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FISCAL SUSTAINABILITY UNDER DECLINING OIL REVENUE IN NIGERIA

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Abstract

The study examined the impact of fiscal sustainability under declining oil revenue in Nigeria covering 1990 to 2025. Debt to Gross Domestic Product Ratio, Debt to Revenue Ratio, Fiscal Balance and Exchange Rate were used as a surrogate for fiscal sustainability while oil revenue served as the dependent variable. World Banks World Development Index (WDI) and computed data were the major sources of data collection while the Augmented Dickey Fuller (ADF) Unit Root test and the Autoregressive Distributive Lag (ARDL) were used to test the variables and analyze the hypothesis. The empirical result revealed that fiscal sustainability is correlated with oil revenue according to the bound test. Further findings showed debt to revenue ratio, fiscal balance and exchange rate are positive and significantly relate with oil revenue while debt to gross domestic product ratio had a negative but and significant impact on oil revenue. Thus, it was concluded that fiscal sustainability had a substantial impact on oil revenue in Nigeria. It was therefore, recommends that the Federal Ministry of Finance and the Budget Office of the Federation should strengthen fiscal discipline and improve public financial management to sustain healthy fiscal balances. This will improve fiscal sustainability and enable the government to maximize the benefits of oil revenue for long-term economic development.

Keywords: Debt to Gross Domestic Product Ratio, Debt to Revenue Ratio, Fiscal Balance, Exchange Rate Oil Revenue

1. Introduction

Fiscal sustainability has become a major concern among resource-dependent economies, particularly those whose public finances are heavily influenced by fluctuations in commodity revenues. In Nigeria, crude oil revenue has historically remained the backbone of government financing, accounting for a significant proportion of export earnings, foreign exchange inflows, and public revenue. However, declining oil revenue arising from global oil price volatility, declining production, insecurity in oil-producing regions, and the global transition toward renewable energy has created increasing pressure on Nigeria's fiscal capacity. Therefore, fiscal it is imperative to note that fiscal sustainability refers to the ability of a government to maintain its current fiscal policies, meet existing and future debt obligations, and finance public expenditure without generating excessive debt accumulation or requiring abrupt fiscal adjustments (Blanchard, 1990;

Bohn, 1998). According to the intertemporal budget constraint theory, fiscal sustainability requires that government expenditure and debt obligations should be supported by adequate revenue generation over time. Consequently, recent literature emphasizes that fiscal sustainability extends beyond debt management to include fiscal balance, revenue stability, debt servicing capacity, and macroeconomic conditions such as exchange rate stability (IMF, 2023).

Empirical previous literature has established a strong connection between fiscal sustainability and oil revenue fluctuations outcomes in Nigeria. Ezekwe and Ogbokor (2025), using annual data from 1990–2022 and an Error Correction Model (ECM), found that crude oil prices significantly improved fiscal sustainability by strengthening government capacity to meet debt obligations, while exchange rate depreciation weakened fiscal sustainability. Similarly, Akpan et al. (2024), using quarterly data from 2001Q1–2020Q4 and the

Cointegrating Non-linear Autoregressive Distributed Lag (C-NARDL) model, revealed that positive oil price shocks improved fiscal sustainability, whereas negative oil price shocks significantly worsened fiscal outcomes. These findings suggest that Nigeria's fiscal position remains highly vulnerable to oil revenue instability.

Therefore, this study is motivated by the need to provide a broader assessment of Fiscal Sustainability under Declining Oil Revenue in Nigeria from 1990 to 2025. Unlike previous studies, this research adopts a multidimensional approach by examining how declining oil revenue affects key fiscal sustainability indicators, including debt sustainability, fiscal balance, and exchange rate conditions. The study is expected to contribute to existing literature by providing updated empirical evidence and generating policy insights for improving revenue diversification, strengthening debt management, and enhancing Nigeria's long-term fiscal resilience.

2. Literature Review

2.1 Conceptual Clarification

Fiscal Sustainability

Fiscal sustainability reflects government's ability to maintain sound fiscal operations over time without compromising economic stability or imposing an excessive burden on future generations. According to Blanchard (2019), fiscal sustainability refers to the capacity of a government to continue its current fiscal policies indefinitely without causing an explosive increase in public debt relative to the size of the economy. This view emphasizes that governments must ensure that public debt remains on a stable trajectory through prudent revenue generation and expenditure management. Similarly, Auerbach and Gale (2020) define fiscal sustainability as the ability of a government to finance its existing and future spending commitments while maintaining a stable debt-to-GDP ratio over the long run without requiring drastic fiscal adjustments. Their definition highlights the importance of balancing fiscal deficits with economic growth to preserve macroeconomic stability. The International Monetary Fund (2023) defines fiscal sustainability as the government's ability to maintain current spending,

taxation, and borrowing policies over the long term without threatening its solvency or requiring unrealistic policy corrections. The International Monetary Fund further argues that sustainable fiscal policy enables governments to respond effectively to economic shocks while maintaining investor confidence and ensuring debt remains manageable.

Oil Revenue

Oil revenue is a critical source of government income in many resource-rich economies, particularly oil-exporting countries, where it finances public expenditure, infrastructure development, and macroeconomic stabilization. According to Ross (2019), oil revenue refers to the financial income that governments derive from the exploration, production, export, and taxation of crude oil and natural gas resources. Ross argues that oil revenue constitutes a major component of public finance in petroleum-dependent economies and significantly influences fiscal policy, economic growth, and political institutions. Similarly, Stevens, et al (2020) define oil revenue as the total receipts earned by governments from petroleum activities through royalties, taxes, production-sharing agreements, bonuses, dividends from state-owned oil companies, and proceeds from crude oil exports. The authors emphasize that oil revenue encompasses all fiscal inflows generated from the exploitation of hydrocarbon resources. The International Monetary Fund (2023) defines oil revenue as government revenue generated from petroleum-related activities, including royalties, profit oil, corporate income taxes, petroleum profit taxes, export earnings, and dividends received from national oil companies. The IMF notes that oil revenue remains highly susceptible to fluctuations in international crude oil prices, production volumes, exchange rate movements, and global energy demand, making fiscal management particularly challenging in oil-dependent economies.

2.2 Theoretical Review

Intertemporal Budget Constraints Theory

The Intertemporal Budget Constraint Theory was propounded by Barro in 1979 and subsequently extended by Hamilton and Flavin (1986) and Bohn (1998, 2007).

The theory is founded on the belief that governments, like households and firms, face an intertemporal budget constraint, implying that current and future public expenditures must ultimately be financed by current and future government revenues. Consequently, governments cannot sustain persistent fiscal deficits through continuous borrowing without eventually generating sufficient fiscal surpluses to repay accumulated debt. The theory therefore maintains that fiscal sustainability exists when the present value of future primary fiscal surpluses is sufficient to offset the existing stock of public debt. The fundamental assumption of the theory is that governments are rational economic agents that seek to maximize long-term social welfare by maintaining fiscal solvency. It assumes that governments possess the institutional capacity to adjust fiscal policy through taxation, expenditure rationalization, or both whenever public debt reaches unsustainable levels.

The theory is highly relevant to the study because it provides a comprehensive explanation of how declining oil revenue influences fiscal sustainability. Nigeria relies heavily on crude oil as a major source of government revenue; consequently, declines in oil prices or production reduce fiscal receipts, widen budget deficits, increase public borrowing, and heighten debt servicing pressures. The theory explains that unless government expenditure is matched with sustainable revenue generation or appropriate fiscal adjustments, persistent fiscal imbalances will eventually undermine long-term fiscal solvency. It therefore provides a suitable framework for examining the sustainability of Nigeria's public finances under declining oil revenue. The theory was adopted as the anchor for this study because it directly addresses the central concept of fiscal sustainability, which constitutes the dependent variable of the study. Unlike alternative theories such as the Resource Curse Theory, which primarily explains the adverse consequences of resource dependence, or the Fiscal Theory of the Price Level, which focuses largely on the interaction between fiscal policy and inflation, the theory explicitly establishes the long-run relationship between government revenue, public expenditure, public debt, and fiscal sustainability. Its emphasis on fiscal balance, prudent debt management, and long-term

solvency makes it the most appropriate theoretical framework for analyzing fiscal sustainability under declining oil revenue in Nigeria.

Resource-Curse Theory

The Resource Curse Theory was propounded by Auty in 1993. The theory was subsequently expanded by Sachs and Warner (1995, 2001) and Ross (1999, 2015, 2019). The theory is founded on the belief that countries endowed with abundant natural resources, particularly oil and minerals, often experience slower economic growth, weaker institutions, poor governance, fiscal instability, and lower levels of development than countries with relatively fewer natural resources. Contrary to conventional expectations, natural resource abundance does not automatically translate into sustainable economic prosperity because excessive dependence on resource revenues exposes economies to external shocks, discourages economic diversification, and weakens fiscal discipline. The theory assumes that governments in resource-rich countries become excessively dependent on revenues generated from natural resources, thereby neglecting the development of other productive sectors such as agriculture, manufacturing, and services. Proponents of the theory argue that abundant natural resources can become an economic liability rather than an advantage when governments fail to manage resource revenues efficiently. Auty (1993) contends that dependence on mineral and petroleum revenues often discourages economic diversification and reduces incentives for fiscal discipline and institutional reforms.

The theory is highly relevant to the present study because Nigeria remains one of the world's most oil-dependent economies, with crude oil serving as a major source of government revenue and foreign exchange earnings for several decades. Declining oil revenue resulting from falling global oil prices, production disruptions, energy transition policies, and reduced export earnings has significantly constrained government finances, widened fiscal deficits, increased public borrowing, and heightened debt servicing obligations. The theory explains that excessive dependence on oil revenue has made Nigeria's fiscal position highly vulnerable to external shocks while weakening incentives for

economic diversification and domestic revenue mobilization. Consequently, fluctuations in oil revenue have become a major challenge to achieving long-term fiscal sustainability.

2.3 Empirical Review

Ezekwe and Ogbokor (2025) investigated the effect of oil price fluctuations on fiscal sustainability in Nigeria. Annual time-series data covering the period 1990–2022 were obtained from the World Bank and the Organization of the Petroleum Exporting Countries (OPEC). The study employed a dynamic parsimonious Error Correction Model (ECM) after conducting unit root and cointegration tests to establish both the short-run and long-run relationships among the variables. Fiscal sustainability was proxied by public debt servicing, while the explanatory variables included Brent crude oil price, West Texas Intermediate (WTI) crude oil price, and the exchange rate. The findings further revealed that Brent crude oil price exerted a significant positive influence on fiscal sustainability, implying that increases in international oil prices improve government revenue and strengthen the government's capacity to meet its debt obligations. Similarly, West Texas Intermediate crude oil price was found to have a positive and statistically significant effect on fiscal sustainability. In contrast, the exchange rate exhibited a negative and significant effect on fiscal sustainability.

Mainoma and Izang (2025) examined the effect of tax revenue on fiscal sustainability in Nigeria. Specifically, the study sought to determine the extent to which tax revenue contributes to improving fiscal sustainability amidst declining oil revenue. An ex-post facto research design was adopted, while quarterly time-series data covering the period 2016–2024 were obtained from the Federal Inland Revenue Service (FIRS) Annual Reports and the Central Bank of Nigeria (CBN) Statistical Bulletin (2024 edition). The findings revealed that Company Income Tax (CIT) exerted a negative and statistically significant effect on the Debt-to-GDP ratio. Similarly, Petroleum Profit Tax (PPT) had a negative and statistically significant effect on the Debt-to-GDP ratio. However, Value Added Tax (VAT) exhibited a positive and statistically significant effect on the Debt-to-GDP ratio.

Adekunle (2025) examined the effect of crude oil revenue volatility on Nigeria's fiscal sustainability. The study adopted an ex-post facto research design and utilized annual secondary data covering the period 2010–2024, obtained from the Central Bank of Nigeria (CBN), the World Bank, and the International Monetary Fund (IMF). The budget deficit was used as the dependent variable and proxy for fiscal sustainability, while the explanatory variables comprised oil revenue volatility (measured using the coefficient of variation of oil revenue), government spending (as a percentage of GDP), and external debt servicing (as a percentage of GNI). The study reveals that oil revenue volatility exerted a positive and statistically significant effect on the budget deficit. The results further showed that government spending had a positive and significant effect on the budget deficit, similarly, external debt servicing was found to have a positive and statistically significant influence on the budget deficit, suggesting that increasing debt repayment obligations reduce fiscal space and weaken fiscal sustainability. The estimated model explained approximately 82.6% of the variations in the budget deficit ($R^2 = 0.826$), indicating strong explanatory power.

Ogbokor and Ezekwe (2025) explore the link between oil price fluctuations and fiscal sustainability in the context of debt servicing in Nigeria. The study constructs a dynamic parsimonious error correction model to quantify the effect of Brent crude and West Texas Intermediate oil prices and exchange rate on public debt servicing between 1990 and 2022 with the data sourced from the World Bank and the Organisation of Petroleum Exporting Countries (OPEC). The findings showed that all the variables are integrated of order one, $I(1)$ and have a long-run relationship at the 5% level. Evidence of a positive and significant effect of Brent crude oil prices on debt servicing was established from the results. This explains that an increase in Brent crude oil prices enhances the process of fiscal sustainability in Nigeria by meeting debt service obligations. Similarly, the results showed that West Texas Intermediate crude oil price affected debt servicing positively, but this finding is not significant at the 5% level. However, evidence of a negative effect of a negative and significant effect of exchange rates on debt servicing. This implies that an

increase in the exchange rate decreases the value of the naira with

Oduyemi, et al (2025) examined the dynamics of Nigeria's fiscal policy responses to oil price shocks and their implications for revenue stabilization, public health outcomes, and external debt sustainability. The study adopted an ex-post facto research design and utilized annual time-series data covering the period 1980–2023. Secondary data were obtained from the Central Bank of Nigeria (CBN), the World Bank, the International Monetary Fund (IMF), and the Organization of Petroleum Exporting Countries (OPEC). The study employed the Vector Autoregressive (VAR) model, while Impulse Response Functions (IRF) and Variance Decomposition (VD) were used to examine the dynamic interactions among the variables. The principal variables included oil price shocks, government revenue, public health expenditure, external debt sustainability, and fiscal performance. The findings revealed that oil price shocks significantly influenced government revenue and fiscal performance in both the short run and the long run. The results further showed that adverse oil price shocks reduced government revenue, constrained public expenditure, and increased the government's dependence on external borrowing, thereby weakening fiscal sustainability. The impulse response analysis indicated that fiscal variables responded negatively to persistent oil price declines, while the variance decomposition results showed that a substantial proportion of the variations in fiscal performance and external debt sustainability could be explained by oil price shocks over the forecast horizon.

Popoola et al (2024) examined the impact of oil revenue on Nigeria's economic growth with emphasis on the asymmetric effects of oil revenue fluctuations. The study adopted an ex-post facto research design and utilized annual time-series data covering the period 1981–2021. Data were sourced from the Central Bank of Nigeria (CBN), the World Development Indicators (WDI), and other official macroeconomic databases. The study employed the Non-linear Autoregressive Distributed Lag (NARDL) model to estimate both the short-run and long-run asymmetric relationships between the variables. The dependent variable was Real Gross

Domestic Product (RGDP), while the explanatory variables included oil revenue decomposed into positive oil revenue shocks and negative oil revenue shocks, alongside relevant macroeconomic control variables. The findings revealed that positive oil revenue shocks exerted a positive and statistically significant effect on Nigeria's economic growth, indicating that increases in petroleum revenue stimulate productive activities and improve government fiscal capacity. However, negative oil revenue shocks had a larger adverse and statistically significant effect on economic growth, suggesting that declines in oil revenue generate greater macroeconomic instability than the gains realized during oil booms.

3. Methodology

3.1 Research Design and Method of Data Analysis

Ex-post factor research design was used in this study because the facts has been established and cannot be manipulated by the researcher while secondary data were collected from the World Banks World Development Index (WDI) and Authors computation 2026 on Debt to Gross Domestic Product Ratio, Debt to Revenue Ratio, Fiscal Balance and Exchange Rate as a surrogate for fiscal sustainability while oil revenue served as the dependent variable. The Augmented Dickey Fuller (ADF) method was used in order to do the unit root test on the model that was developed. Taking into consideration the results of the ADF, the research used the Auto-regressive Distributive Lag (ARDL).

3.2 Model Specification

The model of this study is built on the model of Ogbokor and Ezekwe, (2025) when investigating Fiscal Sustainability in Nigeria: Does Changes in Oil Prices Matter. Their model is specified as follows:

$$EXDS = f(BCP, WTI, EXH) \quad (1)$$

Where: EXDS = External debt service, BCP = Brent crude oil price, WTI = West Texas Intermediate crude oil price, EXH = Exchange rate

To achieve the objective of the study the baseline model was modified to incorporate debt to gross domestic product, debt to revenue ratio, and fiscal balance.

Thus, the new modified model is specified as follows:

$$ORV = f(DGDPR, DRVR, FSBL, EXR) \quad (2)$$

The mathematical model could be symbolically expressed as;

$$ORV = \beta_0 + \beta_1 DGDPR + \beta_2 DRVR + \beta_3 FSBL + \beta_4 EXR \quad (3)$$

$$ORV = \beta_0 + \beta_1 DGDPR + \beta_2 DRVR + \beta_3 FSBL + \beta_4 EXR + e \quad (4)$$

Where:

ORV = Oil Revenue, DGDPR = Debt to Gross Domestic Ratio, DRVR = Debt to Revenue Ratio, FSBL = Fiscal Balance, EXR = Exchange Rate, f = functional relationship β_0 = Intercept of relationship in the model/constant B_1-B_4 = Coefficients of each independent or explanatory variable e = Stochastic or Error term.

3.3 Description of Variable in the Model

Oil Revenue (ORV): This refers to the income earned by a government from the exploration, production, export, and taxation of crude oil and natural gas. Oil revenue serves as the dependent variable and is measured in US\$.

Debt to Gross Domestic Product Ratio (DGDPR):

The debt-to-GDP ratio measures the size of a country's total public debt relative to its Gross Domestic Product (GDP). It indicates the country's capacity to service its debt using the value of goods and services produced. An increase in the debt-to-GDP ratio is generally expected to reduce oil revenue. A high debt burden often reflects weak fiscal management and increases debt servicing obligations, leaving fewer resources for investment in the oil sector. Therefore, this paper hypothesized that debt-to-GDP ratio will be negatively related with oil revenue. Debt-to-GDP ratio is used to proxy fiscal sustainability and was measured in %. Hence, $\beta_1 < 0$

Debt to Revenue Ratio (DRVR): The debt-to-revenue ratio measures the proportion of government debt relative to total government revenue. It indicates how much of government income is required to meet debt obligations. An increase in the debt-to-revenue ratio is

expected to negatively affect oil revenue. When a larger share of government revenue is devoted to servicing debt, fewer funds remain for exploration, infrastructure development, security of oil facilities, and investment in petroleum production, thereby reducing the government's ability to generate higher oil revenue. Consequently, this paper hypothesized that debt-to-revenue ratio will be negatively related with oil revenue. Debt-to-revenue ratio is used to proxy fiscal sustainability and was measured in %. Hence, $\beta_2 < 0$

Fiscal Balance (FSBL): This is the difference between government total revenue and total expenditure over a given period. A positive fiscal balance (surplus) occurs when revenue exceeds expenditure, while a negative balance (deficit) occurs when expenditure exceeds revenue. An improvement in fiscal balance is expected to increase oil revenue. Strong fiscal discipline enhances macroeconomic stability, improves investor confidence, and enables greater investment in the petroleum sector. Accordingly, this paper assumed that fiscal balance will be positively related with oil revenue. Fiscal balance is used to proxy fiscal sustainability and was measured in billions of Naira annually. Thus $\beta_3 > 0$

Exchange Rate (EXR): This is the price of one country's currency in terms of another country's currency. It determines the value of export earnings and international trade transactions. An increase in the exchange rate (currency depreciation, where more naira are required to buy one US dollar) is generally expected to have a positive effect on oil revenue in Nigeria. Since crude oil is priced in U.S. dollars, a depreciation of the naira increases the naira value of oil export receipts when converted into domestic currency. Accordingly, this paper anticipated that exchange rate will be positively related with oil revenue. Exchange rate is used as a control variable and was measured in US\$. Thus $\beta_4 > 0$

4. Results and Discussion

4.1 Empirical Data Analysis

Table 1: Descriptive Statistics

	ORV	DGDPR	DRVR	FBL	EXR
Mean	3449.544	12.08194	110.1186	1372.103	235.5206
Median	3969.900	10.71000	84.68500	462.4000	132.0800
Maximum	8879.000	29.59000	277.2600	6404.700	1518.380
Minimum	71.90000	5.830000	27.51000	-1697.000	8.040000
Std. Dev.	2573.012	5.175115	72.11288	2151.268	340.4311
Skewness	0.136576	1.512964	0.972836	0.851989	2.941637
Kurtosis	1.915109	5.356507	3.069587	2.723096	11.27231
Jarque-Bera	1.877402	22.06404	5.685721	4.470323	154.5661
Probability	0.391136	0.000016	0.058259	0.106975	0.000000
Sum	124183.6	434.9500	3964.270	49395.70	8478.740
Sum Sq. Dev.	2.32E+08	937.3634	182009.4	1.62E+08	4056268.
Observations	36	36	36	36	36

Source: E-view 13 Output

Table 1 presents the descriptive statistics for the variables employed in the study, namely Oil Revenue (ORV), Debt-to-Gross Domestic Product Ratio (DGDPR), Debt-to-Revenue Ratio (DRVR), Fiscal Balance (FBL), and Exchange Rate (EXR), based on 36 annual observations covering the study period. The mean values indicate the average performance of each variable throughout the sample period. Oil Revenue (ORV) recorded the highest average value of 3449.544 billion naira, reflecting the substantial contribution of crude oil to Nigeria's fiscal revenue. The Debt-to-Gross Domestic Product Ratio (DGDPR) had an average value of 12.0819%, suggesting that Nigeria's public debt represented about 12.08 percent of GDP on average during the study period. Similarly, the Debt-to-Revenue Ratio (DRVR) recorded a mean value of 110.1186%, implying that the country's public debt exceeded its revenue generation capacity on average. Fiscal Balance (FBL) had an average value of 1372.103, indicating an overall positive fiscal position over the study period despite periods of deficits. The Exchange Rate (EXR) recorded an average value of ₦235.5206 per US dollar, reflecting the average value of the naira against the United States dollar over the period.

The median values of 3969.900, 10.7100, 84.6850, 462.4000, and 132.0800 for ORV, DGDPR, DRVR, FBL, and EXR, respectively, are generally close to their

corresponding mean values, although the noticeable differences for FBL and EXR suggest the influence of extreme observations. The maximum and minimum values further reveal the extent of variability among the variables. ORV ranged from 71.900 billion naira to 8879.000 billion naira, indicating substantial fluctuations in government oil revenue over the study period. DGDPR varied between 5.830% and 29.590%, reflecting changes in the country's debt burden relative to GDP. DRVR ranged from 27.510% to 277.260%, suggesting considerable variations in debt servicing pressure relative to government revenue. Fiscal Balance recorded values ranging from a deficit of -1697.000 to a surplus of 6404.700, indicating significant swings between fiscal deficits and surpluses across the years. Exchange Rate exhibited the widest range, increasing from ₦8.04 per US dollar to ₦1518.38 per US dollar, highlighting the substantial depreciation of the naira during the study period.

The standard deviation measures the extent to which the observations deviate from their respective mean values. ORV recorded a standard deviation of 2573.012, indicating substantial deviations of oil revenue from its average level due to fluctuations in international crude oil prices, production levels, and global demand conditions. Fiscal Balance also exhibited a high standard deviation of 2151.268, suggesting considerable

departures from its mean as a result of alternating fiscal surpluses and deficits arising from changing government revenue and expenditure patterns. Exchange Rate recorded a relatively large standard deviation of 340.4311, indicating significant deviations from its average value, reflecting persistent exchange rate volatility and episodes of currency depreciation. In contrast, DRVR and DGDPR recorded standard deviations of 72.1129 and 5.1751, respectively, indicating moderate variability around their average values and suggesting relatively more stable movements compared to ORV, FBL, and EXR.

The distributional characteristics of the variables are further examined using skewness, kurtosis, and the Jarque–Bera normality test. The skewness coefficients reveal that all the variables are positively skewed, with ORV (0.1366), DGDPR (1.5130), DRVR (0.9728), FBL (0.8520), and EXR (2.9416) exhibiting longer right tails, implying that relatively high values occurred less frequently than lower values. The degree of skewness is particularly pronounced for EXR, indicating the presence of extreme exchange rate observations during the sample period. The kurtosis statistics indicate that ORV (1.9151) and FBL (2.7231) are platykurtic, implying flatter distributions than the normal distribution. DRVR (3.0696) is approximately mesokurtic, suggesting a distribution close to normal,

while DGDPR (5.3565) and EXR (11.2723) are leptokurtic, indicating more peaked distributions with heavier tails and the presence of extreme observations.

The Jarque–Bera normality test provides additional evidence regarding the distribution of the variables. ORV (JB = 1.8774, $p = 0.3911$), DRVR (JB = 5.6857, $p = 0.0583$), and FBL (JB = 4.4703, $p = 0.1070$) have probability values greater than the 5 percent level of significance, indicating that the null hypothesis of normal distribution cannot be rejected for these variables. Conversely, DGDPR (JB = 22.0640, $p = 0.000016$) and EXR (JB = 154.5661, $p = 0.0000$) exhibit statistically significant departures from normality. Conclusively, although two variables are not normally distributed, the majority of the variables satisfy the normality assumption. Furthermore, since the Augmented Dickey–Fuller (ADF) unit root test does not require strict normality of the data, these results indicate that the dataset possesses acceptable statistical properties and is suitable for proceeding with the unit root analysis and subsequent econometric estimation.

4.2 Unit Root Test

A unit root test known as the Augmented Dickey Fuller (ADF) test was used in the research project to determine the order of integration of the variables that were being investigated. This was done in order to pick the proper approach and prevent false regression.

Table 2: Unit Root Test Using Augmented Dickey Fuller (ADF)

Variables	Levels		First Difference		Order of Integration	P-value
	T. Statistics	5% Critical Value	T. Statistics	5% Critical Value		
LORV	-2.436504	-2.948404	-5.477647	-2.951125	I(1)	0.0001
DGDPR	-1.796215	-2.948404	-6.302995	-2.951125	I(0)	0.0000
DRVR	-0.862581	-2.948404	-6.280731	-2.951125	I(1)	0.000
LFBL	-3.337375	-2.986225			I(1)	0.0025
LEXR	-0.778369	-2.948404			I(1)	

Source: Extracts from E-view 13. * Level of significance at 5%

We examined all of the research variables using Augmented Dickey Fuller (ADF) tests to see whether they were stationary or non-stationary series, following the guidelines provided by table. 2. At the initial difference I(1), the stationarity test indicated that LORV, DGDPR, and DRVR are stationary, whereas LFBL and

LEXR are stationary at the level I(0). The variables show either mixed-order integration or stationarity of level and initial differences when we analyse their stationarity. The Autoregressive Distributive Lag (ARDL) technique was used to analyse the data. Both the first difference (I(1)) and the stationary at level I(0) may be handled by

this method. The ARDL test is the most appropriate analytical technique to utilise since it looks at the relationship between the independent and dependent

variables in terms of both short-term and long-term trends.

4.3 Co-integration Test

Table 3 ARDL Bound Test

Test Statistics	Value	K
F-statistics	6.644966	4

Significance	I (0)	1(1)
10%	2.75	3.99
5%	3.95	4.77
1%	4.76	6.67

Source: Authors computation 2026

From table 3 the bound test result indicates that there exist long run relationships amongst the variables as the F-statistic value of 6.644966 exceeds both the lower and upper bound critical values. Thus, we reject the null hypotheses of no long run relationship and accept its alternative. This means that there is a long-run

relationship between Fiscal Sustainability and Oil Revenue in Nigeria.

4.4 Short and Long-Run Estimation Results for the Model

The results of the short and long-run dynamics association of the model are presented in table 4 below

Table 4. ARDL Short and Long-run Result for the Model

Short Run Coefficient				
Variable	Coefficient	Std. Error	t-Statistics	Prob
D(DGDPR(-1))	0.329387	0.120782	2.272125	0.0134
D(DRVR(-1))	-0.712998	0.473884	-1.504584	0.1489
D(FBL)	0.970024	0.058097	16.69659	0.0000
D(EXR)	-0.832577	0.435495	-1.911795	0.0711
ECM(-1)	-0.653622	0.159698	-4.092854	0.0006
Long Run Coefficient				
Variable	Coefficient	Std. Error	t-Statistics	Prob
DGDPR(-1)	-0.121940	1.101787	-1.197879	0.2407
DRVR(-1)	0.305202	0.146090	2.089143	0.0456
FBL(-1)	0.891302	0.125587	7.097068	0.0000
EXR(-1)	0.709123	0.201454	3.520026	0.0014
C	0.622425	0.161858	3.845503	0.0011
Adj R² = 0.825963, F-statistics = 31.78604 (0.000000), DW = 2.196582				

Source: Authors computation using E-view 13 2026

The coefficient estimate for the error correction term, ECM (-1) has a negative value and is significant at the 0.05 level. It suggests that the model will reach long-run equilibrium at a rate of 0.65% every year. This means that a yearly adjustment speed of 0.65% may fix the mistake from the previous year. The independent variables (IDGDPR, DRVR, FBL & LEXR) explain

82% of the total variance in the dependent variable (LORV), according to the adjusted R-Square (R²) value. As a whole, the model is noteworthy since the F-statistic is significant at the 5% level of significance. Without serial correlation, the model would not work, according to the Durbin-Watson statistics of 2.196582 which is close to 2.

Table 3 displays the model's short-and long run outcome. The value of debt to gross domestic product ratio (DGDPR) and fiscal balance (FBL) had a positive and significant relationship with the log value of oil revenue (LORV)., however, debt to revenue ratio (DRVVR) and the value of exchange rate (EXR) had a negative and insignificant relationship with the value of oil revenue (ORV). In the short-run. Equally, table 3, shows that the outcome of the long-run result that the coefficient of debt

to revenue ratio (DRVVR), fiscal balance (FBL) and exchange rate (EXR) are positive and significantly relate with oil revenue (ORV) while debt to gross domestic product ratio (DGDPR) had a negative but and significant relation with oil revenue (ORV) in the long-run

4.5 Diagnostic Test

Table 5: Ramsey Reset Test, Serial Correlation LM Test and Homoscedasticity Test Results

	F-Statistic	Prob-Value
Ramsey Reset Test	0.333790	0.5726
Breusch-Godfrey Serial Correlation LM Test	0.250332	0.7822
Breusch-Pagan-Godfrey Heteroskedasticity Test	1.363248	0.2758

Source: Authors computation 2026

From Table 5, the results of the diagnostic test shows that the linearity test using Ramsey Reset test indicates that the f-statistic (0.333790) with computed p-value of 0.5726 which is greater than 5 percent (0.05) critical value, hence the study reject the null hypothesis and conclude that the model is correctly specified. The result of the Serial or Autocorrelation Test using Breusch-Godfrey Serial Correlation LM Test shows that the f-statistic is 0.250332, with a Chi-Square probability value is 0.7822. This indicates that the probability value of about 78 percent (0.7822) is greater than 5 percent (0.05)

critical value; hence the study confirms no serial correlation in the model. The result of the heteroscedasticity test using Breusch-Pagan-Godfrey test shows that the f-statistic is 1.363248 with a Chi-Square probability value of 0.2758. The result suggests that there is no evidence of heteroskedasticity in the model since the probability Chi-square value is more than 5 percent ($P > 0.05$). So, residuals do have constant variance which is desirable in regression meaning that residuals are Homoscedastic

Figure 1: Normality Test

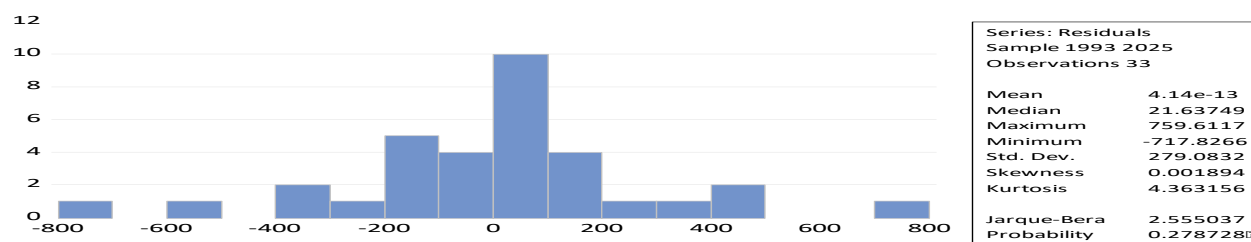


Figure 1, shows summary of the normality test with Jarque-Bera value of 2.555037 and a corresponding probability value of 0.278728 more than 0.05 level of significance, indicating that the residuals are normally distributed

4.6 Discussion of Findings

Debt to Gross Domestic Product Ratio and Oil Revenue in Nigeria.

Inference drawn from the long-run using the Auto-Regressive Distributed Lag (ARDL) model revealed that debt to gross domestic product ratio (DGDPR) had a

negative (-0.121940) relationship with oil revenue (ORV). The negative relationship between debt to gross domestic product ratio (DGDPR) and oil revenue (ORV) agrees with a priori. It was expected that a high debt burden often reflects weak fiscal management and increases debt servicing obligations, leaving fewer resources for investment in the oil sector. However, the p -value of (0.2407) indicates that debt to gross domestic product ratio (DGDPR) had an insignificant relationship with oil revenue (ORV). This means that the null hypothesis which state that there is no significant relationship between debt to gross domestic product ratio (DGDPR) and oil revenue (ORV) is accepted.

Debt to Revenue Ratio and Oil Revenue in Nigeria.

Insinuation drawn from the long-run using the Auto-Regressive Distributed Lag (ARDL) model revealed that debt to revenue (DRVR) had a positive (+0.305202) relationship with oil revenue (ORV). The positive relationship between debt to revenue (DRVR) and oil revenue (ORV) do not agrees with a priori. It was expected that when a larger share of government revenue is devoted to servicing debt, fewer funds remain for exploration, infrastructure development, security of oil facilities, and investment in petroleum production, thereby reducing the government's ability to generate higher oil revenue. However, the p -value of (0.0456) indicates that debt to revenue (DRVR) had a significant relationship with oil revenue (ORV). This means that the null hypothesis which state that there is no significant relationship between debt to revenue (DRVR) and oil revenue (ORV) is rejected.

Fiscal Balance and Oil Revenue in Nigeria.

Insinuation drawn from the long-run using the Auto-Regressive Distributed Lag (ARDL) model revealed that fiscal balance (FBL) had a positive (+0.709123) relationship with oil revenue (ORV). The positive relationship between fiscal balance (FBL) and oil revenue (ORV) agrees with a priori. It was expected that an improvement in fiscal balance is expected to increase oil revenue. Strong fiscal discipline enhances macroeconomic stability, improves investor confidence, and enables greater investment in the petroleum sector.

However, the p -value of (0.0000) indicates that fiscal balance (FBL) had a significant relationship with oil revenue (ORV). This means that the null hypothesis which state that there is no significant relationship between f fiscal balance (FBL) and oil revenue (ORV) is rejected.

Exchange Rate and Oil Revenue in Nigeria.

Insinuation drawn from the long-run using the Auto-Regressive Distributed Lag (ARDL) model revealed that exchange rate (EXR) had a positive (+0.891302) relationship with oil revenue (ORV). The positive relationship between exchange rate (EXR) and oil revenue (ORV) agrees with a priori. It was expected that an increase in the exchange rate (currency depreciation, where more naira are required to buy one US dollar) is generally expected to have a positive effect on oil revenue in Nigeria. Since crude oil is priced in U.S. dollars, a depreciation of the naira increases the naira value of oil export receipts when converted into domestic currency. However, the p -value of (0.0014) indicates that exchange rate (EXR) had a significant relationship with oil revenue (ORV). This means that the null hypothesis which state that there is no significant relationship between exchange rate (EXR) and oil revenue (ORV) is rejected.

5. Conclusion and Recommendations

The study examined the impact of fiscal sustainability under declining oil revenue in Nigeria reported that debt to revenue ratio, fiscal balance and exchange rate are positive and significantly relate with oil revenue while debt to gross domestic product ratio had a negative but and significant impact on oil revenue Thus, it was concluded that fiscal sustainability had a substantial impact on oil revenue in Nigeria

Based on the conclusion and recommendation, the study recommends:

- i. The Federal Ministry of Finance and the Budget Office of the Federation should strengthen fiscal discipline and improve public financial management to sustain healthy fiscal balances. This will improve fiscal sustainability

and enable the government to maximize the benefits of oil revenue for long-term economic development.

ii. The Debt Management Office and the Federal Ministry of Finance should adopt a more growth-oriented public debt management strategy. These institutions should ensure that government borrowing is kept within sustainable thresholds and that borrowed funds are directed toward productive infrastructure and investments capable of expanding the economy and strengthening future oil and non-oil revenue generation.

iii. The Debt Management Office in collaboration with the Federal Inland Revenue Service and the Nigeria Customs Service should improve domestic revenue

mobilization to reduce debt servicing pressure. This will reduce excessive dependence on oil revenue for meeting debt obligations and strengthen fiscal sustainability.

iv. The Central Bank of Nigeria and the Nigerian National Petroleum Company Limited should implement policies that promote exchange rate stability while enhancing foreign exchange earnings from oil exports. These institutions should adopt exchange rate policies that minimize excessive volatility, strengthen foreign exchange reserve management, and encourage timely repatriation of oil export proceeds. Such measures will improve the value of oil revenue in domestic currency and enhance macroeconomic stability.

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