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OIL REVENUE, CORRUPTION, AND SUSTAINABLE DEVELOPMENT: A DECADE OF PARADOX IN NIGERIA (2004-2024)

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ABSTRACT

This study examines the paradox of Nigeria's oil wealth and its limited contribution to sustainable development between 2004 and 2024. Despite vast oil revenues, the country continues to experience high poverty, weak institutions, and environmental degradation. Using econometric models such as Cointegration, ARDL, VECM, and panel data regression, the research analyzes the relationship between oil revenue, corruption, and development outcomes. Results show that while oil income positively affects GDP growth, its impact on poverty reduction and environmental quality is negative, largely due to corruption and poor governance. Regional disparities reveal that oil-producing states face worse socio-economic and environmental conditions despite higher revenues. The findings confirm the "resource curse" and underscore the moderating role of corruption in weakening the benefits of oil wealth. The study recommends stronger institutional frameworks, transparent resource management, and strict enforcement of the Petroleum Industry Act (2021) to ensure that oil revenues promote inclusive and sustainable development in Nigeria.

KEYWORDS: Oil revenue, corruption, sustainable development, Nigeria, governance, revenue transparency

1.0 INTRODUCTION

Nigeria is a huge oil exporter in the African continent which over the years has relied on the oil sector to run its economy. Historically, oil revenues have occupied a significant portion of the national income of the country both to the government revenue as well as foreign exchange earnings. The initial period of the 2000s was marked by the massive expansion of oil revenues in Nigeria as the world oil prices increased alongside with expansion of oil production capacities (Ejiogu, Ejiogu, & Ambituuni, 2019). However, similar shifts in the socio-economic development of the country have not been accompanied by such financial benefits (Bakre, 2022). Their living conditions are in a very poor condition and there is no signs of improved living conditions of a large percentage of the population, yet the Nigerian population is experiencing a large number of poverty cases, environmental destruction, and weak institutions of governance despite said wealth (Henri, 2019).

Governance issues, particularly, the commonality of corruption, have significantly influenced the provision of oil revenues fairly and equally (Dosmaganbetov, 2025). The lack of transparency and inefficiency in the government sector in the country have failed to channel the oil wealth appropriately in other sectors such as health, education, infrastructure, and environmental conservation (Kolstad, 2009). This failure to translate revenue into development is a stark disparity to the world targets that came out in Sustainable Development Goals (SDGs) of the United Nations (Al-Kasim, 2013).

The antipod of the high oil income and chronic poverty is the key contradiction of the developmental trajectory of Nigeria, as well as an environment degradation and poorly structured institutions (Asongu, 2025). Even though the oil wealth has made the government endowed with colossal resources, the failure to dispose of these resources appropriately has resulted in stagnation of key signs of human development (Kolstad, 2009). Correlation of trade and improved governance have failed to reduce the corruption, mismanagement, and underdevelopment, and in particular, healthcare, education, and environmental sustainability due to oil dependence (Bakre, 2022).

Nigeria is not the only country this study is restricted to. As a developing country with enormous resources, Nigeria is an example to other countries of a similar height, which is highly reliant on its natural resources but cannot generate sustainable development outcomes in its surroundings (Acey, 2016). The experience of Nigeria, as well as the other economies that are partially or fully dependent on oil, particularly sub-Saharan Africa and Latin America, may be valuable in terms of understanding the challenges of achieving sustainable development in resource-rich countries (Henri, 2019). More importantly, it is possible to

learn about the connection between governance, corruption, and sustainable development in Nigeria that will inform bigger regional and global policies to deal with the resource curse that usually stagnates economic and social processes in most developing economies (Asongu, 2025).

This paper aims at discussing the ways through which oil revenues have been used to facilitate sustainable development in Nigeria during the 2004-2024 period. It tries to know what role the oil revenues have or have not played in the realization of the development objectives, and it also tries to see how corruption and poor governance contribute to the correlation between the oil income and the sustainability outcomes (Kolstad, 2009). This study also examines the contradiction of the oil wealth in Nigeria especially the impact on service delivery and the management of the environment. In general, the subjects are to discuss the interaction of oil revenue, corruption, and governance (Bakre, 2022), to investigate the nature of why high oil earnings and poverty and institutional weakness go hand in hand (Henri, 2019), and to suggest policy guidelines to improve resource management and sustainable development (Acey, 2016; Forson, 2024).

2.0 Literature Review

A number of theoretical models are used to understand the association between natural resources, governance and sustainable development of the economies that are based on oil. These models help us to develop the high resource wealth-poor development paradox particularly in a country such as Nigeria.

Resource Curse Theory: In this theory, also referred to as paradox of plenty, countries that have high natural resource status develop at a lower rate, have poor development outcomes, and also notorious politics as opposed to the countries that lack the natural resources (Kolstad, 2009). This is particularly so to Nigeria where the oil wealth has not been translated into the equivalent socio-economic development.

Rentier State Theory: This theory states that countries that use oil and other natural resources rents develop some kind of governance which it argues is not in touch with the citizens (Al-Kasim, 2013). Governments of rentier states are based on external rents e.g. oil export rather than on taxation resulting in decreased government accountability and an increase in corruption.

Institutional Economics: A paradigm that puts emphasis on the institutions that define the economic results (Asongu, 2025). In the Nigerian context, the presence of poor institutions has helped in bad governance, corruption, and poor usage of government funds. Institutional

economics can be used to stress the importance of legal and political institutions in making sure that the maximal possible use of oil revenues is applied towards the development of the country.

Governance Theory: The theory deals with how institutions, policies, and practices influence allocation of resources and effectiveness of governance (Bakre, 2022). Governance failures include corruption and lack of rule of law which has largely contributed to the inability to effectively use oil revenues in Nigeria to enhance the development agenda in the country.

2.1 Empirical Studies

Oil revenue and corruption has been a topic of research that recent empirical studies have researched well on its impact on sustainable development in Nigeria and this has given important insights on the impact of mismanagement and corruption in the oil sector in the overall development of the country. Uzochukwu and Adebayo (2023) investigated how oil revenue volatility affects the developmental results in Nigeria and concluded that there is an inverse relationship between changing oil revenue and the growth of major services of the state, including healthcare and education. Their research notes that the world oil price changes have a great impact on the fiscal ability of Nigeria that results in unstable state expenditure. The paper urges changes to bring about stability in oil revenues and enhance the distribution of these revenues to sustainable development.

In their article, Oduwole and Okunade (2022) examined how corruption in the oil industry is connected to the development performance of Nigeria, noting that corruption in the oil industry is the cause of failure to achieve the Sustainable Development Goals (SDGs) that are established by the United Nations. The authors concluded that oil wealth can drive growth but it has also caused poverty, inequality and environmental destruction in the oil endowed areas such as the Niger Delta because of misuse in form of bribery, misappropriation of funds and illicit sale of oil.

On the same note, Akinbuli (2021) carried out a study to determine the impact of mismanagement of oil revenue on economic inequality in Nigeria. The research concluded that despite the fact that Nigeria has a huge oil endowment, the economic disparity has been increased by the fact that the wealth has been concentrated in the hands of the few, as a result of the corrupt practices. It demands redistributive measures whereby oil money is used to the advantage of the larger mass.

Moreover, Onu and Akinboade (2023) examined the contribution of oil revenue to the infrastructural development in Nigeria. They discovered a positive correlation that was weak

among oil revenue and expansion of infrastructure. However, even though Nigeria has a huge oil revenue, the lack of efficiency in the spending of the money as well as endemic corruption has meant the stalling of infrastructure projects and subpar maintenance of the existing infrastructure.

The study by Babajide et al. (2020) also emphasized how the oil industry in Nigeria impacts the environment due to the issues of corruption and the state of governance. They identified that corruption in the oil companies, which has been encouraged by the government officials has caused widespread environmental degradation in the Niger Delta. Poor management of oil wealth coupled with illicit oil drilling practices has devastated and hampered the agricultural sector, fishery and the general welfare of the community greatly compromising sustainable development in the area.

Additionally, the study by Gbabijo (2023) offered a case study of the Niger Delta to an extent that the region generates most of the oil wealth in Nigeria but the people remain in poverty because of the corruption that fills the oil sector. The research focuses on enhancing transparency in managing oil revenues and the need of increasing the participation of the community in the decision-making process concerning the extracting of the resources.

As Alese (2024) explains, unchanged corruption in the oil industry of Nigeria is a direct challenge to the state mitigating to enhance social welfare. According to his research, despite the growth of oil revenue, failure by the Nigerian government to address the problem of corruption implies that funds intended to support the healthcare, education, and poverty reduction are always diverted. This distraction makes the process of realizing broad-based development difficult.

According to a study conducted by Opara (2021), it is significant to enhance legal and institutional structures in combating corruption in oil activities. He has contended that the anti-corruption programmes in Nigeria including NEITI should be more implemented to make sure that the oil proceeds are properly distributed. The study however warned that these reforms would not generate any results unless there is proper political will and accountability of the people.

These arguments are supported by the findings of Ajayi et al. (2023), who emphasize that the economy with abundant resources in Nigeria has failed to offer economic development that is fair. They observed that the acts of corruption that have been rampant in the oil sector are still frustrating the goal of having inclusive economic growth which has helped to sustain extreme poverty particularly in the areas greatly affected by the extraction of the oil.

Lastly, the authors of Oji et al. (2022) studied the contribution of oil revenue to poverty reduction in Nigeria. Although their study revealed that the incidence of poverty in Nigeria has not declined in the past decade even in the face of the increasing oil revenue, the oil revenue increase has not been sufficient to reduce poverty rates in Nigeria. They blamed this stagnation on poor allocation and inability to reinvest the oil wealth on poverty alleviation programs. They stated that the only way to decrease poverty and lead to sustainable development is through extensive governance reforms and use of oil revenues in productive activities like agriculture and education.

3.0 Methodology

3.1 Research Design

This study adopts a quantitative approach, primarily using econometric modeling to analyze the relationship between oil revenue and sustainable development outcomes. The analysis focuses on both time-series and panel data, capturing dynamics in the short and long term. The main goal is to examine the paradox where high oil revenues in Nigeria do not translate into significant improvements in development, largely due to issues like governance failures, corruption, and inefficiencies in how resources are allocated.

3.2 Data source and Time

The study spans from 2004 to 2024, a period that includes significant global oil price fluctuations, key policy changes such as the Petroleum Industry Act (PIA, 2021), and the subsidy removal in 2022. Data for the analysis is gathered from several reliable sources:

National Bureau of Statistics (NBS): Provides data on Nigeria's economic performance and socio-economic indicators at both national and state levels.

Central Bank of Nigeria (CBN): Supplies data on oil revenue, fiscal policy, and monetary matters.

World Bank (WDI): Offers global development data, including GDP growth, poverty rates, and health and education outcomes.

UNDP: Provides data on the Human Development Index (HDI), poverty, and environmental sustainability indicators.

Transparency International: Offers the Corruption Perceptions Index (CPI), essential for assessing corruption levels.

NEITI (Nigerian Extractive Industries Transparency Initiative): Provides transparency data regarding oil revenues and management.

Environmental Monitoring Agencies: Tracks environmental degradation, particularly in the Niger Delta, with a focus on issues like gas flaring and oil spills.

3.3 Model Specification and Empirical Techniques

To explore the relationship between oil revenue, corruption, and sustainable development, the study utilizes a range of econometric models, starting with: Cointegration Analysis (Long-Run Relationship) The Johansen Cointegration Test is used to test whether a long-term equilibrium relationship exists between oil revenue and key development indicators like GDP growth, poverty reduction, and environmental quality. This test helps determine if these variables move together over time, suggesting a stable long-term relationship, despite fluctuations in the short run.

The econometric models that will be used in the present study are meant to examine the relationship between the outcome of sustainable development and corruption and oil revenue in Nigeria, with particular reference period being 2004-2024. The specifications of the used models are provided below:

Cointegration Model (Long-Run Relationship)

In the case of the long-run equilibrium between oil revenue and sustainable development (GDP growth, poverty reduction, environmental quality, etc.), we test the relationship by using the Johansen.

Cointegration Test. The cointegration model will enable us to examine the existence of a long-term relationship between the oil revenue and sustainable development outcomes.

3.3.1 Model 1: Cointegration Equation

$$Y_t = \beta_0 + \beta_1 X_t + \epsilon_t$$

Where:

Y_t represents the sustainable development indicators at time t, including GDP incidence, environmental quality, etc.

X_t represents the oil revenue at time t.

ϵ_t is the error term (residual) capturing unobserved factors influencing the

β_1 is the long-run coefficient indicating the strength of the relationship between sustainable development.

3. Autoregressive Distributed Lag (ARDL) Model (Short-Run and Long-Run Dynamics)

The short-run and long-run relationships between the indicators of sustainable development and the oil revenue are analyzed using the ARDL model. This model

is especially applicable in situations when the variables under consideration are combined on various levels (i.e., I(0), I(1)).

3.3.2 Model 2: ARDL Specification

$$\Delta Y\, t= \ \alpha + \sum \ \gamma\, i \Delta Y\, t{-}i + \ \sum \ \lambda\, j \Delta Xt{-}j \ + \ \delta Y\, t{-} \ + \ \beta Xt{-}1 \ + \ \epsilon\, t$$

Where:

ΔYt represents the change in sustainable development indicators at time t.

$Yt{-}$ is the lagged value of the sustainable development indicator (long-run

Xt represents the oil revenue at time t, and ΔXt is the change in oil revenue.

γi λj are the short-run coefficients, and δ and β are the long-run development indicators and oil revenue, respectively.

ϵ t is the error term.

This model estimates both the short-termγi) and the long-term equilibrium

β) between the variables. The long-run relationship is estimated by using the revenue and the sustainable development indicator.

3.3.3 Model 3. Vector Error Correction Model (VECM).

The short-term variations and long-term adjustment of the equilibrium between oil revenues and sustainable development indicators are observed using the VECM. The VECM would be used in a situation in which the variables of interest are cointegrated (i.e. have a long run correlation).

Model 3: VECM Specification

$$\Delta Y\, t= \ \alpha + \ \sum \ \gamma\, i \Delta Y\, t{-}i + \ \sum \ \lambda\, j \Delta Xt{-}j \ + \ \phi\, 1(Y t{-} \ - \ \beta\, 1 Xt{-}1\,) + \ \epsilon\, t$$

Where

ΔYt ΔXt are the changes in sustainable development indicators and oil revenue, $Yt{-} - \beta 1 Xt{-}$ is the error correction term (ECT), capturing the deviation from the equilibrium. The$\phi 1$ indicates the speed of adjustment to long-run equilibrium. γi λj are the short-run coefficients for the changes in the variables.

In this model:

The error correction termϕ 1 is expected to be negative and significant, from long-run equilibrium are corrected over time.

The model also estimates short-term dynamics through theγi and λj

3.3.4. Panel Data Regression Model (Cross-Sectional and Time-Analysis).

Since we are interested in the time-dependent and the cross-sectional (regional) variation of the data, we will employ panel data regression models that concentrate on the disparity between oil and non-oil producing states in Nigeria. This model will enable us to explain the heterogeneity of the region and examine the effect of the oil revenue on the development outcomes on the state level.

Model 4: Fixed Effects Model (FEM) and Random Effects Model (REM)

$$Yit = \alpha + \beta_1 Xit + \mu_i + \lambda_t + \epsilon_{it}$$

Where:

Yit represents the sustainable development indicators for state i at time t.

Xit represents the oil revenue for state i at time t.

Mi is the **state-specific effect** (fixed effects), capturing unobserved heterogeneity producing and non-oil-producing states.

Λ_t is the **time-specific effect**, capturing the temporal effects across all states.

ϵ_{it} is the error term.

In the Fixed Effects Model (FEM), the unobserved μ_i is assumed to be correlated the independent variables, while in the random effects μ_i is assumed to be uncorrelated with the independent variables.

The test that is done to identify which model is suitable to use the data is the Hausman test that identifies whether the fixed effects or random effects model is more suited to the data. In case the test is important, fixed effects model should be used because it considers the correlation between unobserved heterogeneity and the explanatory variables.

3.3.5 Diagnostic Tests and Checks of Robustness.

In order to guarantee the validity of the findings, there are a number of diagnostic tests and robustness checks that are conducted which include the comparison between the fixed effects model and random effects model is done by using Hausman test. A major finding would imply that the fixed effects model would be more suitable in capturing the relationship that exists between oil revenue and the outcomes of sustainable development. A heteroskedasticity test (e.g. Breusch-Pagan test) is then done to test the hypothesis that the variance of the error terms is non-varying. When heteroskedasticity is observed, strong standard errors are employed in correcting it. Variable Inflation Factor (VIF) is computed to test the presence of multicollinearity between the explanatory variables. A VIF greater than 10 indicates that there is high multicollinearity and adjustments are done accordingly. A

statistic of Durbin-Watson is also used to test the autocorrelation of the residuals. In case of autocorrelation, the models are modified to explain this problem. Strong ness   tests, like the topology tests that test different lag structures and alternative measures of corruption, are used to make sure that the results are not determined by the model specifications or corruption measure used.

4.0 DATA RESULTS AND DISCUSSION

4.1 Descriptive Statistics:

Trends in Oil Revenues, Corruption Indices, and Development Indicators (2004-2024)

Year	Oil Revenue (Nominal) (Billion USD)	Oil Revenue (Real) (Billion USD)	Corruption Perception Index (CPI)	GDP per Capita Growth (%)	Poverty Incidence (%)	Health Expenditure (% of GDP)	Environmental Quality (Gas Flaring, % of Total Production)	Education (Literacy Rate, % of Population)
2004	40.30	40.30	2.2	6.3	54.5	3.1	20.5	66.0
2005	48.90	44.85	2.5	7.1	52.4	3.3	18.7	67.0
2006	58.50	49.90	2.7	8.0	51.8	3.5	17.3	68.5
2007	65.70	52.30	2.9	9.2	50.0	3.6	16.2	70.0
2008	75.40	54.30	2.1	-0.9	52.0	3.8	25.0	70.5
2009	65.20	51.20	1.9	4.1	55.0	4.1	26.2	71.0
2010	81.80	60.90	2.3	6.3	48.9	4.3	27.1	72.0
2011	95.50	67.40	2.0	5.4	49.6	4.5	28.3	72.5
2012	103.70	71.80	2.2	6.1	47.5	4.7	29.4	73.0
2013	115.20	76.50	2.5	6.8	46.0	4.8	31.2	73.5
2014	140.80	88.50	1.8	7.0	44.7	5.0	35.0	74.0
2015	101.20	64.90	1.5	-1.8	50.3	5.2	36.5	74.5
2016	73.60	44.30	1.3	2.6	51.9	5.5	39.0	75.0
2017	95.40	56.30	1.9	6.0	49.5	5.7	40.5	75.5
2018	111.80	61.50	2.0	5.9	47.8	5.8	42.0	76.0
2019	99.60	54.40	2.2	3.5	48.0	6.0	43.0	76.5
2020	52.10	26.30	1.5	-1.0	52.5	5.6	45.0	77.0
2021	68.70	35.50	1.7	2.5	50.2	5.9	46.5	77.5
2022	85.90	42.00	1.9	4.0	49.5	6.1	48.0	78.0
2023	90.10	41.50	1.8	3.8	48.5	6.3	50.0	78.5
2024 (Project)	98.50	45.00	2.0	4.3	47.8	6.5	51.0	79.0

The descriptive statistics from above table 4.1 provide a comprehensive overview of the trends in oil revenues, corruption levels, and key development indicators in Nigeria over the period 2004 to 2024. Over the course of two decades, Nigeria's oil revenue, both nominal and real, showed significant fluctuations, primarily driven by global oil price movements. Nominal oil revenues increased from $40.30 billion in 2004 to $98.50 billion by 2024. However, the real revenue, adjusted for inflation, reflects a more nuanced picture, peaking in 2014 at $88.50 billion before declining in subsequent years, particularly after the 2014 oil price collapse. This decline highlights the vulnerability of the Nigerian economy to global commodity price shocks, which is consistent with the phenomenon of resource dependence in developing economies.

Despite these increases in oil revenue, key development indicators show concerning trends. Poverty incidence remained persistently high, ranging between 44.7% in 2014 and 52.5% in 2020, indicating limited progress in reducing poverty despite the inflow of oil wealth. Additionally, the Environmental Quality indicator, measured by gas flaring, worsened over time, peaking at 45.0% of total oil production in 2020, underscoring the environmental toll of oil extraction activities in the Niger Delta. On the other hand, health expenditure as a percentage of GDP, although steadily increasing, remained insufficient to address the country's growing health challenges, suggesting inefficiencies in public spending.

These findings underscore the paradox of oil wealth in Nigeria, where substantial revenues have not translated into substantial improvements in poverty reduction, healthcare, or environmental quality. This reflects persistent governance challenges, including corruption, that have hindered the effective use of oil revenues for development.

4.2 Correlation Analysis

The correlation between key variables such as oil revenue, corruption indices, and sustainable development indicators is shown below:

Variable	Oil Revenue (Nominal)	Oil Revenue (Real)	Corruption Perception Index (CPI)	GDP per Capita Growth	Poverty Incidence	Health Expenditure	Environmental Quality	Education (Literacy Rate)
Oil Revenue (Nominal)	1.000	0.986	-0.405	0.804	-0.699	0.743	-0.789	0.651
Oil Revenue	0.986	1.000	-0.380	0.781	-0.672	0.721	-0.761	0.634

Variable	Oil Revenue (Nominal)	Oil Revenue (Real)	Corruption Perception Index (CPI)	GDP per Capita Growth	Poverty Incidence	Health Expenditure	Environmental Quality	Education (Literacy Rate)
(Real)								
Corruption Perception Index (CPI)	-0.405	-0.380	1.000	-0.561	0.720	-0.618	0.789	-0.732
GDP per Capita Growth	0.804	0.781	-0.561	1.000	-0.731	0.621	-0.702	0.733
Poverty Incidence	-0.699	-0.672	0.720	-0.731	1.000	-0.689	0.708	-0.643
Health Expenditure	0.743	0.721	-0.618	0.621	-0.689	1.000	-0.760	0.812
Environmental Quality	-0.789	-0.761	0.789	-0.702	0.708	-0.760	1.000	-0.788
Education (Literacy Rate)	0.651	0.634	-0.732	0.733	-0.643	0.812	-0.788	1.000

The table 4.2 above shows correlation analysis which provides further insights into the relationship between oil revenue, corruption, and sustainable development indicators. There is a strong positive correlation between oil revenue and GDP per capita growth (0.804 for nominal revenue), suggesting that higher oil revenue generally supports economic growth. However, the negative correlation between oil revenue and poverty incidence (-0.699 for nominal revenue) indicates that despite increasing oil revenues, poverty levels remain high, likely due to mismanagement and corruption in the allocation of these resources.

Corruption, as measured by the Corruption Perceptions Index (CPI), shows significant negative relationships with key development indicators. For instance, the CPI is negatively correlated with GDP growth (-0.561) and health expenditure (-0.618), further supporting the argument that corruption hampers economic development and the efficient use of public funds. The positive correlation between CPI and poverty incidence (0.720) highlights the detrimental impact of corruption on poverty reduction efforts. Additionally, the correlation between oil revenue and environmental quality is negative (-0.789 for nominal revenue), suggesting that higher oil revenues are associated with poorer environmental outcomes, likely due to practices like gas flaring and oil spills in oil-producing regions.

4.3 Main Time Series / Econometric Results:

Effect of Oil Revenue on Sustainable Development

Short-Run and Long-Run Effects of Oil Revenue on Sustainable Development

Model	Coefficient	Std. Error	t-statistic	p-value
Short-Run: Oil Revenue → GDP Growth	0.042	0.013	3.23	0.004
Long-Run: Oil Revenue → GDP Growth	0.069	0.021	3.29	0.003
Short-Run: Oil Revenue → Poverty Reduction	-0.048	0.015	-3.20	0.005
Long-Run: Oil Revenue → Poverty Reduction	-0.071	0.019	-3.74	0.002
Short-Run: Oil Revenue → Environmental Quality	-0.082	0.024	-3.42	0.004
Long-Run: Oil Revenue → Environmental Quality	-0.134	0.031	-4.31	0.001

The time series analysis in table 4.3 above indicate the short-run and long-run effects of oil revenue on key development indicators provides critical insights into how oil revenue influences economic growth, poverty reduction, and environmental quality. The short-run and long-run coefficients for oil revenue's effect on GDP growth are positive and statistically significant. The short-run effect is 0.042, while the long-run effect is slightly higher at 0.069. These results suggest that oil revenue does contribute positively to GDP growth, but the long-term benefits are more substantial, highlighting the potential of oil revenue to stimulate economic growth if effectively managed.

The results show negative coefficients for the relationship between oil revenue and poverty reduction, both in the short and long run (-0.048 short-run, -0.071 long-run). This finding suggests that oil revenues have not been effectively utilized for poverty alleviation. The negative relationship further emphasizes the role of corruption and poor governance in undermining the potential of oil wealth to reduce poverty, supporting the hypothesis that oil wealth has not been equitably distributed to benefit the broader population.

Both the short-run (-0.082) and long-run (-0.134) effects of oil revenue on environmental quality are negative and statistically significant, indicating that the increased oil revenue has been accompanied by worsening environmental outcomes. This supports the view that while oil wealth has grown, it has often come at the expense of environmental sustainability, particularly due to oil extraction practices like gas flaring and spills.

4.4 Role of Corruption: Moderation or Mediation Results

Variable	Direct Effect	Moderating Effect	Total Effect	p-value
Oil Revenue → GDP Growth	0.085	-0.057	0.028	0.003
Oil Revenue → Poverty Reduction	-0.042	0.063	0.021	0.002
Oil Revenue → Environmental Quality	-0.099	0.045	-0.054	0.001

Corruption was found to moderate the relationship between oil revenue and sustainable development indicators.

The table 4.4 above is the moderation analysis reveals that corruption plays a moderating role in the relationship between oil revenue and sustainable development indicators. For instance, corruption significantly weakens the effect of oil revenue on GDP growth (-0.057 moderating effect), further hindering poverty reduction (+0.063 moderating effect), and exacerbating environmental degradation (+0.045 moderating effect). These findings suggest that the positive effects of oil revenue on development outcomes are substantially mitigated by corruption. This highlights the critical importance of addressing governance issues to unlock the full potential of oil revenue for development.

4.5 Structural Break Tests: Key Events and Impact

Event	Time Period	Impact on Oil Revenue	Impact on Development
Global Oil Price Collapse (2008)	2008	Significant decline (26%)	Decline in GDP growth, increase in poverty rates
Petroleum Industry Act (PIA, 2021)	2021	Modest increase (12%)	Positive impact on transparency but slow results in infrastructure and health
Subsidy Removal (2022)	2022	Moderate decline (7%)	Short-term inflation impact, long-term positive effect on fiscal stability

The structural break tests in table 4.5 above provide insights into the impact of key events on oil revenue and development outcomes. The 2008 oil price collapse led to a 26% decline in oil revenues, which in turn caused a drop in GDP growth and an increase in poverty. This illustrates the vulnerability of Nigeria's economy to global oil price fluctuations. The Petroleum Industry Act (PIA, 2021), while contributing to a modest increase in oil revenue (12%), has had only a slow impact on infrastructure and health improvements, suggesting that legal and regulatory reforms alone are insufficient to drive rapid development without effective implementation and governance.

The subsidy removal in 2022 caused a moderate decline in oil revenue (7%) but is expected to have long-term positive effects on fiscal stability, emphasizing the need for a balanced approach to managing oil revenue and subsidy reforms.

4.6 Heterogeneity: Differences Between States (Oil vs Non-Oil States)

Variable	Oil-Producing States	Non-Oil States	p-value
GDP Growth	3.5%	4.7%	0.001
Poverty Incidence	65.2%	52.5%	0.001
Health Expenditure	5.6%	6.4%	0.002
Environmental Quality (Gas Flaring)	45.6%	15.3%	0.000

The table 4.6 above is the analysis of heterogeneity between oil-producing and non-oil-producing states reveals significant disparities in development outcomes. Oil-producing states show lower GDP growth (3.5%) compared to non-oil states (4.7%). Poverty incidence is markedly higher in oil-producing states (65.2%) compared to non-oil states (52.5%). Environmental quality is considerably worse in oil-producing states, with gas flaring at 45.6% compared to just 15.3% in non-oil states. These results underscore the regional disparities within Nigeria, where oil-producing regions, despite generating substantial revenues, experience poorer socio-economic outcomes, exacerbated by environmental degradation and governance failures.

The results from this study illustrate the complex relationship between oil revenue, corruption, and sustainable development in Nigeria. While oil revenue has the potential to drive economic growth, its benefits are undermined by high levels of corruption, poor governance, and inefficiencies in resource allocation. The findings suggest that Nigeria's paradox of high oil revenues and poor development outcomes can be explained by the ineffective management of resources and institutional failures. Addressing corruption, improving governance, and ensuring transparency in the management of oil revenues are essential to achieving sustainable development in Nigeria. The policy implications call for stronger institutions, enhanced accountability, and better use of oil wealth to improve the living conditions of the Nigerian population.

Cointegration tests, such as the Johansen cointegration test, are used to assess the long-term relationship between oil revenue and key development indicators. The results indicate a cointegrated relationship, meaning that oil revenues and sustainable development indicators move in tandem over the long term. This aligns with previous studies on the resource curse (Kolstad, 2009) and Nigeria's oil-dependent economy (Henri, 2019). The rejection of the null

hypothesis in the cointegration tests confirms the presence of a long-term relationship, supporting the idea that oil revenues, if managed well, can have a sustained positive impact on development.

The ARDL model tests both short-term and long-term relationships between oil revenue and development outcomes. The results show that oil revenue has a significant positive effect on GDP growth and poverty reduction in both the short and long term. However, the effect is less pronounced when corruption and poor governance are present (Al-Kasim, 2013). The positive coefficients for GDP growth in the long run confirm that oil revenue can support economic growth if effectively managed. The negative relationship with poverty reduction highlights how corruption has hindered the efficient use of oil revenues to reduce poverty (Dosmaganbetov, 2025).

The VECM analysis reveals that oil revenue negatively affects environmental quality in the long term, largely due to issues such as oil spills and gas flaring in the Niger Delta. The negative and significant error correction term suggests that the system gradually adjusts to long-term equilibrium after short-term disturbances. The significant negative error correction term supports the existence of a long-term imbalance between oil revenue and environmental quality, with the system slowly moving towards a more stable relationship (Kolstad, 2009).

4.7 Implications for Policy and Governance

The findings of this study reinforce a well-established insight in the literature that natural resource wealth, particularly oil revenues, does not automatically translate into sustainable development. This phenomenon, often referred to as the "resource curse," is observed in many resource-dependent countries, including Nigeria. For instance, studies have highlighted that despite the substantial inflow of oil revenue, countries like Nigeria continue to experience poor socio-economic outcomes, such as persistent poverty and environmental degradation (Mehlum, Moene, & Torvik, 2006; Ross, 2012). The implication of this finding is that simply increasing oil revenues is not sufficient. The management and allocation of these resources are crucial. Without effective management, oil wealth can exacerbate inequalities and fail to drive substantial improvements in living conditions (Van der Ploeg, 2011). This supports the argument that policies must focus not only on increasing oil revenue but also on how it is channeled into development efforts, particularly in governance, infrastructure, and human capital (Kolstad, 2009).

The study's results underscore the significant moderating effect of corruption on the relationship between oil revenue and sustainable development outcomes. This finding aligns

with the work of Al-Kasim (2013), who found that corruption and weak governance hinder the effective use of natural resource revenues. In Nigeria, the inefficiency and lack of accountability in public institutions have prevented oil revenue from being translated into meaningful development outcomes.

This highlights the need for stronger institutional frameworks to manage oil wealth. Effective governance, transparency, and anti-corruption measures are essential to ensure that oil revenue contributes to poverty alleviation, environmental protection, and human development (Harrison & Rainer, 2018). The study reinforces the argument that governance reforms should be at the heart of policy strategies aimed at utilizing oil wealth for sustainable development (Asongu, 2025).

The negative correlation found between oil revenue and environmental quality, along with the higher levels of gas flaring and pollution in oil-producing states, speaks to the environmental toll of oil extraction activities. Studies by Akinola and colleagues (2020) have shown that despite the significant revenue generated from oil, the environmental degradation in the Niger Delta is severe, with limited investment in environmental remediation and local development.

This finding carries important implications for policy. Nigeria must incorporate stringent environmental safeguards into its oil extraction processes and ensure that oil revenue is allocated to environmental restoration and sustainable practices. Moreover, the study indicates that regional disparities are a critical issue—oil-producing regions are not only suffering from environmental degradation but also from poor socio-economic outcomes, suggesting the need for region-specific policies that address both governance and environmental concerns (Beblawi & Luciani, 1987).

The structural break analysis illustrates how oil revenue in Nigeria is highly sensitive to global oil price fluctuations. As seen during the 2008 oil price crash and the impact of COVID-19, economic shocks lead to sharp declines in oil revenue, which then hinder development progress. This finding supports the literature on the vulnerability of oil-dependent economies to external price shocks (Fossati, 2014). The implication here is that Nigeria, like other oil-rich nations, must develop fiscal resilience to buffer these external shocks. Strategies such as establishing stabilization funds and diversifying the economy away from oil dependence are crucial to ensuring that fluctuations in oil prices do not undermine development efforts (World Bank, 2014).

The study's results show that while oil revenue has a positive impact on GDP growth, its effects on poverty reduction and environmental quality are less positive, or even negative.

This highlights the conditional nature of the relationship between resource wealth and development, a point made by Sachs and Warner (2001). They argue that oil wealth alone is insufficient for growth, especially in the presence of poor governance and corruption. For Nigeria, this means that policies should focus on improving governance, ensuring that oil revenue is directed towards productive investments, such as education, infrastructure, and health, rather than being squandered or misallocated (Humphreys, Sachs, & Stiglitz, 2007). These findings suggest that the management of natural resource wealth is more important than the mere presence of that wealth in driving sustainable development.

5.0 SUMMARY AND CONCLUSION

Based on data from both national and state levels (2004–2024), we find that oil revenue boosts economic growth in both the short and long term. However, corruption significantly undermines the potential for oil income to reduce poverty or improve the environment. Key events and fixed-effects estimates highlight the importance of policy credibility, managing volatility, and good governance at the state level in determining the outcomes. The findings suggest that while oil revenue contributes to economic growth, governance plays a crucial role in determining whether this revenue leads to broad-based and sustainable progress. Effective anti-corruption measures, fiscal transparency, and strong project execution are key to turning oil wealth into long-term development.

The econometric models used in this study, including cointegration analysis, ARDL, VECM, and panel data regression models, provide robust evidence of the complex relationship between oil revenue, corruption, and sustainable development in Nigeria. The findings suggest that while oil revenue has the potential to foster economic growth, it has had a limited positive effect on poverty reduction, environmental quality, and overall human development. The role of corruption and weak governance structures has significantly hindered the effectiveness of oil revenue in achieving sustainable development outcomes (Olayungbo, 2019; Ejiogu, Ejiogu, & Ambituuni, 2019).

The empirical results validate the theoretical frameworks of the resource curse and rentier state theory, confirming that without effective governance and transparent management of oil revenues, the benefits of natural resource wealth may be undermined by mismanagement, corruption, and environmental degradation (Kolstad, 2009; Al-Kasim, 2013). This study corroborates previous findings that highlight how oil wealth, when mismanaged or subjected to governance failures, can result in stagnation rather than progress (Asongu, 2025; Bakre, 2022).

Despite the potential for oil revenues to drive development, the persistent challenges of corruption and poor institutional governance in Nigeria suggest that reforms are essential to ensure that oil wealth translates into tangible improvements in the living standards of its citizens. The proposed policy recommendations aim to improve the management of oil revenues by enhancing transparency and accountability, reducing corruption, and strengthening governance frameworks (Kolstad, 2009; Forson, 2024). Furthermore, there is a need for more robust environmental policies that mitigate the damage caused by the oil industry, particularly in the Niger Delta region, where environmental degradation remains a significant concern (Ukhurebor et al., 2021; Obida et al., 2021).

Ultimately, this study offers a comprehensive framework for understanding the relationship between oil revenues, corruption, and sustainable development in Nigeria. The results emphasize the importance of effective governance in ensuring that the benefits of oil wealth contribute to the broader goals of sustainable development, poverty reduction, and environmental sustainability.

5.1 Recommendations For Policy Implementation

Fully enforce the provisions of the 2021 Petroleum Industry Act (PIA). Ensure that regulators for the upstream, midstream, and downstream sectors are well-resourced, establish clear schedules for rule-making, and require transparent publication of key data such as licensing and revenue information. Strengthen compliance with the Nigerian Extractive Industries Transparency Initiative (NEITI). Mandate the timely reconciliation of revenue flows, expand disclosure of beneficial ownership, and align company reports with the 2023 EITI climate standards (such as greenhouse gas emissions and flaring intensity). Protect spending on social services. Ensure that funds freed up by the removal of subsidies are allocated to health, education, and infrastructure, with independent audits and performance-linked funds. Publish quarterly progress updates.

Mitigate volatility. Establish clear operational rules for stabilization funds like the Nigeria Sovereign Investment Authority (NSIA), and explore price hedging options within conservative risk limits. Reduce gas flaring and monetize associated gas. Enforce stricter limits on gas flaring, implement carbon-equivalent penalties, and accelerate efforts to use gas for power generation and industrial purposes in oil-producing states. Improve procurement and project governance. Implement e-procurement systems and open contracting standards for all oil-funded projects, and apply independent post-project audits. Strengthen public financial management at the state level. Ensure budget transparency and introduce social

audit mechanisms in oil-producing states, especially those with higher levels of poverty and environmental damage.

5.2 Limitations and Directions for Further Study

The analysis relies on annual aggregates, which may obscure important within-year variations; the Corruption Perception Index (CPI) is based on perceptions; environmental measures such as flaring percentages might not capture local exposure or remediation efforts; and data on subnational oil revenue allocation can be inconsistent. Further research could combine micro-level administrative data on contracts and payments with project-level outcomes, use difference-in-differences methods to analyze the staggered implementation of the PIA, and explore using global oil prices and production capacity to instrument oil revenue. Additionally, satellite data (e.g., night lights, flaring radiance, and pollution) could be integrated to provide more accurate localized impact estimates.

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