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The Effect of Natural Resource Endowment on Economic Performance: The Case of Nigeria

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ABSTRACT

This study analyses the impact of natural resource endowment on Nigeria's economic performance using data from 1996 to 2024. Despite Nigeria's rich resources, it suffers from high unemployment and poverty. Various statistical tests, including AutoRegressive Distributed Lag and Granger causality, were employed. Long-term results suggest that natural resources positively influence economic performance but with weak significance ($\beta = 1.919$, $p = 0.160$). Conversely, short-term effects show a negative impact on GDP per capita ($\Delta NRE = -0.237$, $p = 0.017$; $\Delta NRE(-1) = -0.464$, $p = 0.0001$), highlighting the need for policies such as sovereign wealth funds and economic diversification to stabilise the economy and minimise vulnerability to price shocks.

INTRODUCTION

The existing studies have not reached a consensus in the discourse on the impact of resource abundance on economic growth, whether it aids growth or brings about a curse. Mainly, the empirical findings from the existing studies can be viewed in the three different outcomes. For instance, works like Gylfason (2001), Sachs and Warner (1995), Shahbaz *et al.* (2019), Qiang and Jiang (2020), Zhang *et al.* (2022), Zalle (2019) and Arezki & Ploeg (2019) found that resource abundance hurts growth. Conversely, authors like Antwi (2024), Adu (2011) and Havranek *et al.* (2016) submit that resource abundance supports growth in the resource-rich countries. Yet, mixed results, which are contingent on country-specificities and resource types, are the outcome obtained by Adebayo *et al.* (2022), Nasiru *et al.* (2022), Bildirici and Gökmenoğlu (2019) and Ekpenyong (2018), making the link between natural resource endowment and economic performance remain unclear.

Nigeria's heavy reliance on oil revenues tends to result in the "resource curse". Nigeria's GDP per capita remains low despite abundant natural resources, underscoring institutional flaws that prevent equitable resource distribution and sustainable development. Nigeria's economy is heavily influenced by its vast natural resource wealth, especially oil, which plays a crucial role in shaping its economic landscape. The country's reliance on oil exports has generated substantial revenue, significantly contributing to its national income and foreign exchange. However, this dependence has also led to challenges, including economic vulnerability to global oil price fluctuations and a lack of diversification across other sectors. Meshesha *et al.* (2024) examine the link between natural resource abundance and economic growth across 46 African countries, employing dynamic panel threshold regression. They identify that reliance on natural resources adversely affects growth. This paradox is often labelled the resource curse, which describes the phenomenon whereby countries with an abundance of natural resources, such as oil, gas, and minerals, tend to have lower economic growth, less democracy, and worse development outcomes than countries with fewer natural resources (Auty, 1993; Sachs & Warner, 1995).

Natural resources constitute a significant source of national wealth for countries endowed with these resources. Traditionally, economists have argued that resource-endowed countries experience more sophisticated growth than resource-poor countries, as resource rents can serve as a productive asset and help finance key sectors of the economy, ultimately benefiting citizens (Oliver *et al.*, 2022). In reality, the outcomes from many resource-endowed countries have revealed that the endowments of natural resources are insufficient to achieve the necessary economic progress (Adu, 2011). The relationship between natural resources and economic performance showcases mixed outcomes (Zalle, 2019). For instance, while countries like Australia, Canada and Botswana have recorded significant growth as a result of effective management of the endowed natural resources, the reverse has been the case in many other resource-rich countries like Nigeria, the Republic of Congo, etc., mainly due to mismanagement & over-dependence on natural resources (Epo & Nochi, 2019). The posits that resource abundance often leads to adverse outcomes, including poor economic performance, corruption, rent-seeking, political instability, and ineffective governance (Augustin & Dede, 2019). The resource curse theory suggests that natural resources can harm economic performance,

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leading to the Dutch Disease. A development where an increase in revenues from natural resources leads to a decline in other sectors, particularly manufacturing and agriculture. The term originated from the Netherlands' experience in the 1960s, following the discovery of natural gas, which boosted the economy but diminished other sectors (Corden & Neary, 1982). The influx of foreign currency strengthens the national currency, making exports from other industries less competitive globally (Sachs & Warner, 1997). For instance, Nigeria, with significant oil reserves, illustrates the Dutch Disease; its overreliance on oil has inhibited agricultural growth and economic diversification (Osagie, 2019).

Natural resources play a crucial role in a nation's economic development, and Nigeria is endowed with a diverse array of them. These resources can be broadly categorised into two types: renewable and non-renewable resources. Renewable resources, such as agricultural products and forests, can regenerate naturally, while non-renewable resources, like fossil fuels and minerals, are finite and deplete over time. The oil sector is the bedrock of the Nigerian economy, accounting for over 87% of export revenues and around 54% of government earnings in 2019 (Ogunleye, 2020). Between 1976 and 2024, crude oil has been Nigeria's primary economic driver, significantly influencing GDP growth. During the 1970s and 1980s, oil exports surged due to increased global demand, contributing over 80% of Nigeria's foreign exchange and around 15-20% of GDP (OPEC, 2021). However, reliance on oil exposed the economy to volatility; periods of oil price crashes, such as in 2016, caused GDP contractions. Studies by Ajakaiye and Adeyemi (2019) highlight that the economy's dependence on oil limited diversification efforts. From 2019 to 2024, fluctuating prices due to global shifts and conflict impacts, including Nigeria's efforts at economic diversification, have moderated oil's contribution, but it still represents over 70% of revenue (World Bank, 2022).

In terms of biomass, Nigeria also has significant reserves of coal, natural gas, and minerals like tin and limestone. However, the oil concentration has led to several economic challenges, often referred to as the "resource curse.", Nigeria's GDP growth has been heavily influenced by fluctuations in global oil prices. According to the National Bureau of Statistics (NBS, 2021), GDP growth in Nigeria was approximately 2.27% in 2019, it declined sharply to 1.92% in 2020 due to the oil market crash exacerbated by the COVID-19 pandemic. This has impacted the indicators of governance, including political stability, the rule of law, government effectiveness, regulatory quality, and the control of corruption. A study carried out by Kaufmann, Kraay, and Mastrorillo (2023) highlights Nigeria's persistent challenges with weak governance structures. In the 2019 governance index, Nigeria scored only 33 out of 100 on the corruption perception index, indicating high levels of corruption, which hampers efficient resource utilisation. High corruption rates result in misallocation of resources, limiting the potential growth that could arise from Nigeria's substantial natural wealth.

Nigeria's over-reliance on oil revenues has led to weak diversification, making the economy vulnerable to global oil price fluctuations. This dependence fosters corruption, rent-seeking behaviours, and misallocation of resources, hindering sustainable growth. Moreover, resource rent dynamics often lead to the "resource curse," which hinders sectors such as agriculture and manufacturing. Weak institutions can undermine policy effectiveness and hinder diversification efforts.

These highlighted problems regarding the complex relationship between resources, institutions, and economic outcomes and the quest for guiding policy interventions for Nigeria's development warrant this study to be carried out, paving the way for meaningful policy recommendations and ensuring that Nigeria's wealth in natural resources is translated into sustainable economic development with a well-established institutional quality.

The optimal path for economic development is for a country to build on its endowments, both natural resources and human capital, while simultaneously enhancing its institutional framework. Therefore, the new structural economic theory provides a lens to analyse how Nigeria can effectively translate its natural and human resources, coupled with a strong institutional framework, into sustainable growth. Improved institutions lead to better economic performance by fostering investment and entrepreneurship (Acemoglu et al, 2001). New structural economics is closely linked to government and economics (Li & Maskin, 2021), as both fields emphasise the impact of high-quality institutions on economic performance. The need to explicate how Nigeria can leverage its factor endowments, supported by improved institutions, to achieve better economic outcomes necessitates this study.

LITERATURE REVIEW

Theoretical Link Between Natural Resource Endowment and Economic Performance

Sachs and Warner (1995) demonstrate that natural resource abundance fosters a climate that discourages openness and, consequently, restricts economic growth.

Economic performance is a complex interplay of various indicators, including GDP growth, per capita income, employment rates, and living standards. Each of these elements provides valuable insights into a country's financial stability and the quality of life of its citizens.

The Resource Curse Theory posits that countries rich in natural resources often experience slower economic growth, ineffective governance, and conflict due to factors such as corruption and volatility in global prices (Sachs & Warner, 1995). Furthermore, empirical evidence suggests that reliance on resource wealth can lead to the neglect of other economic sectors, thereby fostering corruption and mismanagement. For instance, Sachs and Warner's influential paper, "The Curse of Natural Resources" (1995), found that resource-rich countries tended to grow more slowly than their less resource-endowed counterparts. Furthermore, the Dutch Disease effect describes how resource abundance can lead to currency appreciation, thereby undermining other sectors, such as manufacturing and agriculture (Corden & Neary, 1982). For instance, Nigeria's oil sector exemplifies this paradox: despite its vast oil reserves, the country continues to struggle with economic instability and corruption. Conversely, Norway demonstrates effective resource management by using oil revenues to invest in social services and infrastructure, thereby promoting sustained economic growth (Olofsdotter, 1998).

Empirical Review

Havranek *et al.* (2016) conducted a meta-analysis of 402 estimates from 33 studies to explore the influence of natural resources on economic growth. Their findings suggest that the resource curse hypothesis is weakened by publication bias and methodological diversity. Moreover, when considering investment levels, factors such as the interaction between institutional quality and natural resource abundance significantly affect economic growth. Shahbaz *et al.* (2019a) analyse the resource curse hypothesis in the USA and found that natural resource has long-run negative effects on GDP per capita. Qiang and Jian (2020) further investigate this hypothesis across 30 regions in China, revealing that an abundance of natural resources negatively affects economic growth, while labour and capital positively influence it.

Zhang *et al.* (2022) explore the connections between natural resource volatility, global economic performance, and public administration during the early, peak, and post-COVID-19 periods, using cointegration tests with three long-run estimators (DOLS, FMOLS, CCR). Their findings revealed that natural resource volatility negatively affects global economic performance.

Arezki and Ploeg (2010) studied the impact of resource dependency on income per capita. They found that reliance on natural resources negatively affects income per capita, particularly in countries with weak legal systems, although the significance decreases when accounting for endogeneity. Antwi (2024) explores the link between natural resource abundance and economic growth in Ghana, using the FMOLS method. The study finds a positive correlation between oil production and economic growth, challenging traditional resource curse theories.

Bildirici and Gökmenoğlu (2019) examine the relationship between precious metal production and economic growth for seven precious metal-producing. The study examined gold, silver, and copper production and found a long-run relationship with mixed outcomes in different countries. For instance, between precious metals production and economic growth. Particularly, the coefficient of gold production harms economic growth in both the United States and Canada, supporting the resource curse hypothesis, but it revealed a positive impact on economic growth in South Africa.

Adebayo *et al.* (2022) examine the effect of natural resources on economic growth for the MINT nations (Mexico, Indonesia, Nigeria, and Turkey) using a unique quantile-on-quantile regression (QQR) approach. The empirical findings reveal that, in the majority of quantiles, the effect of natural resources on economic expansion is positive in both Nigeria and Mexico. At the same time, it is negative in Indonesia and Turkey. Additionally, feedback causality is observed between economic growth and natural resources in Mexico, Indonesia, and Nigeria.

Meanwhile, Adu (2011) examines the impact of natural resource abundance on long-term economic growth in Ghana. The results rejected evidence of the resource-curse hypothesis.

Zalle (2019) examine the effect of natural resources on economic growth for 29 African countries, employing a panel autoregressive distributed lag model in the form of pooled mean group, mean group and dynamic fixed effects models. The author used GDP per capita as a proxy for economic growth, total natural resource rents as a proxy for natural resources, gross fixed capital formation as a measure of total investment, and human capital and other institutional variables. The results showed that a natural resource has a negative and significant impact on economic growth.

Nasiru *et al.* (2022) analysed the impact of natural resource rents on Nigeria's economic growth, the study found a long-run equilibrium among the variables. It highlighted that oil and forest rents negatively affect economic growth, aligning with the resource curse hypothesis, while natural gas, coal, and mineral rents positively influence growth. The findings indicate that different resource rents have distinct effects on economic growth.

The study by Ewubare and Kakain (2017) explored the link between natural resource abundance and economic growth in Nigeria, the findings indicated that while petroleum and natural gas have positive coefficients, they are statistically insignificant regarding GDP. In contrast, coal showed a positive and statistically significant relationship with GDP at the 5% level, while limestone was positive but not statistically significant.

Ekpenyong (2018) evaluates the resource curse hypothesis in Nigeria from 1981 to 2013, utilizing the Johansen cointegration test, parsimonious error correction model, and multiple regression analysis. The findings indicate that crude oil production adversely affects economic growth, while agricultural and industrial outputs positively contribute to it.

Kabir (2026) analyses the influence of institutional quality on green economy initiatives in Bangladesh through a survey of 400 respondents. Using SPSS version 26, the study finds a significant positive correlation between green practice adoption and governance dimensions, while weak governance negatively impacts this relationship. It highlights the necessity for improved governance, including stronger institutions, better enforcement, greater transparency, and active involvement of stakeholders.

Akomolafe (2024) examines the role of human capital development in the relationship between natural resources and economic growth in six African countries from 1992 to 2019. The findings indicate that while natural resources negatively affect growth, human capital has a positive influence. However, human capital does not alleviate the adverse effects of resource dependency. The study recommends that African nations diversify their economies to address the resource curse.

MATERIALS AND METHODS

The study is anchored on the new structural economic theory propounded by Justin Yifu Lin in 2011. It provides a solid foundation by focusing on the structure of economic systems, including industries, institutions, resource endowments, and technological progress, to address the dynamic interactions and offer a path for economic diversification in Nigeria. Ju *et al.* (2015) suggest that economic growth involves transitioning from lower to higher productivity, and accelerating capital accumulation is achieved through comparative advantages and strong institutional frameworks.

Furthermore, a study by Haussmann and Rodrik (2003) supports the relevance of structural transformation in developing economies, advocating that countries that effectively identify and exploit their unique structural characteristics can fast-track their growth trajectories.

Furthermore, a study by Haussmann and Rodrik (2003) underscores the relevance of structural transformation in developing economies, arguing that countries that effectively identify and exploit their unique structural characteristics can fast-track their growth.

Model Specification

Following the new structural economic theory and in line with the studies of Grabowski and Self (2021) and Oliver et al (2022), the following AutoRegressive Distributed Lag (ARDL) and Toda-Yamamoto causality test models for the study is specified.

To examine the dynamic relationship between Natural Resource Endowment and Economic Performance, economic performance is proxied by GDP per capita and modelled as a function of natural resource endowment and selected macroeconomic controls. The functional form is specified as:

$$GDPPC = f(NRE, FDI, GFCF, EXR, INFR) \tag{3.1}$$

where GDPPC represents the economic performance, NRE denotes natural resource endowment measured by resource rents as a percentage of GDP, FDI represents foreign direct investment inflows, GFCF denotes gross fixed capital formation, EXR denotes the exchange rate, and INFR is proxied for persistent changes in prices.

The Dynamic model is specified as:

$$GDPPC_t = \beta_0 + \beta_1 GDPPC_{t-1} + \beta_2 NRE_t + \beta_3 FDI_t + \beta_4 GFCF_t + \beta_5 EXR_t + \beta_6 INFR_t + \mu_t \tag{3.2}$$

In Equation 3.2, economic performance (GDP per capita, $GDPPC_t$) is modelled as a function of its past value and key determinants: natural resource endowment (NRE_t), foreign direct investment (FDI_t), gross fixed capital formation ($GFCF_t$), exchange rate (EXR_t), and inflation ($INFR_t$). The coefficient β_1 captures persistence in GDP per capita, while β_2 to β_6 measure the contemporaneous impact of each explanatory variable. The term μ_t represents unobserved shocks affecting economic performance.

To distinguish between short run dynamics and long run equilibrium relationships, the ARDL error correction representation is specified as:

$$\Delta GDPPC_t = \theta_0 + \Sigma_i \theta_{1i} \Delta GDPPC_{t-i} + \Sigma_i \theta_{2i} \Delta NRE_{t-i} + \Sigma_i \theta_{3i} \Delta FDI_{t-i} + \Sigma_i \theta_{4i} \Delta GFCF_{t-i} + \Sigma_i \theta_{5i} \Delta EXR_{t-i} + \Sigma_i \theta_{6i} \Delta INFR_{t-i} + \psi_1 GDPPC_{t-1} + \psi_2 NRE_{t-1} + \psi_3 FDI_{t-1} + \psi_4 GFCF_{t-1} + \psi_5 EXR_{t-1} + \psi_6 INFR_{t-1} + \xi_t \tag{3.3}$$

Equation (3.3) is the ARDL representation of economic performance, where $\Delta GDPPC_t$ captures short run changes in GDP per capita. The θ coefficients measure the short run effects of lagged changes in GDPPC, NRE, FDI, GFCF, EXR, and INFR, while the ψ coefficients on the lagged levels represent the long run equilibrium relationship. The coefficient on the lagged level of GDPPC, ψ_1, captures the speed of adjustment, indicating how quickly GDP per capita returns to its long-run equilibrium following a short-run shock. A negative and significant ψ_1 implies that deviations from equilibrium are corrected over time, with the magnitude reflecting the proportion of the disequilibrium adjusted in each period. The term ξ_t captures random shocks affecting GDPPC.

To determine the direction of causality, and that because the variables are I(0) and I(1), the Toda-Yamamoto causality test equations were specified thus:

$$GDPPC_t = c_1 + \sum_{i=1} \alpha_i GDPPC_{t-i} + \sum_{i=1} \beta_i NRE_{t-i} + \sum_{i=1} \gamma_i FDI_{t-i} + \sum_{i=1}^{p} \delta_i GFCF_{t-i} + \sum_{i=1}^{p} \phi_i EXR_{t-i} + \sum_{i=1}^{p} \eta_i INFR_{t-i} + \epsilon_{1t} \tag{3.4}$$

$$NRE_t = c_2 + \sum_{i=1}^{p} \rho_i NRE_{t-i} + \sum_{i=1}^{p} \kappa_i GDPPC_{t-i} + \sum_{i=1}^{p} \lambda_i FDI_{t-i} + \sum_{i=1}^{p} \mu_i GFCF_{t-i} + \sum_{i=1}^{p} \nu_i EXR_{t-i} + \sum_{i=1}^{p} \xi_i INFR_{t-i} + \epsilon_{2t} \tag{3.5}$$

$$\sum_{i=1}^{p} \gamma_i GFCF_{t-i} + \sum_{i=1}^{p} \delta_i EXR_{t-i} + \sum_{i=1}^{p} \eta_i INFR_{t-i} + \epsilon_{3t} \tag{3.6}$$

$$GFCF_t = c_4 + \sum_{i=1}^{p} \lambda_i GFCF_{t-i} + \sum_{i=1}^{p} \alpha_i GDPPC_{t-i} + \sum_{i=1}^{p} \beta_i NRE_{t-i} +$$

$$\sum_{i=1}^{p} \gamma_i FDI_{t-i} + \sum_{i=1}^{p} \phi_i EXR_{t-i} + \sum_{i=1}^{p} \eta_i INFR_{t-i} + \epsilon_{4t} \tag{3.7}$$

$$EXR_t = c_5 + \sum_{i=1}^{p} \phi_i EXR_{t-i} + \sum_{i=1}^{p} \alpha_i GDPPC_{t-i} + \sum_{i=1}^{p} \beta_i NRE_{t-i} +$$

$$\sum_{i=1}^{p} \gamma_i FDI_{t-i} + \sum_{i=1}^{p} \delta_i GFCF_{t-i} + \sum_{i=1}^{p} \eta_i INFR_{t-i} + \epsilon_{5t} \tag{3.9}$$

$$INFR_t = c_6 + \sum_{i=1}^{p} \eta_i INFR_{t-i} + \sum_{i=1}^{p} \alpha_i GDPPC_{t-i} + \sum_{i=1}^{p} \beta_i NRE_{t-i} +$$

$$INFR_t = c_6 + \sum_{i=1}^{p} \eta_i INFR_{t-i} + \sum_{i=1}^{p} \alpha_i GDPPC_{t-i} + \sum_{i=1}^{p} \beta_i NRE_{t-i} + \sum_{i=1}^{p} \gamma_i FDI_{t-i} + \sum_{i=1}^{p} \delta_i GFCF_{t-i} + \sum_{i=1}^{p} \phi_i EXR_{t-i} + \epsilon_{6t} \tag{3.10}$$

In equations (3.4) to (3.10), each variable—$GDPPC_t$, NRE_t, FDI_t, $GFCF_t$, EXR_t, and $INFR_t$—is expressed as a function of its own lagged values and the lagged values of all other variables in the system. In equation (3.4), α_i represents the effect of past GDPPC, while β_i, γ_i, δ_i, ϕ_i, and η_i capture the short-run predictive effects of lagged NRE, FDI, GFCF, EXR, and INFR, respectively, with ε_{1t} as the error term. In equation (3.5), ϱ_i, $\varkappa_i$, λ_i, μ_i, ν_i, and ξ_i measure the influence of lagged NRE, GDPPC, FDI, GFCF, EXR, and INFR on NRE_t, with ν_t as the disturbance term. Similarly, in equation (3.6), λ_i, θ_i, ψ_i, γ_i, δ_i, and η_i capture the effects of past FDI, GDPPC, NRE, GFCF, EXR, and INFR on FDI_t, with ω_t as the residual. Equations (3.7) to (3.8) follow the same structure, with coefficients corresponding to each variable's lags, and the respective error terms capturing unobserved shocks. Granger causality is determined by testing whether the coefficients on the lagged explanatory variables are jointly zero; rejection of the null indicates that past values of a variable significantly predict the dependent variable, revealing the direction and strength of interdependencies among the macroeconomic indicators.

Table 1: Description of Variables in the Study

Variable	**Code**	**Description and Measurements**	**Source**
GDP per capita	GDPPC	Calculated by dividing a country's GDP by its population, showcasing the nation's economic value on a per-person basis.	WDI
Inflation	INFR	Measured by the annual growth rate of the GDP implicit deflator shows the rate of price change in the economy.	WDI
Foreign Direct Investment	FDI	Measures the net flows as a percentage of GDP.	WDI
Natural Resource Endowment	NRE	Total natural resource rents as a percentage of GDP, including oil, gas, mineral, and forest rents.	WDI
Gross Fixed Capital Formation	GFCF	Total investment in fixed assets, plus net changes in the level of inventories, measured as a percentage of GDP.	WDI
Exchange Rate	EXR	Official exchange rate of the local currency against USD or major currencies, measures currency stability.	WDI

Note: WDI represents World Development Indicators.
Source: Author's Compilation 2026.

Estimation Technique

The estimation phase utilised the ARDL error correction framework to analyse both short-run and long-run dynamics. The key advantages of the bounds testing approach allow for mixed orders of integration [I(0) and I(1)], unlike traditional integration methods that require all variables to be integrated to the same order, usually I(1). Also, the technique is effective with small sample sizes (e.g., 30-80 data points), as it yields more robust, reliable, and super-consistent results. The technique minimises endogeneity issues by operating under the assumption that all variables are endogenous and by involving a single long-run relationship, allowing for clear identification of dependent and independent variables. According to Pesaran *et al.* (2001), the ARDL approach posits a unique reduced-form equation relationship between the dependent and exogenous variables. Moreover, Toda-Yamamoto Granger causality tests were conducted to examine the direction of causality among natural resource endowment, institutional quality, and economic performance. Model stability was assessed using the CUSUM and CUSUMSQ tests, and a series of diagnostic evaluations covering serial correlation, heteroskedasticity, normality, variance inflation test and CUSUMSQ stability tests were performed to confirm the robustness and validity of the estimated models. All empirical analyses were conducted using EViews 14.

Ethical considerations

The study discusses an empirical economic inquiry that uses only secondary, publicly accessible macroeconomic and socio-economic data, eliminating the need for direct interaction with human subjects or the collection of sensitive personal data.

This precludes the requirement for formal institutional review board approval while upholding high standards of academic integrity and research ethics.

Key practices operationalising this commitment include a dedication to transparency in data sourcing and methodology, with all data clearly attributed to their origin, such as the World Development Indicators and the central Bank of Nigeria, accompanied by indicator codes for clarity. The entire econometric approach is delineated in meticulous detail, facilitating replication and enabling critical evaluation by peers.

Moreover, the study prioritises accurate and comprehensive citation of all referenced materials, ensuring proper attribution for theoretical frameworks, methodologies, and datasets to mitigate plagiarism and embed the research within the broader scholarly discourse regarding the resource curse.

In addition, the analysis is characterised by objective reporting of findings, eschewing data manipulation or selective reporting. All results, including those statistically deemed insignificant, are presented in full, along with model diagnostics that disclose potential limitations. This practice prevents "cherry picking" favourable results, reinforcing the idea that conclusions should be based on rigorous empirical evidence.

Lastly, it includes transparent acknowledgement of the research's limitations, encompassing discussions of potential data constraints and the assumptions inherent in the econometric models. By confronting these limitations candidly, the research maintains intellectual honesty concerning the scope and certainty of its conclusions.

This ethically sound methodological framework provides a thorough, transparent, and reproducible approach to exploring the complex relationships between natural resource endowment, institutional quality, and the diverse impacts on economic performance in Nigeria. It is systematically designed to yield credible evidence addressing the study's primary objectives surrounding investment, governance, and human capital pathways through which resource dependence can affect developmental outcomes.

RESULTS AND DISCUSSIONS

The estimation phase employed the ARDL error correction framework to capture both short run and long run dynamics, while pairwise Granger causality tests were conducted to examine the direction of causality among natural resource endowment, institutional quality, and economic performance. A series of diagnostic evaluations covering serial correlation, heteroskedasticity, normality and stability tests was performed to confirm the robustness, validity and stability of the estimated models. All empirical analyses were conducted using EViews.

Descriptive Statistics

The descriptive statistics for the key variables used in the study, including natural resource endowment, inflation, foreign direct investment, real GDP per capita, gross fixed capital formation and exchange rate. The detailed results are reported in Table2:

Table 2: Descriptive Statistics

	GDPPC	FDI	NRE	INFR	GFCF
Mean	2.079045	0.398216	13.01583	13.88631	9187833.
Median	2.245000	0.384849	13.04363	12.53783	9178168.
Maximum	12.21000	0.885559	24.93573	33.24210	11766417
Minimum	-4.018925	-0.039285	4.554107	5.388008	6860444.
Std. Dev.	3.216243	0.263043	5.186866	6.490965	1310859.
Skewness	0.650398	0.028274	0.234732	1.360205	0.131179
Kurtosis	4.936012	1.958849	2.379244	4.721908	2.016769
Jarque-Bera	6.573588	1.313691	0.731929	12.52510	1.251319
Probability	0.037373	0.518484	0.693527	0.001906	0.534909
Observations	29	29	29	29	29

Note: The table presents descriptive statistics for the key macroeconomic and institutional variables. The statistics include the mean, median, maximum, minimum, standard deviation, skewness, kurtosis, Jarque–Bera statistic, probability, sum, sum of squared deviations, and number of observations. Skewness indicates the asymmetry of the distribution, while kurtosis measures the peakedness. The Jarque–Bera test assesses the normality of the series, with the probability value indicating whether the null hypothesis of normality can be rejected.
Source: Author's computations, 2026.

The descriptive evidence in Table 4.1.1 presents a clear picture of the behaviour of the study variables over the sample period. Real GDP per capita growth averages 2.08 % (median: 2.25 %), fluctuating widely between a minimum of −4.02 % and a maximum of 12.21 %. The standard deviation (3.22 %) exceeds the mean, reflecting pronounced macroeconomic volatility that mirrors recurrent economic shocks in Nigeria, as documented in the literature (Ndikumana & Boyce, 2011). The distribution is positively skewed (skewness: 0.65) and leptokurtic (kurtosis: 4.94), and the Jarque-Bera probability (0.04) indicates non-normality. Foreign direct investment inflows remain low at 0.40 % of GDP (median: 0.38 %) and vary between −0.04 % and 0.89 %, with a standard deviation of 0.26 %. The distribution is nearly symmetric (skewness: 0.03) and flat (kurtosis: 1.96), with the Jarque-Bera probability (0.52) supporting normality, reflecting a constrained investment environment (UNCTAD, 2023).

Natural resource endowment averages 13.02 % of GDP (median: 13.04 %) and ranges from 4.55 % to 24.94 %, indicating strong exposure to global commodity cycles (Ross, 2015). The standard deviation (5.19 %) reflects substantial variation.

Inflation averages 13.89 % (median: 12.54 %), ranging from 5.39 % to 33.24 %, with a standard deviation of 6.49 %, positive skewness (1.36) and leptokurtic distribution (kurtosis: 4.72). The Jarque-Bera probability (0.002) indicates non-normality, reflecting episodic inflationary shocks in the economy and is consistent with previous analyses of Nigeria's macroeconomic volatility (Calderón & Servén, 2014). Gross fixed capital formation averages 9,187,833 (median: 9,178,168), showing wide variation from 6,860,444 to 11,766,417 (standard deviation: 1,310,859), consistent with volatile investment

Table 3: Pairwise Correlation Matrix

Variable	GDPPC	FDI	NRE	INFR	GFCF	EXR
GDPPC	1					
FDI	0.193	1				
NRE	0.417**	–0.112	1			
INFR	0.008	0.063	–0.065	1		
GFCF	–0.355	0.166	–0.661***	0.15	1	
EXR	-0.093	0.303	-0.403	0.654***	0.637***	1

*Notes: N = 29. GDPPC = real GDP per capita growth (%), NRE = natural resource endowment (% of GDP), GFCF = gross fixed capital formation (% of GDP), INFR = inflation (consumer prices, %), FDI = foreign direct investment net inflows (% of GDP). *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$ (two-tailed tests.*

Source: Author's computations, 2026.

patterns in developing economies (Aghion *et al.*, 2019). Exchange rate averages 236.52 (median: 150.30), with a range from 21.88 to 1478.97 (standard deviation: 275.39), exhibiting strong right skewness (3.39) and leptokurtic peak (kurtosis: 15.58). The Jarque-Bera probability (0.00) confirms non-normality, reflecting periods of extreme currency depreciation and volatility.

Correlation Analysis

Prior to conducting the econometric analysis, it is important to examine the relationships among the variables to identify potential associations and multicollinearity issues. Table 3 presents the pairwise correlation coefficients for all key variables over the sample period 1996–2024. The correlation analysis provides insights into the strength and direction of linear relationships, highlighting which variables may interact or move together in the Nigerian economic context.

Table 3 presents Pearson correlations among real GDP per capita growth (GDPPC), natural resource variables, and the full set of covariates. The results indicate that GDP per capita growth is positively and significantly correlated with natural resource endowment (NRE, 0.417**) consistent with resource-driven growth episodes and demographic dividend effects observed in Nigeria (Sala-i-Martin & Subramanian, 2013).

Exchange rate exhibits a weak negative correlation with GDP per capita growth (−0.093), while depreciation episodes may mildly constrain growth.

FDI inflows and gross fixed capital formation both exhibit positive correlation (FDI 0.610***) and (GFCF, 0.615***) respectively, suggesting that the moderating effect of resource endowment on growth nexus may operate partly through enhanced investment and capital accumulation channels (Bhattacharyya & Hodler, 2014).

Stationarity Test

Given the small annual sample of the macroeconomic data, stationarity was assessed using the Augmented Dickey–Fuller (ADF), Phillips–Perron (PP), and Zivot–Andrews (1992) unit root tests, which were performed to show the stationarity of the data. Tables 4-3 report the results in levels and first differences.

Table 4: Augmented Dickey–Fuller (ADF) Unit Root Test Result

Variable	Levels		First Difference		Order of Integration
	ADF Statistic	p-value	ADF Statistic	p-value	
GDPPC	–2.886	0.0597	–7.302***	0.0000	I(1)
NRE	–2.513	0.1232	–5.482***	0.0001	I(1)
GFCF	–0.249	0.9199	–8.837***	0.0000	I(1)
INFR	–2.785	0.0733	–6.818***	0.0000	I(1)
EXR	-1.2811	0.6226	-4.266	0.0026	I(1)
FDI	–2.728	0.0820	–7.931***	0.0000	I(1)

*Note: ADF = Augmented Dickey–Fuller test statistic; levels and first differences represent the original series and its first-differenced form, respectively. ** and *** denote significance at the 5% and 1% levels, respectively. I(0) indicates stationarity at levels, while I(1) indicates stationarity after first differencing.*

Source: Author's computation, 2026.

The Augmented Dickey Fuller unit root test was conducted to determine the stationarity properties of the variables. As shown in Table 4.3a, most of the series become stationary after first differencing, indicating integration of order one. Specifically, gross domestic product per capita GDPPC becomes stationary at first difference (ADF = −7.302, p = 0.0000), natural resource endowment NRE (ADF = −5.482, p = 0.0001), natural gas revenue Gross fixed capital formation GFCF (ADF = −8.837, p = 0.0000), infrastructure INFR (ADF = −6.818, p = 0.0000), exchange rate EXR (ADF = −4.266, p = 0.0026), and foreign direct investment FDI (ADF = −7.931, p = 0.0000).

Given the small sample size, these results are interpreted with caution and are used primarily to inform model specification rather than to strictly enforce asymptotic cointegration based estimation requirements.

The Phillips–Perron (PP) unit root test was conducted on the selected macroeconomic and institutional variables to assess their stationarity properties and determine their order of integration. As shown in Table 4.3b, most variables are non-stationary at levels, failing to reject the null hypothesis of a unit root at the 5% significance level. Specifically, GDP per capita (GDPPC, PP = −2.814, p = 0.0691), Natural Resource Endowment (NRE, PP = −2.540, p = 0.1172), Gross Fixed Capital Formation (GFCF, PP = −2.196, p = 0.2122), Foreign Direct Investment (FDI, PP = −2.572, p = 0.1105), Exchange Rate (EXR, PP = −0.544, p = 0.8676), In contrast, Inflation (INFR, PP = −3.209, p = 0.0300) is stationary at levels, indicating integration of order zero, I(0). All other non-stationary variables achieve stationarity only after first differencing, with their first-difference statistics significant at the 1% level, confirming they are integrated of order one, I(1).

Overall, the dataset exhibits a mixed order of integration, with both I(0) and I(1) variables present, justifying the use of the Autoregressive Distributed Lag (ARDL) bounds testing approach for cointegration analysis, as it allows estimation of long-run relationships without requiring all series to be uniformly stationary, thus reducing the risk of spurious regression and ensuring robust inference.

Table 5: Phillips–Perron (PP), Unit Root Test Result

Variable	**Levels Adj. t-Stat**	**Prob.**	**First Difference Adj. t-Stat**	**Prob.**	**Order of Integration**
GDPPC	-2.814	0.0691	-7.427***	0.0000	I(1)
NRE	-2.540	0.1172	-10.354***	0.0000	I(1)
GFCF	-2.196	0.2122	-13.241***	0.0000	I(1)
INFR	-3.209***	0.0300	-	-	I(0)
EXR	-0.544	0.8676	-4.266***	0.0026	I(1)
FDI	-2.572	0.1105	-8.473***	0.0000	I(1)

*Note: PP = Phillips–Perron test statistic; levels and first differences refer to the original series and its first-differenced form, respectively. *** denotes significance at the 1% level. I(0) indicates stationarity at levels, I(1) indicates stationarity after first differencing.*
Source: Author's computation, 2026

Table 6: Zivot–Andrews Unit Root Test Results (Structural Break)

Variable	**ZA t-Statistic**	**Prob.**	**5% Crit**	**Order of Integration**
GDPPC	-4.271	0.3193	-5.08	I(1)
NRE	-4.867	0.0055	-5.08	I(0)
GFCF	-7.577	0.0047	-5.08	I(0)
INFR	-6.247	0.4287	-5.08	I(1)
EXR	-3.182	0.2814	-5.08	I(1)
FDI	-3.164	0.0407	-4.93	I(1)

Note: ZA = Zivot–Andrews test statistic; Critical value at 5% = –4.80. I(0) denotes stationarity at levels, I(1) denotes stationarity after first differencing.
Source: Author's computation, 2026.

The Zivot–Andrews unit root test was employed to account for possible endogenous structural breaks in the series, recognising that ignoring such breaks may bias conventional unit root results. The test allows for a one-time shift in both the intercept and trend, providing a more robust assessment of stationarity in the presence of structural change. The results presented in Table 4.3c reveal mixed integration properties across the variables.

At the five percent significance level, the null hypothesis of a unit root cannot be rejected for GDP per capita (GDPPC, ZA = –4.271), Inflation Rate (INFR, ZA = –6.247), Exchange rate w(EXR, ZA=-3.182), and Foreign Direct Investment (FDI, ZA = –3.164), as their test statistics are less negative than the 5% critical value of –5.08 (or –4.93 in the case of FDI). This indicates that these variables are non-stationary at levels and must be differenced once to achieve stationarity, classifying them as integrated of order one, I(1). Natural Resource Endowment (NRE, ZA = –4.867), Gross Fixed Capital Formation (GFCF, ZA = –7.577) reject the null hypothesis of a unit root, indicating stationarity at levels and classifying these variables as integrated of order zero, I(0).

Overall, the presence of both I(0) and I(1) variables confirms mixed integration across the dataset. These findings support the application of the ARDL bounds testing approach for subsequent empirical analysis, as it accommodates variables with differing orders of integration and accounts for potential structural breaks in the series.

Table 7: VAR Lag Order Selection Criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-659.6181	NA	4.15e+11	49.45319	49.83714	49.56736
1	-511.6860	197.2428	1.02e+09	43.23600	46.69156	44.26352
2	-300.4556	156.4670*	89840.12*	32.33004*	38.85722*	34.27091*

*Note: LR = Likelihood Ratio; FPE = Final Prediction Error; AIC = Akaike Information Criterion; SC = Schwarz Criterion; HQ = Hannan-Quinn Criterion. * indicates the lag order selected by the respective criterion.*

Source: Authors Computation.

Lag Length Criteria

Table 7 presents the VAR lag order selection criteria for the model specification. The results show that most of the information criteria consistently select an optimal lag length of 2 periods. This convergence justifies the choice of a maximum lag of two, ensuring an appropriate balance between model adequacy and parsimony while minimising the risk of overfitting. The selected lag structure therefore provides a robust foundation for subsequent estimation and inference.

Short run and Long Run Autoregressive Distributed Lag (ARDL) Estimation

The Autoregressive Distributed Lag (ARDL) approach, developed by Pesaran, Shin, and Smith, was employed to estimate both short run dynamics and long run equilibrium

Table 8: Summary of ARDL Estimates – Dependent Variable: GDPPC

Variable	Coefficient	Std. Error	t Statistic	Prob.
Long Run Coefficients				
NRE(-1)	1.919199	1.319483	1.454508	0.1599
FDI(-1)	-4.122005	7.394492	-0.557443	0.5829
GFCF(-1)	-7.40E-06	7.26E-06	-1.017968	0.3198
EXR(-1)	0.129567	0.099422	1.303192	0.2060
INFR(-1)	-1.732433	1.614681	-1.072926	0.2949
Short Run Dynamics				
ECM(-1)	-0.339537	0.039747	-8.542428	0.0000
D(GDPPC(-1))	-0.357756	0.083902	-4.263969	0.0008
D(NRE)	-0.236837	0.087459	-2.707992	0.0170
D(NRE(-1))	-0.464466	0.083033	-5.593774	0.0001
D(FDI)	0.355339	1.625755	0.218569	0.8301
D(FDI(-1))	-4.699837	1.348873	-3.484270	0.0036
D(GFCF)	-7.99E-07	2.92E-07	-2.731161	0.0162
D(GFCF(-1))	6.43E-07	3.47E-07	1.854880	0.0848
D(EXR)	-0.027012	0.005036	-5.364099	0.0001
D(EXR(-1))	0.107767	0.018362	5.869073	0.0000
D(INFR)	-0.255404	0.080566	-3.170135	0.0068
D(INFR(-1))	0.275302	0.053597	5.136514	0.0002
Deterministic				
C	13.75542	1.767860	7.780828	0.0000
R-squared	0.930579			
Adjusted R-squared	0.871075			
F-statistic	15.63900			
Prob(F-statistic)	0.000005			
Durbin-Watson stat	2.709572			

Source: Author's computation.

relationships. This methodology is particularly suitable for the study because the variables display a combination of stationary and non-stationary behaviour, as indicated in Table 4.3. Its flexibility allows reliable estimation regardless of the variables' order of integration and makes it well-suited for small sample sizes, eliminating the need for prior differencing or stringent pre-testing procedures.

The ARDL results reported in Table 4.11 indicate a statistically robust model explaining variations in economic performance measured by real GDP per capita. The adjusted R squared of 0.871 suggests that approximately 87 percent of the changes in GDP per capita are explained by natural resource endowment, foreign direct investment, gross fixed capital formation, exchange rates, and inflation rate. The overall model is jointly significant, as reflected by the F statistic of 15.639 with a probability value of 0.000005, confirming the relevance and adequacy of the specification. The Durbin-Watson statistic of 2.710 is close to the benchmark value of two, indicating the absence of serious serial correlation and supporting the reliability of the estimated coefficients.

In the long run, none of the lagged explanatory variables are statistically significant at conventional levels. Natural resource endowment exhibits a positive but insignificant effect on GDP per capita ($\beta = 1.919$, $p = 0.160$), suggesting that while resource wealth may contribute to economic performance, its long run impact is not strongly established within the model. Foreign direct investment ($\beta = -4.122$, $p = 0.582$), gross fixed capital formation ($\beta = -7.40E-06$, $p = 0.320$), exchange rates ($\beta = 0.130$, $p = 0.206$), and inflation ($\beta = -1.732$, $p = 0.295$) also show statistically insignificant coefficients, indicating that these factors do not exert a strong direct long run effect on GDP per capita in the estimated framework.

The short run dynamics reveal significant adjustment toward long run equilibrium. The error correction term is negative and highly significant (ECM = −0.340, $p = 0.000$), confirming the existence of a stable long run relationship. This coefficient implies that about 34 percent of short run deviations from equilibrium in GDP per capita are corrected within one period, reflecting a moderate speed of adjustment toward long run equilibrium.

Changes in the explanatory variables exert mixed short run effects on GDP per capita. Contemporaneous and lagged changes in natural resource endowment have negative and statistically significant effects (D(NRE) = −0.237, $p = 0.017$; D(NRE(−1)) = −0.464, $p = 0.0001$), suggesting that short run resource shocks may initially depress economic performance, possibly due to adjustment costs or inefficiencies in resource management. Foreign direct investment shows a significant negative lagged effect (D(FDI(−1)) = −4.700, $p = 0.004$) while the contemporaneous change is insignificant, indicating delayed impacts of FDI inflows. Gross fixed capital formation exhibits mixed effects, with a contemporaneous negative effect (D(GFCF) = −7.99E−07, $p = 0.016$) and a marginally positive lagged effect (D(GFCF(−1)) = 6.43E−07, $p = 0.085$), highlighting the gradual nature of investment impacts. Exchange rates and inflation demonstrate strong short run effects, with contemporaneous depreciation or rising inflation reducing GDP per capita, while lagged effects partially offset these movements.

Overall, the results suggest that economic performance responds to both structural long run factors and immediate short run shocks. The highly significant error correction term confirms the stability of the long run relationship, while the short run coefficients underscore the importance of adjustment processes and the dynamic effects of resource endowment, capital flows, and macroeconomic variables in shaping GDP per capita fluctuations.

Table 9: Summary of Pairwise Granger Causality Tests

Null Hypothesis	**F-Statistic**	**Prob.**	**Mode of Causality**
NRE does not Granger Cause GDPPC GDPPC does not Granger Cause NRE	3.95739 0.55095	0.0239 0.6536	NRE → GDPP
FDI does not Granger Cause GDPPC GDPPC does not Granger Cause FDI	1.19547 1.15860	0.3382 0.3514	No Causality
GFCF does not Granger Cause GDPPC GDPPC does not Granger Cause GFCF	2.88581 0.11980	0.0626 0.9473	No Causality
EXR does not Granger Cause GDPPC GDPPC does not Granger Cause EXR	0.80011 1.71232	0.5091 0.1983	No Causality
INFR does not Granger Cause GDPPC GDPPC does not Granger Cause INFR	1.72058 0.18736	0.1967 0.9037	No Causality

Source: Author's computation.

Granger Causality Test

Table 9 presents the results of the pairwise Granger causality tests examining short-run predictive relationships between GDP per capita and key macroeconomic variables. The findings indicate limited evidence of short-run causality. For natural resource endowment (NRE), the null hypothesis that NRE does not Granger cause GDPPC is rejected ($F = 3.95739$, $p = 0.0239$), indicating that changes in resource endowment have predictive power for GDP per capita in the short run. However, the reverse causality is not significant (GDPPC → NRE, F = 0.55095, p = 0.6536), suggesting no feedback from GDP per capita to resource endowment.

For foreign direct investment, gross fixed capital formation, exchange rates, and inflation, neither the null hypothesis of causality from the variable to GDPPC nor the reverse is rejected. Specifically, FDI shows F = 1.19547, p = 0.3382 for FDI → GDPPC, and F = 1.15860, p = 0.3514 for GDPPC → FDI; GFCF exhibits F = 2.88581, p = 0.0626 and F = 0.11980, p = 0.9473; EXR has F = 0.80011, p = 0.5091 and F = 1.71232, p = 0.1983; and INFR reports F = 1.72058, p = 0.1967 and F = 0.18736, p = 0.9037. These results indicate no statistically significant short-run predictive relationship in either direction for these variables.

Overall, the pairwise Granger causality analysis suggests that short-run fluctuations in GDP per capita are largely driven by resource endowments, whereas other macroeconomic indicators exhibit minimal immediate predictive power. This implies that the impact of FDI, investment, exchange rate changes, and inflation on economic performance is more likely to operate through long-run structural channels rather than short-run dynamics.

Post Estimation Test

Following the estimation of the ARDL models and Granger causality tests, post-estimation diagnostics were carried out to verify the robustness of the results. These procedures are intended to examine the distribution of residuals, check for heteroskedasticity, autocorrelation, model specification and assess the stability of the estimated coefficients over the sample period.

Table 10: Breusch-Godfrey Serial Correlation LM Test Results

Test	Statistic	Value	df	Probability	Remarks
Wald Test	F-statistic	67.026	(2, 16)	0.0000	Rejected
Chi-square	134.051	2	0.0000		
Breusch–Godfrey Serial Correlation LM Test	F-statistic	0.322	(2, 14)	0.7299	Not rejected
	Obs*R-squared	1.187	0.5523		
Breusch–Pagan–Godfrey Heteroskedasticity Test	F-statistic	0.977	(10, 16)	0.4985	Not rejected
	Obs*R-squared	10.235	0.4202		
	Scaled explained SS	2.606	0.9892		
Ramsey RESET Test	t-statistic	.482412	8	0.6424	Not rejected
	F-statistic	.232721	(1, 8)	0.6424	
	Likelihood ratio	.774226	1	0.3789	

Source: Author's computation.

Table 10 presents the post estimation diagnostic results assessing serial correlation and heteroskedasticity in the estimated model. The Breusch Godfrey LM test indicates that the null hypothesis of no serial correlation up to two lags cannot be rejected, as reflected by the F statistic of 0.322 with a probability value of 0.7299 and the Obs R squared statistic of 1.187 with a probability value of 0.5523. These results confirm the absence of residual autocorrelation, suggesting that the specified lag structure sufficiently captures the model's underlying dynamics and that the estimated coefficients are not biased by serial dependence.

In addition, the Breusch-Pagan-Godfrey heteroskedasticity test fails to reject the null hypothesis of constant error variance, with an F statistic of 0.977 and a p-value of 0.4985, and an Obs R-squared of 10.235 with a p-value of 0.4202. This confirms homoskedasticity of the residuals and supports the reliability of the standard errors. The Wald test strongly rejects the joint null hypothesis at the one per cent level, with an F statistic of 67.026 and a Chi-square value of 134.051, indicating joint significance of the imposed restrictions.

The Ramsey RESET test for model specification also indicates no evidence of misspecification, with a t-statistic of 0.482 (p = 0.6424), an F-statistic of 0.233 (p = 0.6424), and a likelihood ratio of 0.774 (p = 0.3789). While the Wald test strongly rejects the joint null hypothesis at the one percent level, with an F statistic of 67.026 and a Chi-square value of 134.051, indicating the joint significance of the imposed restrictions, the overall diagnostic outcomes affirm the robustness of the model and the credibility of the inferential results.

Figure 1 presents the histogram and normality statistics for the residuals from the ARDL estimation (1998–2024). The residuals are symmetrically distributed around a mean of near zero (–1.15e-16), with a modest standard deviation of 1.806. The distribution exhibits mild positive skewness (0.018) and is slightly leptokurtic (kurtosis 2.450), but the Jarque–Bera statistic of 0.341 (p = 0.843) fails to reject the null hypothesis of normality at any conventional significance level.

These results confirm that the residuals are normally distributed, satisfying a core assumption of the classical linear regression model and supporting valid statistical inference on the coefficient estimates.

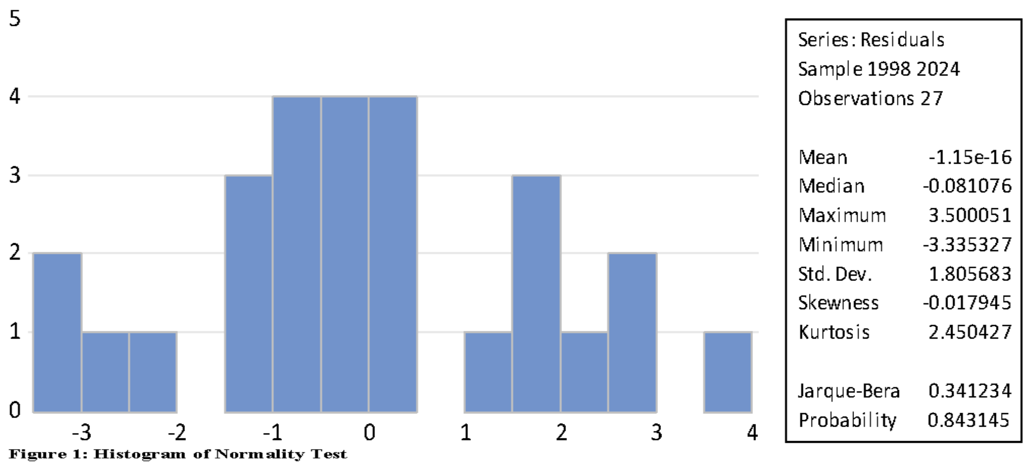

Figure 1: Histogram of Normality Test

Stability Test Results: CUSUM and CUSUM of Square

The stability test results assess the consistency of the estimated parameters over the sample period and verify whether the model remains structurally reliable over time

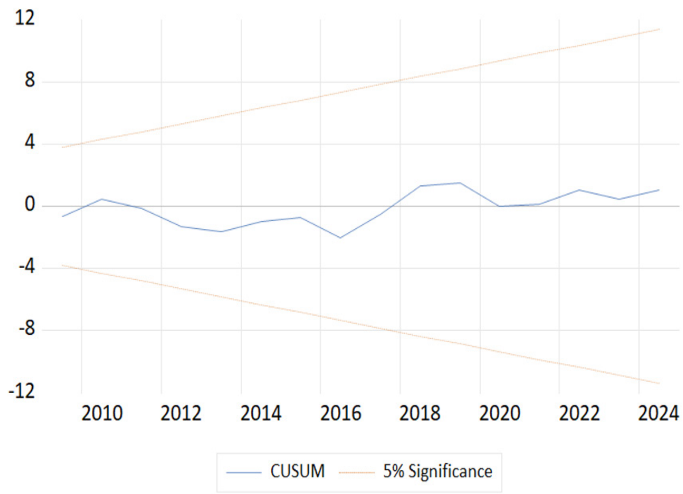

Figure 2: Stability Test - CUSUM

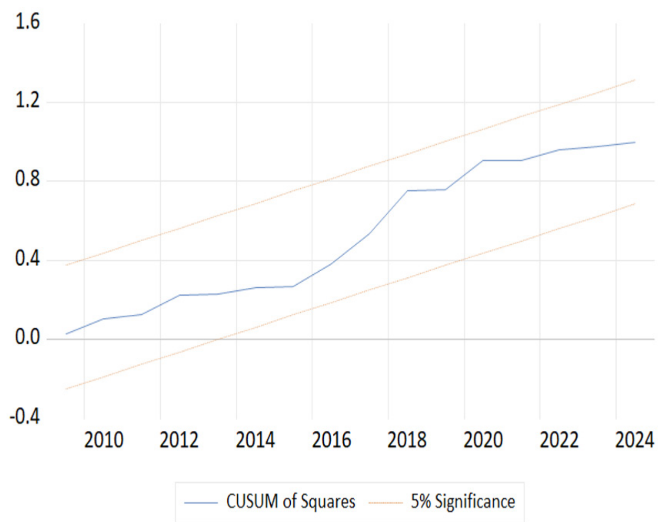

Figure 3: Stability Test - CUSUM of squares

Figures 2 and 3 present the cumulative sum (CUSUM) and cumulative sum of squares (CUSUMSQ) tests for parameter stability in the estimated ARDL specification. The CUSUM plot (Figure 4.2.2) remains entirely within the 5 % critical bounds throughout the sample period (2010–2024), indicating no evidence of systematic parameter instability. Similarly, the CUSUMSQ plot (Figure 4.2.3) stays well within the critical bounds, confirming constancy of residual variance and the absence of structural breaks in the error process.

These results provide strong support for the structural stability of the estimated long-run and short-run relationships. The absence of significant departures from the bounds holds despite major macroeconomic shocks in Nigeria during the period, including the 2014–2016 oil price collapse and the COVID-19 recession. Taken together with earlier diagnostics indicating no serial correlation, homoskedasticity, and moderate multicollinearity, the CUSUM and CUSUMSQ tests affirm the reliability of the coefficient estimates and reinforce confidence in the robustness of the core findings regarding the role of natural resource endowment and institutional quality in Nigeria's economic performance.

Discussion And Interpretation Of Findings

The hypothesis states that natural resource endowment has no significant impact on economic performance in Nigeria (H_0). The ARDL results provide evidence to reject this null in part. In the long run, natural resource endowment has a positive but statistically insignificant effect on GDP per capita ($\beta = 1.919$, $p = 0.160$), suggesting that higher resource rents may support income growth over extended periods, even if the effect is not strong. This reflects broader empirical findings that natural resource rents can influence economic welfare, although the direction and strength of the effect vary depending on institutional and structural factors (Umaru & Nadabo, 2024). The insignificance of foreign direct investment, capital formation, exchange rates, and inflation in the long run further suggests that these macroeconomic variables do not exert a measurable impact on per capita income when resources are abundant.

Short-run dynamics reveal that contemporaneous changes in natural resource endowment reduce GDP per capita ($\Delta NRE = -0.237$, $p = 0.017$), while lagged changes have an even stronger negative effect ($\Delta NRE(-1) = -0.464$, $p = 0.0001$), reflecting adjustment costs and economic disruptions that often accompany resource revenue volatility. This finding aligns with studies showing that resource-dependent economies can experience short-term instability, particularly when revenues fluctuate and fiscal buffers are weak (Balogun *et al.*, 2024). The error correction term (-0.340, $p = 0.000$) indicates moderate adjustment toward long-run equilibrium, with a significant proportion of short-run deviations corrected over time.

Granger causality tests show a unidirectional short-run causal effect from natural resource endowment to GDP per capita (NRE → GDPPC), while no causality is observed in the reverse direction or for other macroeconomic variables. This unidirectional causality suggests that short-term movements in economic performance respond to changes in resource endowment, whereas other variables may influence performance through structural, long-term mechanisms rather than immediate predictive channels (Eregha & Mesagan, 2016).

These findings imply that Nigeria's resource endowment does matter for economic performance, but its effects are conditional and manifest differently across time horizons. In the long run, resource wealth may support income growth when managed well, whereas short-run volatility can depress performance, underscoring the importance of fiscal and macroeconomic policies that cushion against revenue swings (van der Ploeg, 2021). The unidirectional causality from resource endowment to per capita output in the short run reinforces the role of resource revenues as a driver of immediate economic activity, even when other macroeconomic variables do not exhibit predictable causal links. Overall, the evidence points away from an unconditional resource curse and toward a conditional scenario in which natural resource endowment can contribute positively to economic performance when complemented by sound policy and management frameworks (Ross, 2015; Sachs & Warner, 2001).

The finding is consistent with the insights of Olayungbo and Olayiwola (2021), who examined oil price shocks and growth in Nigeria using quarterly data from 1981 to 2018 and found that resource fluctuations can significantly influence GDP through government spending and investment channels. For Nigeria, the negative contemporaneous and lagged effects indicate that resource volatility may temporarily suppress output, reflecting fiscal pressures, inflationary tendencies, and exchange rate adjustments that often accompany resource windfalls or shocks. This reinforces the notion that resource-driven performance is highly conditional on policy management, stabilising mechanisms, and fiscal planning.

These results suggest that Nigeria's resource-driven growth is not inherently a curse but rather a conditional opportunity, dependent on how rents are utilised. The moderate error-correction term (-0.340, $p = 0.000$) indicates a moderate pace of adjustment toward long-run equilibrium, implying that while shocks depress output in the short term, the economy gradually restores balance. This observation underscores practical steps such as improving revenue transparency, implementing stabilisation funds, and managing resource volatility to maximise developmental benefits. However, the findings also partially contradict the classic resource curse hypothesis, which predicts that resource abundance leads to rent-seeking behaviour, Dutch disease, and institutional deterioration (Ross, 2015; Sachs & Warner, 2001).

Capital formation, foreign direct investment, exchange rates, and inflation are not significant in the long run, suggesting that the contribution of natural resource endowment to GDP per capita operates largely independently of these macroeconomic variables. The weak positive effect of capital formation observed in the previous literature (Olayungbo & Olayiwola, 2021) is not statistically confirmed in these findings, highlighting that Nigeria's resource-income channel may bypass conventional investment pathways, possibly due to direct fiscal reliance on oil revenues. This mirrors the perception of a study by (World Bank, 2024).

Short-run ARDL dynamics further reveal that natural resource endowment exerts immediate and lagged effects in opposing directions, reflecting an oscillatory adjustment mechanism. These patterns capture how resource shocks initially depress economic activity before structural or policy interventions facilitate recovery. The error-correction term suggests a moderate adjustment speed, indicating that deviations from long-run equilibrium persist briefly before correction. Granger causality tests confirm a unidirectional short-run relationship from natural resource endowment to GDP per capita (NRE → GDPPC), with no reverse causality and no significant short-run effects of other macroeconomic variables. This implies that while resource shocks influence output, they do not predictably interact with broader macroeconomic indicators in the immediate term, aligning with studies emphasising lagged or structural effects of resource rents in Nigeria (Balogun *et al.*, 2024; Umaru & Nadabo, 2024). These findings could be due to Nigeria's oil dominance, which has historically played a central role in the economy, with the sector generating a large share of government revenues and export earnings despite contributing only a modest share of GDP. The petroleum industry's contribution to government revenue and export earnings underscores the importance of natural resources to fiscal and external balances (World Bank, 2024b; Energy Information Administration, 2004). For decades, oil rents have financed infrastructure and consumption, supporting per capita income during periods of high global oil prices and enabling funding for major projects and public expenditure. However, the resource revenue share of GDP has fluctuated sharply over time, reflecting structural challenges and production constraints that have sometimes weakened this positive development (World Bank, 2023; Okoye et al., 2022). These dynamics help explain why Nigeria's natural resource endowment shows a positive long-run contribution to GDP per capita even when other macroeconomic factors are insignificant in the long run.

Recent institutional reforms, including the Petroleum Industry Act of 2021 and fuel subsidy removal policies, aim to strengthen governance of the oil sector and channel rents more productively toward sustainable development, which may support economic performance over time (World Bank, 2024a). Unlike classic resource curse cases, such as Venezuela, where persistent dependence on oil has led to severe economic contraction and institutional breakdown, Nigeria's federal structure and diversification efforts in sectors like agriculture and services help mitigate some negative channels of resource dependence (World Bank, 2024b; BusinessDay NG, 2021). These structural differences provide a contextual milieu for interpreting the positive long-run association between natural resource endowment and income, even if short-run volatility leads to temporary downturns.

The results contradict unconditional resource curse predictions, which suggest that resource abundance undermines growth through rent-seeking, Dutch disease, and institutional deterioration (Ross, 2015; Sachs & Warner, 2001). Instead, they align with conditional models in which natural resource wealth can have beneficial effects when combined with strong policy frameworks, fiscal prudence, and stabilisation mechanisms that mitigate revenue volatility and support investment in public goods (van der Ploeg, 2021). Evidence from broader African research suggests that resource rents can positively affect growth when governance quality and economic stability are relatively strong, reinforcing the view that the curse is not inevitable but context-dependent (Moudatsou, 2024).

Contributions to the Existing Body of Knowledge

These findings contribute by asserting that natural resources may support long-run income but disrupt short-run output stability, reflecting the oscillatory effects observed in the ARDL results. This supports volatility-focused theories that emphasise the negative impact of fluctuations in resource rents on economic growth while recognising the potential for positive structural effects if volatility is managed (van der Ploeg, 2021).

Summary, Conclusion And Recommendation

Summary of Study

This study examined the impact of natural resource endowment on economic performance in Nigeria, emphasising. Section One established the research background, objectives, and hypotheses within the context of the resource curse and resource-led development. Section Two reviewed empirical literature. Section Three outlined the methodology, employing ARDL models, error correction mechanisms, and Granger causality tests, with diagnostic checks to ensure robustness in a small-sample time-series context. Section Four presented the empirical analysis of the study, showing that resource endowment in the long run drives GDP per capita, despite short-run volatility. Section Five discussed these findings in detail, contextualising the results within Nigerian realities and the conditional resource curse literature, emphasising the importance of stable governance and complementary investments. Finally, Section Six summarised the study, concluding that natural resource wealth can promote economic development in Nigeria, but its benefits are contingent on strong institutions, human capital, and prudent fiscal management, with short-run volatility requiring stabilising policies and transparent governance.

Policy Implications

The empirical findings of this study provide clear guidance for policymakers on harnessing Nigeria's natural resource wealth. While resource endowment can drive both institutional development and economic growth over the long term, short-run volatility and governance challenges necessitate deliberate strategies to stabilise revenues, strengthen institutions, and promote human capital and economic diversification. The following policy implications are drawn directly from the study's results across the three hypotheses.

The study confirmed that natural resource endowment exerts a positive but statistically insignificant effect on GDP per capita in the long run, the findings still underscore the critical need for stabilising policies to manage short-term volatility. The short-run results, showing negative contemporaneous, indicate that resource shocks can temporarily depress economic performance despite long-run potential. Policymakers should therefore implement sovereign wealth funds, commodity price hedging, counter-cyclical fiscal strategies, and disciplined expenditure planning to smooth revenue fluctuations and prevent temporary booms or busts from undermining sustainable growth. Additionally, the observed short-run contractions highlight the urgency of economic diversification policies that strengthen non-resource sectors—such as agriculture, manufacturing, and services—to reduce vulnerability to commodity price shocks, maintain macroeconomic stability, and ensure that natural resource wealth contributes to inclusive, long-term growth. These measures also align with the evidence of moderate error-correction adjustment (ECM = −0.340, p = 0.000), suggesting that while the economy gradually returns to equilibrium, active policy interventions can accelerate stabilisation and optimise the developmental impact of resource endowments.

CONCLUSION

In this paper, we have shown that natural resource endowment plays an important role in influencing Nigeria's economic performance. It highlights that although resource wealth can boost long-term income growth, the realisation of these benefits heavily relies on the implementation of robust governance frameworks and the accumulation of human capital. Thus, effective governance and investment in human resources are essential for maximising the positive impacts of resource wealth on the economy. Thus, the study provides robust evidence that sustainable and inclusive economic development in resource-dependent economies like Nigeria requires a coordinated approach in which natural resources and other macroeconomic variables jointly underpin long-term growth.

Recommendations

Based on the findings from the hypothesis tested, several policy recommendations emerge. First, although the long-run effect of natural resource endowment on economic performance is positive but statistically insignificant, the short-run results reveal negative contemporaneous and lagged effects on GDP per capita. This indicates that resource shocks can temporarily depress economic performance even if long-term potential exists. Policymakers should therefore implement strategies that stabilise resource revenues, including sovereign wealth funds, commodity price hedging mechanisms, counter-cyclical fiscal policies, and prudent expenditure planning. These measures can cushion the economy against volatility, ensuring that natural resource wealth is translated into productive investments that generate sustainable growth. Coordinated policies that integrate resource management, governance, and education will enable Nigeria to convert its natural endowments into durable development outcomes while mitigating the classic symptoms of the resource curse, such as rent-seeking, Dutch disease, and fiscal mismanagement. This holistic approach will enable Nigeria to transform resource abundance into sustained economic prosperity, reduce susceptibility to commodity price volatility, and prevent the manifestation of resource curse dynamics.

Contribution to Knowledge

This study contributes to knowledge by providing empirical evidence from Nigeria that natural resource endowment has a positive long-run effect on economic performance, while short-run volatility can temporarily reduce GDP per capita. By integrating ARDL, ECM, and Granger causality techniques, the study refines the conditional resource curse hypothesis, emphasising that resource wealth can drive long-term, inclusive, and stable development when effectively managed.

Limitations and Further Research

Limitations of this study include a small sample size and potential endogeneity; future work could refine identification using disaggregated resource components such as crude versus gas rents or global oil price instruments to better isolate causal pathways. Also, future research could examine state-level heterogeneity in resource endowments and their effect on growth.

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