher living expenses for consumers, lower consumer spending, and lower business profits. By raising the cost of products and services, these consequences eventually impede economic growth by reverberating across important industries like manufacturing, agriculture, and transportation (Eneji et al., 2016).

Nigeria's economy is heavily impacted by fluctuations in oil prices because the country's economy and oil prices are tightly linked. The cost of production rises with rising oil prices, which reduces consumer demand and hurts other sectors like agriculture. The rising costs of oil-based inputs have had a detrimental impact on Nigeria's agricultural output, which was a significant contribution to the country's economy. The conflict between Russia and Ukraine, among other world events, has also raised the price of crude oil and caused inflation worldwide. For instance, Nigeria's benchmark crude price, Bonny Light, saw mild swings in August 2022, demonstrating that oil-dependent countries are susceptible to external geopolitical and market forces (Roeben, 2024).

Although the influence of oil price fluctuation on Nigeria's economy has been thoroughly examined, the volatility of particular petroleum products has received less attention than the overall volatility of oil prices. Nigeria's economic activities are greatly impacted by changes in the prices of goods including gas, fuel, kerosene, and petrol. The cost of transportation and the costs of consumer products and services are directly impacted by fluctuations in petrol prices, which have an impact on several economic sectors. Similarly, diesel fuel price fluctuations have a big effect because they are utilized in heavy-duty vehicle transportation, agriculture, and industrial processes. In the context of Nigeria's efforts to increase domestic gas consumption and promote industrial development, gas price volatility is also important.

Additionally, because kerosene is used for cooking and lighting, price fluctuations have an impact on household welfare, particularly for low-income groups. Given the significant significance these refined products play, the purpose of this study is to investigate the various implications of the price volatility of gasoline, diesel, kerosene, and gas on Nigeria's real GDP. By breaking down the effects of these distinct products, the study will be helpful in understanding how oil price volatility affects the many economic sectors. This will direct certain policy initiatives that support Nigeria's efforts to diversify its economy, protect sensitive industries, and stabilize prices.

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2.0. CONCEPTUAL CLARIFICATIONS AND THEORETICAL FRAMEWORK

2.1. Conceptual Clarifications

Nigeria is a large exporter of crude oil to create foreign exchange and revenue, therefore the volatility of oil prices has a considerable impact on the price volatility of petroleum pumps in the country. Petrol prices in the local market are impacted by rising global oil prices, especially when the subsidy was eliminated, and increased production and transportation expenses lead to inflation. However, Nigeria experiences a revenue shortfall when oil prices drop, which affects fiscal budgets and lowers the naira, providing little pass-through to consumers due to exchange rate pressures. These swings can impede policy planning, reduce disposable income, and create uncertainty for consumers and businesses, all of which can impede economic growth. Additionally, the country's reliance on imports and inefficiencies in the downstream sector exacerbate these consequences, suggesting a more resilient and diversified economic structure.

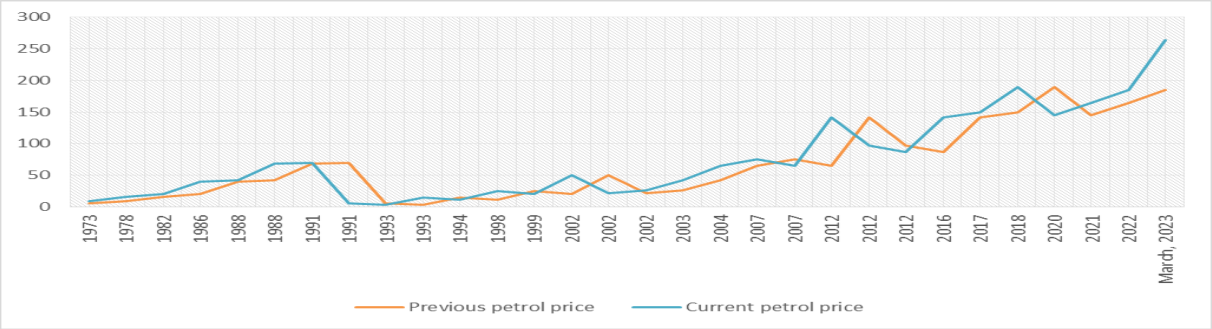

Figure 1: Petrol Pump Price Fluctuations in Nigeria. **Source:** Researcher's Computation, 2026)

Figure 1.1 shows the trend of petrol pump prices in Nigeria since 1973, showing an upward tendency over the course of 49 years. When comparing the pricing of gasoline before and after the peak oil period, the data reveals very small price increases throughout the early period (1973 to the 1990s). The modest price swings throughout this period suggest a comparatively stable pricing environment, which may be explained by government subsidies or by market regulation that keeps internal consumers unaffected by changes in external prices.

However, the tendency indicates higher price increases after the 2000s. This shift is consistent with shifting economic policies, increased access to the dynamics of the global crude oil market, and rising domestic inflationary pressures. As the government's previous interventionist policies shifted toward market forces, price hikes accelerated during this time.

The most striking feature of the data, nevertheless, is found in the most recent years of the record, particularly the 2020–21 period, when current gas prices are noticeably higher than those in the past. This sharp rise comes after policy changes, including the phase-out of subsidies and other fiscal adjustments made in response to mounting economic pressures. The timeline's visualization of the price gap between past and present prices emphasizes how customers are increasingly impacted financially when making gasoline pricing decisions.

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These price fluctuations are a prime example of the complex interactions that continue to influence Nigeria's economic course between domestic policy decisions and forces of the global energy market. The historical volatility pattern is crucial to understanding the changes in petrol prices and how they affect Nigeria's macroeconomic results.

2.2. Theoretical Framework

Classical Growth Theory: The Supply-Side Economic Theory examines how external shocks, such as fluctuations in oil prices, affect the economy's capacity to produce. According to this idea, economic growth is caused by the factors of production, such as capital, labor, and technology, which increase the economy's potential for production. In this instance, changes in oil prices may have an impact on production costs and, consequently, economic growth.

Oil-dependent economies are negatively impacted by rising production costs, which lead to inflationary pressures, a decline in industrial activity, and slower growth. On the other hand, a decline in oil prices might affect manufacturing margins, increase demand, and support the expansion of energy-dependent businesses, all of which would contribute to positive economic growth. The supply side impacts, or the direct impact of changes in oil prices on production costs, investment choices, and long-term economic growth, are also included by this theory.

Dutch Disease Theory: The Dutch Disease Theory explains why the discovery and export of natural resources, like oil, have a detrimental effect on other sectors of the economy, particularly manufacturing and agriculture. According to the hypothesis, reliance on oil exports raises the real exchange rate, which makes non-oil sectors less competitive. This is particularly true in countries like Nigeria that rely heavily on oil exports. When oil prices are high, nations receive inflows of foreign currency, which causes the value of their own currency to increase. This hurts non-oil industries by making non-oil exports more expensive and less competitive in global markets**.** When oil prices drop, the effect's on other prices rise, which lowers the value of the currency and affects the economy by reducing oil revenue. It increases the susceptibility of oil-dependent economies, like Nigeria, to changes in oil prices. Put differently, the Dutch Disease theory highlights the detrimental impact of oil price volatility on diversified economic growth by encouraging reliance on oil exports and impeding the expansion of other industries.

2.3. Empirical Review

Tijjani and Yahaya (2025) used secondary data to examine the impact of oil price volatility on the Nigerian economy between 1981 and 2023. With a focus on macroeconomic stability in the face of fluctuating global oil prices, the study sought to determine how the performance of the Nigerian economy is impacted by oil price volatility. The authors employed the Vector Error Correction Model (VECM) to examine both short-run and long-run dynamics. Oil price volatility, trade openness, government spending, population growth rate, technical advancement, and institutional factors are the primary elements taken into account. The findings indicated a negative and strong long-term relationship between Nigeria's economic growth and the volatility of oil prices. Additionally, the study found that each of the four factors, trade openness, government spending, population expansion, and technical advancement, has a unique effect on growth. The relationship between oil price

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volatility and economic growth was shown to be significantly moderated by governance, particularly institutional quality.

However, Ozokede and Awogbemi (2025) used secondary data to examine the impact of crude oil price fluctuation on economic development in Nigeria from 1990 to 2023. Examining the short-term and long-term relationships between the price of crude oil (COP), fuel pump prices (FPP), inflation (INFL), interest rates (INTR), exchange rates (EXR), and Nigeria's real GDP growth rate (GDPGR) are the study's particular goals. In order to determine whether there are any long-term correlations between the variables, the authors do the unit root tests and bounds testing technique to co-integration in addition to using the Autoregressive Distributed Lag (ARDL) model to evaluate the relationship. The findings demonstrated that domestic fuel pricing had a negative short-term impact on GDP growth, in contrast to crude oil earnings. This suggests that fuel price volatility, which is primarily caused by the subsidy system and import dependence, impedes economic growth more than crude oil earnings. Furthermore, the short-term negative impact of inflation on economic growth was minimal.

Using secondary data, Justina and Isioma (2025) examined the relationship between oil price volatility and the Nigerian economy from 2000 to 2023. Examining the socioeconomic effects of oil price fluctuations on Nigerian households and communities, assessing the effects of oil price fluctuations on public debt and fiscal sustainability, and determining the role of government policy in mitigating the effects of oil price fluctuations were the three primary goals of the study. To ascertain the strengths and directions of the associations, the authors employed multiple regression and correlation analysis. Global oil prices, GDP growth rate, government income, unemployment rate, inflation, and public debt are all examined. The findings showed that while oil price volatility has a major negative impact on unemployment and public debt, it has a large positive impact on GDP growth rate and government revenue. However, the association between oil prices and inflation was weak and not statistically significant, suggesting that structural and monetary factors had a greater impact on inflation than oil prices.

The asymmetric effects of crude oil price volatility on Nigeria's economy from 2000 to 2023 were examined by Obaje, Nwinee, and Eme (2025). Examining the impact of both positive and negative oil price shocks on the chosen economic indicators of inflation, unemployment, and trade balance was the aim of this study. To make sure the results were reliable, the authors employed the Nonlinear Autoregressive Distributed Lag (NARDL) Model and carried out a number of diagnostic tests. Crude oil price volatility, inflation, unemployment, and trade balance were the primary variables examined. The findings demonstrated that whereas negative oil price shocks have a favorable impact on economic growth, positive oil price shocks have a negative impact. GDP was found to be significantly impacted negatively by unemployment, positively impacted by lower inflation, and positively impacted even more by improved trade balance.

3.0. METHODOLOGY

3.1. Dutch Disease Theory as a Theoretical Framework

The Dutch Disease Theory explains how reliance on oil exports can result in significant economic imbalances, particularly due to the impact of oil price volatility on the exchange rate and other sectors. Additionally, as oil prices rise, the currency rate appreciates, making non-oil exports less competitive and reducing the amount of resources allocated to the oil industry. Important sectors like industry and

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agriculture that contribute to the expansion and diversity of the economy are negatively impacted by this shift. From an economic standpoint, Nigeria's oil price volatility includes petrol price volatility (PVOL), diesel price volatility (DVOL), gas price volatility (GVOL), and kerosene price volatility (KVOL), all of which have a direct impact on the country's real GDP (RGDP) growth and production costs.

3.2. Derivation of Volatilities

To ascertain the rate of change in the pump prices of gasoline, diesel, kerosene, and gasoline, each variable was examined using the conventional GARCH framework. This methodology is used to record volatility indicators, including the mean, a deterministic trend, or a time-varying value, that quantify the impact of sporadic variations in oil price volatility relative to a base level.

3.3. Model Specification

This study draws on the study of Ozokede and Awogbemi (2025) which investigated the effect of price volatility of crude oil on economic growth in Nigeria. Their model was specified as follows:
GDPGR = F (FPP, INFL, INTR, EXR) i

Where Crude Oil Price (COP), Fuel Pump Price (FPP), Inflation (INFL), Interest Rate (INTR), and Exchange Rate (EXR) were the independent variables, while Nigeria's Real GDP Growth Rate (GDPGR) was the dependent variable

To address the research questions of this study, we modified Ozokede and Awogbemi's model into the following functional form:

RGDP = F(PVOL, DVOL, GVOL, KVOL, EXR) ii

Where: RGDP = Growth rate of Real Gross Domestic Product (Real GDP); PVOL = Petrol Pump Price Volatility; DVOL = Diesel Pump Price Volatility; GVOL = Gas Pump Price Volatility; KVOL = Kerosene Pump Price Volatility and EXR = Exchange Rate

The Econometric form is specified as thus;

$$RGDP_t = \beta_0 + \beta_1 PVOL_t + \beta_2 DVOL_t + \beta_3 GVOL_t + \beta_4 KVOL_t + \beta_5 EXR_t + \mu_t \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots iii$$

The expanded econometric model is expressed as follows:

$$\Delta RGDP_t = \alpha_{01} + b_{11} RGDP_{t-1} + b_{21} PVOL_{t-1} + b_{31} DVOL_{t-1} + b_{41} GVOL_{t-1} + b_{51} KVOL_{t-1} + b_{61} EXR_{t-1} + \Delta RGDP_{t-1} + \sum_{i=1}^{q} \alpha_{2i} \Delta PVOL_{t-1} + \sum_{i=1}^{q} \alpha_{3i} \Delta DVOL_{t-1} + \sum_{i=1}^{q} \alpha_{4i} \Delta GVOL_{t-1} + \sum_{i=1}^{q} \alpha_{5i} \Delta KVOL_{t-1} + \sum_{i=1}^{q} \alpha_{6i} \Delta EXR_{t-1} + +\mu_{1t} \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots iv$$

Where; All variables retain their previously defined meanings.
β_0 = intercept of the independent variable

$\beta_1 to \beta_7$ are the coefficients of the independent variables and t = trend factor and μ = error term

Amongst these variables, RGDP is specified as the dependent variable, PVOL, DVOL, GVOL and KVOL are the independent variables, while EXR is the control variables.

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3.4. Source of Data

Central bank of Nigeria statistical bulletin, National Bureau of Statistics (various years), and data generated from the standard Garch framework.

4.0. PRESENTATION OF RESULTS AND DISCUSSION

4.1. Presentation of Results

Unit Root Test and ARDL Model Results

Table 1: Overview of the Augmented Dickey-Fuller (ADF) Unit Root Testing

Variables	ADF Statistics	Test Critical Values (5%)	Order of Integration	Conclusion
RGDP	-5.808358	-2.918778	I(0)	Stationary
PVOL	-4.370311	-2.919952	I(0)	Stationary
DVOL	-5.428386	-2.919952	I(0)	Stationary
GVOL	-7.646961	-2.919952	I(0)	Stationary
KVOL	-6.033448	-2.919952	I(0)	Stationary
EXR	-6.011133	-2.919952	I(1)	Stationary

Source: Author's computation, 2026

The variables under examination have a mixed order of integration, according to the Augmented Dickey-Fuller (ADF) unit root test results shown in Table 1. In particular, only EXR attained stationarity after initial differencing, indicated I(1), whilst other variables were stationary at level, designated I(0). The volatility measurements for gasoline (PVOL), diesel (DVOL), kerosene (KVOL), and real gross domestic product (RGDP) were all stationary at level since their corresponding ADF statistics were higher than the threshold values at the 5% significance level. On the other hand, after initial differencing, the exchange rate (EXR), which was non-stationary at level, became stationary.

The approach ARDL was appropriate for the current investigation because it combined the I(0) and I(1) variables. Because it allowed for the estimation of both short-run dynamics and long-run equilibrium relationships without requiring that all variables be integrated of the same order, the ARDL framework was especially well-suited to such mixed integration orders. This adaptability improved the empirical analysis's resilience and made it possible to draw trustworthy conclusions about the variables' long-term cointegrating interactions.

Bounds Testing Approach to Autoregressive distributed lag

We chose the ARDL estimate method as the best technique based on the outcomes of the unit root tests. In order to ascertain whether the variables in the model had long-term or equilibrium links, an ARDL bounds co-integration test was carried out.

Table 2: ARDL Bounds Test

Dependent Variables	Values of F- statistic and t-statistic	Co-integration	Decision
RGDP	$F_{RGDP} = 5.385766$	Yes $t_{RGDP} = -5.824448$	Estimate the ARDL long-term structure and determine the model of error correction

Source: Author's Compilation 2026

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The null hypothesis that there is no co-integration between the variables is rejected if the calculated value of the F statistic is higher than the 5 percent critical value of the I(1) constraint. Conversely, the null hypothesis is accepted if the calculated F-statistic is less than the corresponding critical value of the I(0) bound at the five percent level.

Adopting the ARDL long-run structure and error correction model is justified by the findings in Table 2. Cointegration between the variables was indicated by the F statistic (F_RGDP = 5.385766), which was higher than the upper critical value at the 5% level of significance, and the t statistic (t_RGDP = −5.834448). This finding implied that the dependent variable (RGDP) and the independent variables have a long-run equilibrium relationship.

Thus, the ARDL model was found to be suitable for describing the long-run interactions and the error correction model (ECM) was necessary to capture the short-run relationships and to rectify the deviations from the long-run equilibrium.

Table 3: Summary of ARCH Effect Determination Using Lagrange Multiplier (LM) Test

No	Generated series	obs*R-squared prob. Values	Values of b_1 coefficients	Values of R^2	Decision
1.	PVOL	0.0019	0.439157	0.192882	Presence of ARCH effect
2.	DVOL	0.9429	-0.010125	0.000103	No ARCH effect
3.	GVOL	0.7494	-0.045182	0.002041	No ARCH effect
4.	KVOL	0.8785	-0.021625	0.000468	No ARCH effect

Source: Author's Computation, 2026.

The ARCH effect is determined and the results are also mixed as seen in Table 3 by applying the Lagrange Multiplier (LM) test for the variables. The presence of an ARCH effect is confirmed for PVOL since the obs$*R^2$ p-value is statistically significant (0.0019). This suggests volatility clustering for this series. If we take a look at the observed R^2 p-values of these variables, it can be seen that no ARCH effect is detected for DVOL, GVOL, and KVOL (p-values are 0.9429, 0.7494, and 0.8785, respectively). Moreover, the negative b_1 coefficients and low values of the R^2 for these series confirm the lack of volatility clustering, that is, a positive trend in variance over time.

Table 4: The summary result for EGARCH Model

Generated series	Method	Value of lambda	Decision
PVOL	ML ARCH - Normal distribution (Marquardt / EViews legacy)	-0.641319	A negative shock leads to higher volatility compared to an equally-sized positive shock.

Source: Author's Computation, 2026.

Table 4 displays the EGARCH model's summary results, which demonstrated that the PVOL series had an asymmetric volatility response. Assuming a normal distribution, the Maximum Likelihood (ML) ARCH model generated a negative lambda coefficient ($\lambda = -0.641319$). This finding suggested that negative shocks had a greater effect on volatility than positive shocks of the same size. The

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PVOL series is more volatile when negative occurrences are included, and this is characteristic of financial and economic data: negative events can result in bigger swings.

The asymmetric nature of the PVOL in Nigeria was further supported by the EGARCH model's results, which showed that negative price disturbances, such as abrupt drops in gas prices or market conditions, produced greater volatility than positive price disturbances of the same magnitude. This finding had significant ramifications for how Nigeria's economic growth is impacted by fluctuations in oil prices. Since oil is a key component of this economy, changes in the price of gasoline, particularly on the downside, may have an impact on investment choices, economic planning, and the operations of industries that depend on stable gas prices. These variations may potentially increase inflationary pressures and lower consumer purchasing power, which would restrict economic growth. The results reaffirmed the necessity of implementing efficient economic policies to mitigate the detrimental effects of pricing volatility and guarantee macroeconomic stability over time.

Parsimonious ARDL Model on Effect of Oil Price Volatility On Economic Growth Of Nigeria

Table 5. Result Estimates of Dynamic Short Run ARDL Error Correction Model for Effect of Oil Price Volatility on Economic Growth of Nigeria

Dependent Variable: RGDP(Real Gross Domestic Product)
Method: Least Squares

VARIABLE	COEFFICIENT	STD. ERROR	T-STATISTIC	PROB.
C	-0.075207	7.920474	2.809495	*0.0025
RGDP(-1))	0.204258	0.170360	4.198979	*0.0073
PVOL(-1))	-0.007973	0.670320	-3.011895	**0.0306
DVOL(-1))	9.241881	20.82574	0.443772	0.6595
GVOL(-1))	6.200199	25.55524	3.242620	*0.0095
KVOL(-1))	-1.587770	41.60524	-2.038163	**0.0397
EXR(-1))	0.003473	0.008816	0.393922	0.6956
ECT(-1)	-0.755874	0.670320	-6.911895	*0.0006

R-squared	0.865879	Mean dependent var	3.237255
Adjusted R-squared	0.810620	S.D. dependent var	5.369131
S.E. of regression	5.477093	Akaike info criterion	6.397811
Sum squared resid	1259.939	Schwarz criterion	6.738722
Log likelihood	-154.1442	Hannan-Quinn criter.	6.528083
F-statistic	0.756032	Durbin-Watson stat	2.006112
Prob(F-statistic)	0.002513		

Source: Researcher's Extract from EViews 12 Output Package 2026
*Key: * Significant at 1% level; ** Significant at 5% level*

Growth Rate of RGDP (RGDP): There was a strong positive correlation between the RGDP growth rate and its historical values. In particular, the current RGDP growth increased by 0.2043 units for every 1% increase in RGDP from the prior era (Lag -1). This implied that the momentum of earlier economic growth had a long-lasting beneficial effect on current economic activity.

Petrol Pump Price Volatility (PVOL): RGDP growth was significantly impacted negatively by petrol price volatility. In particular, RGDP growth decreased by 0.00797 units for every 1% rise in gasoline price volatility from the prior period (Lag -1). This would seem to indicate that the economy was

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being negatively impacted by the fluctuation of gasoline prices, perhaps due to its significance in Nigeria's transportation and manufacturing costs.

Diesel Pump Price Volatility (DVOL): Diesel price volatility has no discernible impact on RVGP growth. With a t-statistic of 0.44 and a p-value of 0.6595, the results showed that a 1% increase (or decrease) in the price of diesel had no discernible short-term effect on the growth rate of RGDP. This might have resulted from diesel's weaker economic penetration compared to gasoline.

Gas price volatility (GVOL): RGDP growth was significantly positively impacted by gas price volatility. In particular, it was discovered that a 1% increase in gas price volatility had a favorable effect on RGDP growth (Lag -1). This unanticipated positive link may have resulted from the markets' reaction to changes in gas prices, which could have encouraged adopters or innovators in production and consumption.

Kerosene Pump Price Volatility (KVOL): RGDP growth was significantly impacted negatively by kerosene price volatility. For every 1% increase in kerosene price volatility over the previous period, the RGDP growth fell by an average of 1.5878 units (Lag -1).On average, RGDP growth decreased by 1.5878 units and kerosene price volatility increased by 1% compared to the prior period (Lag -1). Given how much Nigerian households and businesses depended on kerosene for economic activity, this highlighted the detrimental impact of the volatile energy costs on the country's economy.

The exchange rate (EXR): The exchange rate does not have a strong influence on RGDP growth. The coefficient for lagged exchange rate (Lag -1) was positive, but the t-statistic (0.394) and p-value (0.6956) indicated that exchange rate changes in this model were not significant. This may have been because of Nigeria's use of a managed exchange rate system, which lessened the impact of volatility at first.

Error Correction Term (ECT): The Error Correction Term (ECT) was significantly negative, with a coefficient of -0.7559 and a t-statistic of -6.9119. This indicated that deviations from long-term equilibrium were corrected over time. In particular, each period saw the correction of roughly 75.59% of any short-term disequilibrium. Although this correction happened at a considerable rate, guaranteeing long-term stability, this robust adjustment mechanism indicated that the Nigerian economy was resilient in returning to equilibrium aftershocks.

R-squared: The model's explanatory variables account for about 86.59% of the variation in RGDP growth, according to the R-squared value of 0.8659. This shows a robust fit, indicating that the model explains changes in RGDP growth well and that the factors included account for most of the variation in economic growth.

F-statistic: The model's overall significance is tested by the F-statistic of 0.7560. The model is statistically significant at the 1% level, according to the corresponding p-value of 0.0025. This indicates that all of the explanatory factors, such as the volatility of oil prices, play a significant role in explaining the variation in RGDP growth.

Durbin-Watson Statistic: The Durbin-Watson stat of 2.0061 is quite near to 2, indicating that the regression's residuals do not exhibit any appreciable autocorrelation. This indicates that the regression

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https://www-ajsspub-org.b12sites,com https://www.ajsspub2.org
E- ISSN: 3043 – 5463 ISSN: 1595 – 5842 VOLUME 3, ISSUE 2, 2026

findings are not skewed by autocorrelation and that the mistakes from one period are independent of those from another.

4.2. DISCUSSION OF FINDINGS

Because it is the momentum of the prior expansion, the ARDL results indicated that the previous economic growth has a lasting impact on the current economic activity. This is consistent with the findings of Ozokede and Awogbemi (2025), who pointed out that the Nigerian economy is constantly susceptible to changes in the price of oil. The study's findings, which also demonstrate a detrimental impact on RGDP growth when petrol prices change, are further supported by their conclusion that fuel price volatility impedes economic activity.

The beneficial effect of gas price volatility on RGDP growth is another intriguing observation. This might be a market reaction or a way to promote economic activity in particular regions. It is in line with reports from Awogbemi (2025) and Ozokede (2025) that kerosene price volatility has a detrimental impact on Nigerian households and businesses.

Nigeria's economy has a reasonably robust self-correcting mechanism, according to the Error Correction Term (ECT) statistics, with an average of 75.59% being rectified within each period. The results of Tijjani and Yahaya's (2025) VECM research, which indicated that the impact of oil price volatility on Nigeria's economic growth is a long-term phenomenon, are consistent with the impact of oil price volatility on the country's economic growth. This analysis confirms their findings that Nigeria's economy is vulnerable to external shocks due to its reliance on oil exports.

The high R-squared value of 86.59% indicates that the chosen variables—such as the volatility of oil prices—account for a significant portion of the variation in RGDP growth. This validates the conclusions of Justina and Isioma (2025), who found that one of the main variables affecting macroeconomic stability in Nigeria is the volatility of oil prices.

5.0. CONCLUSION AND RECOMMENDATIONS

5.1. Conclusion

The empirical examination of the volatility of oil prices and Nigeria's economic development confirmed the importance of the effect which fluctuations in prices of petrol and kerosene as energy commodities had on Nigeria's economic stability. Positive oil price shocks hindered economic growth, while negative price shocks tended to have a more beneficial impact. It was also found that the volatility of petrol and of kerosene prices was negative while that of gas prices was positive for the economic growth.

The pattern showed complex and asymmetrical relationships between oil price and growth in Nigeria. Furthermore, the study revealed that the exchange rate was considered as one of the determinants of economic dynamics however, it was not a significant determinant of short term growth of RGDP's. The results highlighted the need to implement structural reforms, economic diversification and better economic policies to ensure a more stable economic growth and diminish the reliance on oil prices.

5.2. Recommendations

Following the above findings, the following recommendations were made:

1. To reduce the impact of fluctuations in oil prices, Nigeria would need to focus on diversification of its economy from reliance on oil. In order to lessen the economy's reliance on fluctuations in global oil prices, farmers, manufacturers, and technologists needs to be encouraged to expand.

2. Energy prices needs to be stabilized and their destabilizing effect on the economy minimized by increasing the domestic refining capacity, decreasing fuel subsidies, and encouraging the use of energy efficient and alternative energy sources.

Conflict of Interest

The authors declare that no conflict of interest exist in this manuscript

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