# Examining the Impact of Relative Poverty and Income Inequality on Sustainable Development in Nigeria: A Kuznets Hypothesis Perspective.

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**Abstract**

*This study examined the impact of relative poverty and income inequality on sustainable development in Nigeria, drawing upon the Kuznets hypothesis as a guiding theoretical framework. Utilising annual secondary data spanning 1999 to 2024 from the World Bank, National Bureau of Statistics (NBS), and Central Bank of Nigeria (CBN), the study employed the Fully Modified Ordinary Least Squares (FMOLS) technique to investigate the longrun determinants of the Sustainable Development Index (SDI). The findings revealed that poverty exerted a positive and statistically significant effect on sustainable development, suggesting that targeted poverty alleviation measures—particularly those enhancing access to services and economic participation—contributed to inclusive development outcomes. Inflation was found to have a negative and significant impact on SDI, underscoring its destabilising effects on economic stability and long-term development prospects. Furthermore, the Human Capital Index and education variables both had positive and statistically significant influences on SDI, reaffirming the critical role of investments in health, skills acquisition, and innovation for sustainable progress. Income inequality demonstrated a negative but statistically insignificant relationship with SDI, offering limited empirical support for the Kuznets hypothesis within the Nigerian context. Unexpectedly, GDP growth was negatively associated with sustainable development, indicating that economic growth in Nigeria during the study period may have lacked inclusivity and environmental sustainability. Based on these findings, the study recommended comprehensive policy interventions, including inclusive poverty reduction strategies, inflation control measures, expanded human capital investment, equitable fiscal redistribution, and a structural reorientation of economic growth toward green and inclusive sectors, with enhanced public support for education and innovation.*

***Keywords:*** *Sustainable development, poverty alleviation, income inequality, human capital,* Kuznets hypothesis

## 1.0 Introduction

Sustainable development, according to The United Nations (UN), is development that meets present needs without jeopardizing the ability of future generations to meet their own. It has a broad agenda that includes social inclusion, economic growth, and environmental stewardship, (Barbier & Burgess, 2017). The pursuit of a balanced development trajectory in Nigeria is increasingly threatened by rising income inequality and persistent relative poverty. Recent statistics indicate that approximately 40% of Nigeria's population,

out of an estimated 220 million people, lived below the international poverty line of $2.15 per day as of 2024 (Aladejana *et al*., 2019; Israel & Charity, 2024). This is a concerning reality. At the same time, millions of people are facing severe shortages and malnutrition as food and nutrition insecurity increases. These circumstances are a reflection of the nation's growing economic instability and distress. By concentrating wealth and resources in the hands of a privileged minority, income inequality exacerbates this problem by limiting equitable access to opportunities for productive work and basic services. Poverty and inclusive economic growth are still impeded by this structural imbalance. The evolution of inequality within development processes can be understood through the lens of economic theory. In particular, the Kuznets hypothesis suggests that there is an inverted U-shaped relationship between economic growth and income inequality, meaning that inequality first rises in the early phases of development but then falls as income levels rise and structural change takes place, (Nadabo, *et al*, 2024; Odhiambo & Saungweme, 2024). Nigeria's experience, however, seems to depart greatly from this trend. Despite being one of Africa's largest economies and experiencing consistent GDP growth over the previous 20 years, the advantages of economic growth are still disproportionately concentrated, with sizable portions of the populace still living in poverty.

One of the biggest challenges to sustainable development is persistent inequality. Income and opportunity disparities erode social cohesiveness, limit access to basic services like healthcare and education, and perpetuate intergenerational cycles of poverty. In rural Nigeria, for example, less than 40% of households have access to electricity, which significantly impairs health and educational results, (Owolabi *et al*. 2024). This picture is further complicated by gender disparities, as women's literacy rates are much lower than men's (35% vs. 59.5%), and they continue to face significant barriers to formal employment and land ownership. These disparities are caused by institutional flaws, inconsistent policies, and deeply ingrained sociopolitical hierarchies in addition to market failures, (Ajala, 2017). A comprehensive and evidence-based policy framework that aims to reduce poverty and narrow income disparities is necessary to address these structural challenges. To promote inclusive and sustainable growth, progressive taxation, enlarged social protection programs, and focused investments in human capital—especially in the areas of gender equity, health, and education—are crucial. It is therefore crucial to comprehend the intricate relationships that exist between relative poverty, income inequality, and sustainable development, particularly through the theoretical framework of the Kuznets hypothesis. In addition to contributing to the academic conversation, this study aims to clarify these dynamics in order to guide policy initiatives that can hasten Nigeria's shift to a resilient and inclusive development path.

**1.1 Statement of the Research Problem** Globally, one of the main obstacles to sustainable development is balancing rapid economic growth with fair social outcomes. Despite significant GDP growth in many countries, poverty and inequality are still prevalent and, in certain situations, getting worse. As of 2024, more than 700 million people worldwide were still living on less than $2.15 per day, with over 60% residing in sub-Saharan Africa, according to the World Bank (2024), as cited by Acheampong *et al*. (2024). These figures highlight the shortcomings of growth-centric development paradigms and raise questions about the long-term sustainability and inclusivity of traditional models, particularly in low- and middle-income nations where wealth accumulation is frequently disproportionately skewed.

Nigeria is among the best instances of this paradox. With a projected GDP of $477 billion in 2022 (World Poverty Clock, 2018; Aladejana *et al*., 2020; World Bank, 2023), Nigeria possesses the largest economy in Africa; however, as of 2024, more than 133 million people were still living in multidimensional poverty (NBS, 2024). A small elite has benefited from the nation's economic growth, while the majority has been left out of the benefits of progress. Inequitable development outcomes have continuously been hampered by structural inefficiencies, such as poor governance, inconsistent policies, deteriorating infrastructure, and unequal access to healthcare and education. These persistent difficulties highlight structural defects in the process of converting macroeconomic gains into appreciable enhancements of human well-being, (Adusei & Nketiah-Amponsah, 2023). The Kuznets hypothesis, which contends that inequality increases during early growth but eventually declines as economies mature, has long provided a conceptual framework for comprehending the connection between economic development and income inequality. But in light of empirical facts, this model is coming under more and more scrutiny, particularly in nations like Nigeria where inequality has gotten worse in tandem with economic growth. Nigeria's Gini coefficient, which was 35.1 in 2020 according to the World Bank, has not significantly improved in spite of numerous reform and poverty alleviation initiatives. This discrepancy suggests that the theoretical presumptions and policy approaches supporting Nigeria's development trajectory need to be reexamined.

Significant variations in the observed relationships between poverty, inequality, and development are revealed by empirical literature. A direct and strong causal relationship between poverty and inequality is established by some studies (e.g., Krokeyi & Obayori, 2020; Musa, *et al*., 2024), while others (e.g., George-Anokwuru and Inimino, 2024) report a statistically insignificant link between the two. Further research by Ewubare and Okpani (2018) and Olabiyi and Akanbi (2021) indicates that poverty and inequality obstruct development through a self-reinforcing, reciprocal cycle.

Furthermore, the fragmented and frequently contradictory nature of this evidence highlights the complexity of the problem and the shortcomings of current analytical techniques, especially with regard to the direction, magnitude, and mechanisms of interaction. It's interesting to note that the literature still lacks many integrated frameworks that simultaneously examine relative poverty, income inequality, and sustainable development. When such efforts are undertaken, they often fail to account for intergenerational and environmental aspects of deprivation, as well as structural injustices. Therefore, the situation in Nigeria provides an essential context for reassessing the relevance of the Kuznets hypothesis and examining the intricate relationships among these variables in a coherent analytical framework. Closing this significant research gap is the aim of this study. By analyzing the relationships between relative poverty, income inequality, and sustainable development in Nigeria and situating the analysis within the broader theoretical framework of the Kuznets hypothesis, it aims to provide fresh empirical insights and policy-relevant recommendations. This type of research is essential if Nigeria is to break free from the cycle of underdevelopment and exclusion and clear the path for a more just and sustainable future.

### 1.2 Research Objectives

i. To examine the impact of relative poverty on sustainable development in Nigeria.
ii. To examine the impact of income inequality on sustainable development in Nigeria.
iii. To test the validity of the Kuznets hypothesis in explaining income inequality trends in Nigeria.

## 2.0 Empirical Review

Empirical evidence on the relationship between income inequality and poverty remains inconclusive, with findings varying due to differences in sample periods, econometric methods, poverty measures, model specifications, and country-specific contexts. GeorgeAnokwuru and Inimino (2024) investigated the effect of income inequality on poverty in Nigeria from 1985 to 2022, employing the Gini index, poverty incidence, the misery index, and the Human Development Index (HDI). Using cointegration and error correction techniques, they found a positive but statistically insignificant relationship between income inequality and poverty, while both the misery index and HDI had significant positive effects. The study recommended equitable wealth distribution, prudent resource use, and realistic employment policies to reduce both inequality and poverty. In a similar vein, Lucky and Achebelema (2018) demonstrated that a significant number of Nigerians live below the poverty line, indicating a significant income gap, by using the Lorenz curve, the Gini coefficient, and several other poverty indicators.

Krokeyi and Obayori (2020) used data from 1985 to 2018 and the Generalized Method of Moments (GMM) to conclude that while wage increases help to reduce poverty, rising income inequality significantly increases it. Obayelu and Edewor (2022) argued in their bibliographic review that inequality both causes and results in poverty in Nigeria. However, there is still debate in the literature regarding the direction of causality; some studies suggest positive, negative, bidirectional, or inconclusive links. Using panel data analysis, Fırat and Mehmet (2023) investigated the connection between poverty, economic growth, and income inequality in eight developing nations between 2000 and 2020. They used the HDI, the Gini index, and the misery index, and they used the Durbin-Hausman test to find a longterm cointegrating relationship between the variables. Musa, Enaberue, and Magaji (2024) evaluated the long-term impacts of inequality on poverty in Nigeria using the ARDL approach. Their findings supported a favorable long-term correlation, leading to suggestions for redistributive measures to lessen poverty and inequality. Additionally, Olabiyi and Akanbi (2021) used the ARDL approach to study the dual relationship between poverty, income inequality, and population dynamics in Nigeria from 1980 to 2019. They discovered that poverty was greatly exacerbated by both inequality and population growth, and that over time, population growth made income inequality worse. Increased efforts to control population growth and enhance social services were suggested by their study. Ewubare and Okpani (2018) discovered a bidirectional causal relationship between poverty and inequality in Nigeria between 1980 and 2017, indicating mutual reinforcement, using Granger causality tests, Ordinary Least Squares (OLS), and Error Correction Models (ECM). In a separate study, Ogbeide-Osaretin *et al*. (2022) examined the connection between income inequality and climate change from 1980 to 2020 using Dynamic OLS. After discovering a U-shaped relationship between inequality and temperature (a stand-in for climate change) with feedback effects, they suggested population control, improved education, and modern energy access as mitigation measures. Albu and Albu (2020) used two-stage OLS to evaluate how carbon emissions affected inequality in EU nations. They found that older and newer EU member states had different inequalityemission dynamics. Using ARDL and Dynamic OLS, Hundie (2021) investigated $CO_2$ emissions, economic growth, and income inequality in Ethiopia from 1979 to 2014. Although there was no discernible correlation between inequality and CO2 emissions, the study did validate the environmental Kuznets curve for emissions.

Adelowokan *et al*. (2019) examined the connection between Nigerian infrastructure, poverty, and growth using a Vector Autoregressive (VAR) framework with impulse response functions and variance decomposition. Although the relationship between

poverty reduction and growth seemed to be inverse at times, their findings showed that both infrastructure and poverty reduction had a positive impact on growth. Poverty and inequality are major obstacles to Nigeria's sustainable development, according to Dauda and Oyeleke (2021), who support policies that focus on health investment, education (particularly for girls), anti-corruption reforms, and economic diversification. From 2000 to 2015, Adeleye *et al*. (2020) investigated the relationship between poverty, inequality, and growth in 58 nations in Sub-Saharan Africa, Latin America, and the Caribbean. According to their findings, poverty can be lessened by growth, but this effect is weakened and made worse by high inequality. The extensive corpus of literature still has some gaps. Many studies carried out in Nigeria disregard the Kuznets hypothesis and fail to test for nonlinear relationships. Others choose to use outdated data, ignoring recent structural shocks like inflation and COVID-19. Methodological errors like poor diagnostics, endogeneity issues, and theoretical underdevelopment are common, and regional variations are usually disregarded. Additionally, measures of poverty and inequality are applied inconsistently, and few studies employ comparative approaches within Africa. This study will get around these present restrictions by utilizing updated and disaggregated data, strong nonlinear econometric models, and regionspecific analyses. Integrating reliable theoretical frameworks like growth theory, poverty traps, and institutional dynamics will enable a more thorough understanding of the evolving relationship between poverty and income inequality in Nigeria. Such an approach will allow for a deeper understanding of structural patterns and dynamics, which are important for policy but often obscured by aggregate national statistics.

## 3.0 Methodology 3.1 Theoretical framework and Model specification

The structuralist theory of development offers a stronger framework for understanding Nigeria's persistent poverty and inequality. In contrast to the Kuznets Hypothesis, which maintains that inequality decreases with growth, the Structuralist Theory argues that entrenched economic structures, such as wealth concentration, low educational attainment, and weak institutions, sustain disparities, (Odozi & Uwaifo,2023; Onah, *et al*., 2024). Many Nigerians live in poverty as a result of the elite's largescale profits from economic growth, even in spite of GDP increases. Structuralist economists advocate for government action through investments in human capital, progressive taxation, and social protection in order to address these disparities, Ogbeide-Osaretin, *et al*., 2024. Inequalities in healthcare, education, and infrastructure, particularly among women and in rural areas, draw attention to barriers that cannot be eliminated by market forces, (Ali, 2022). Growth remains exclusive in the absence of focused policies, exacerbating instability and poverty. According to this theory, inclusive development necessitates institutional reforms and redistributive policies. For Nigeria, the structuralist method provides a more efficient route to longterm, fair development.

Based on the theoretical review and empirical consideration, the following model was used in this work: Mathematically written as:

$$SDI = f(POV, INEQ, GDPG, EDU, HCI, INF) \quad \text{----------(1)}$$

Where;

SDI$t$ = Sustainable Development Index (proxy for sustainable development)

POV$t$ = Relative Poverty Rate (percentage of population below poverty line)

INEQ$t$ = Income Inequality (Gini coefficient)

GDPGt = Economic Growth (GDP growth rate)

EDU$t$ = Education Access (School Enrollment, Secondary (% Gross))

HCI$t$ = Human Capital Index (proxy for Public Expenditure on Education (% of GDP)

INF$t$ = Inflation Rate (control for macroeconomic stability) $\beta_0$ = Intercept

$\beta_1$, $\beta_2$..., $\beta_6$ = Coefficients to be estimated $\epsilon_t$ = Error term

Econometric, the long-run equilibrium equation (i) is written as:

$$SDI_t = \beta_0 + \beta_1 POV_t + \beta_2 INEQ_t + \beta_3 GDPG_t + \beta_4 EDU_t + \beta_5 HCI_t + \beta_6 INF_t + \epsilon_t \quad \text{----------(2)}$$

**Expected Signs**

$< 0\beta_1$, $\beta_2<0$ (higher poverty and inequality reduce sustainable development) $\beta_3>0$ (economic growth supports development) $\beta_4$, $\beta_5>0$ (education and human capital enhance development)

$\beta_6<0$ (higher inflation may negatively impact sustainable development)

### 3.2 Source of Data

This study utilised secondary data from reputable sources, including the World Bank, the Nigerian National Bureau of Statistics (NBS), and the Central Bank of Nigeria's Statistical Bulletin. The dataset covers the period from 1999 to 2024, ensuring the inclusion of the most recent and comprehensive national-level information. This timeframe provides a strong empirical foundation for analysing the relationship between relative poverty, income inequality, and sustainable development in Nigeria. By drawing from well-established sources, the study ensures data reliability and consistency, enabling a thorough examination of how income disparities and poverty levels shape the country's development trajectory through the lens of the Kuznets hypothesis.

## 4.0 Data Analyses and Discussion of Findings 4.1 Descriptive Statistics Table 1: Descriptive Statistics

| | SDI | POV | GINI | GDPG | EDU | HCI | INF |
|---|---|---|---|---|---|---|---|
| Mean | 0.538 | 77.629 | 0.475 | 4.816 | 39.437 | 309.525 | 13.696 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Median | 0.535 | 76.380 | 0.488 | 5.165 | 42.441 | 330.495 | 12.700 |
| Maxim | 0.590 | 114.160 | 0.591 | 15.330 | 54.883 | 702.979 | 34.600 |
| Minim | 0.485 | 42.840 | 0.351 | -1.790 | 23.545 | 39.883 | 5.400 |
| Std. Dev. | 0.039 | 18.214 | 0.099 | 3.602 | 8.134 | 228.872 | 6.183 |
| Skew | -0.103 | 0.586 | -0.051 | 0.523 | -0.407 | 0.429 | 1.552 |
| Kurt | 1.475 | 3.003 | 1.316 | 4.268 | 2.239 | 1.789 | 6.270 |
| Jarq-Bera | 2.564 | 1.487 | 3.085 | 2.927 | 1.346 | 2.382 | 22.019 |
| Prob | 0.277 | 0.475 | 0.214 | 0.231 | 0.510 | 0.304 | 0.000 |
| Obs | 26 | 26 | 26 | 26 | 26 | 26 | 26 |

**Source:** Authors' Computation (2025)

The descriptive statistics of the important variables were compiled in Table 1. The poverty rate was 77.63%, the GINI coefficient was 0.475, and the Sustainable Development Index (SDI) was 0.538 on average. While the education and human capital indices were 39.44 and 309.53, respectively, GDP growth averaged 4.82%. The average rate of inflation was 13.70%. Consistency in central tendencies was indicated by the median values, which were typically near the means. For example, the median values of the education index, GDP growth, and SDI were 42.44, 5.17%, and 0.535, respectively. There was a noticeable difference between the lowest and maximum values. Poverty ranged from 42.84% to 114.16%, the GINI coefficient from 0.351 to 0.591, and the SDI from 0.485 to 0.590. Human capital and inflation showed significant variability, with GDP growth ranging from -1.79% to 15.33%, the education index from 23.55 to 54.88, the human capital index from 39.88 to 702.98, and inflation from 5.40% to 34.60%. With the exception of inflation, which displayed a significant deviation with a value of 22.019 and required additional statistical analysis, the Jarque-Bera statistics indicated that the majority of the variables were roughly normally distributed.

### 4.2 Correlation Analysis

**Table 2:** Correlation Analysis

| | SDI | POV | GINI | GDPG | EDU | HCI | INF |
|---|---|---|---|---|---|---|---|
| SDI | 1 | 0.841 | -0.832 | -0.599 | 0.851 | 0.946 | 0.382 |
| POV | 0.841 | 1 | -0.712 | -0.326 | 0.719 | 0.851 | 0.648 |
| GINI | -0.832 | -0.712 | 1 | 0.624 | -0.651 | -0.825 | -0.402 |
| GDPG | -0.599 | -0.326 | 0.624 | 1 | -0.313 | -0.557 | -0.129 |
| EDU | 0.851 | 0.719 | -0.651 | -0.313 | 1 | 0.793 | 0.291 |
| HCI | 0.946 | 0.851 | -0.825 | -0.557 | 0.793 | 1 | 0.482 |
| INF | 0.382 | 0.648 | -0.402 | -0.129 | 0.291 | 0.482 | 1 |

***Source*: *Researcher's Compilation***, (2025)

Table 2 displays the correlation coefficients between the key variables, demonstrating the existence of meaningful connections between them. The Sustainable Development Index (SDI) showed moderate correlations with inflation (0.382), but strong and positive correlations with poverty (0.841), education (0.851), and the human capital index (HCI) (0.946), while showing strong negative correlations with the GINI coefficient (-0.832) and GDP growth (-0.599). Poverty had positive correlations with inflation (0.648), education (0.719), and HCI (0.851), but negative correlations with GDP growth (-0.326) and GINI (-0.712). Similarly, GINI showed a positive correlation with GDP growth (0.624) but a strong negative correlation with SDI (0.832), education (-0.651), and HCI (-0.825). This suggests that income inequality tends to increase in tandem with economic expansion, possibly at the expense of inclusive development. GDP growth demonstrated a moderately positive correlation with GINI and a weakly negative correlation with SDI, poverty, education, HCI, and inflation, supporting the notion that growth by itself did not result in more significant development gains. Education had a negative correlation with GINI and GDP growth, but a positive correlation with SDI, poverty, and HCI (0.793). The human capital index correlated strongly and positively with SDI, poverty, and education, and moderately with inflation (0.482), while its associations with GINI and GDP growth were strongly negative. Inflation displayed weak to moderate positive relationships with all variables except GINI (-0.402) and GDP growth (-0.129), implying that rising prices coincided with improvements in education, poverty reduction, and human capital, though not necessarily with equity or economic growth.

**Table 3:** Results of Unit Root Test

| | **Test at Level** | | | | **Test at first level difference** | | | |
|---|---|---|---|---|---|---|---|---|
| *Variable* | *Test Statistic* | *5% critical value* | *Remark* | *S/NS* | *Test Statistic* | *5% critical value* | *Remark* | *S/NS* |
| SDI | -0.503 | -2.986 | I(0) | NS | -4.288 | -2.992 | I(1) | S |
| POV | 0.990 | -3.021 | I(0) | NS | -5.075 | -3.021 | I(1) | S |
| GINI | -1.675 | -2.986 | I (0) | NS | -7.556 | -2.992 | I(1) | S |
| GDPG | -2.754 | -2.986 | I (0) | NS | -6.979 | -2.992 | I(1) | S |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| EDU | -1.906 | -2.986 | 1(0) | NS | -6.383 | -2.992 | I(1) | S |
| HCI | 0.107 | -2.986 | 1(0) | NS | -4.593 | -2.992 | I(1) | S |
| INF | -0.668 | -2.986 | I(0) | NS | -4.542 | -2.992 | I(1) | S |

*Where; S indicates Stationary; NS non-Stationary*

***Source:*** *Researcher's Compilation,* (2025)

The unit root test results in Table 3 show that all variables— SDI, POV, GINI, GDPG, EDU, HCI, and INF—are nonstationary at level I(0), as their test statistics are less negative than the 5% critical values. This suggests the presence of unit roots and a lack of mean reversion in their original form. However, after first differencing, all variables become stationary at first difference I(1), indicating they are integrated of order one. In summary, the variables are I(1) and thus appropriate for further analyses such as cointegration or error correction modelling, assuming longrun relationships exist among them. **Table 4:** Johansen Co-Integration Test

Trace Max-Eingen & Max-Eingen Statistics

| **H₀** | **Trace Statistics** | **Critical value at 5% level** | **Prob.** | **Max-Eingen Statistics** | **Critical value at 5% level** | **Prob.** |
|---|---|---|---|---|---|---|
| None * | 229.246 | 125.615 | 0.000 | 106.592 | 46.231 | 0.000 |
| At most 1 * | 122.655 | 95.754 | 0.000 | 48.298 | 40.078 | 0.005 |
| At most 2 * | 74.357 | 69.819 | 0.021 | 33.559 | 33.879 | 0.055 |
| At most 3 | 40.798 | 47.856 | 0.195 | 18.929 | 27.584 | 0.420 |
| At most 4 | 21.869 | 29.797 | 0.306 | 15.079 | 21.132 | 0.284 |
| At most 5 | 6.791 | 15.495 | 0.602 | 5.649 | 14.265 | 0.659 |
| At most 6 | 1.142 | 3.841 | 0.285 | 106.592 | 46.231 | 0.000 |

Trace test indicates 5 co-integrating eqn.(s) at the 0.05 level, Denotes rejection of the hypothesis at the 0.05 level** indicates statistically significant.

***Source:*** Researcher's Compilation, (2025)

The Johansen cointegration test confirms long-run relationships among the variables, with the trace statistic identifying three and the max-eigenvalue test confirming two cointegrating equations at the 5% significance level. The null hypotheses of no cointegration and at most one cointegrating vector are rejected, while higher-order hypotheses are not, indicating that SDI, POV, GINI, GDPG, EDU, HCI, and INF share a stable long-run equilibrium. Consequently, FMOLS is justified, as it provides consistent and efficient estimates by addressing endogeneity and serial correlation inherent in cointegrated systems, ensuring reliable coefficients that capture genuine equilibrium dynamics.

**Fully Modify Ordinary Least Squares (FMOLS) Result**

**Table 5:** Fully Modify Ordinary Least Squares (FMOLS)(Dependent Variable: SDI)

| Variable | Coefficient | Std. Error | T-Statistic | Prob.** |
|---|---|---|---|---|
| POV | 0.001 | 0.000 | 2.946 | 0.009** |
| INF | -0.001 | 0.000 | -2.299 | 0.034** |
| HCI | 5.41E | 2.21E | 2.452 | 0.025** |
| GINI | -0.033 | 0.036 | -0.938 | 0.361 |
| GDPG | -0.002 | 0.001 | -2.755 | 0.013** |
| EDU | 0.001 | 0.000 | 3.059 | 0.007** |
| C | 0.459 | 0.025 | 18.009 | 0.000 |
| Adjusted R-squared | 0.958 | | | |
| R-squared | 0.944 | | | |
| Durbin-Watson stat | 1.358 | | | |
| Prob(F-statistics) | 0.000 | | | |

*** indicates statistically significant at 5% significance level*

***Source:*** Researcher's Compilation (2025)

The Fully Modified Ordinary Least Squares (FMOLS) estimation provides a robust empirical framework for analysing the determinants of the Sustainable Development Index (SDI) in Nigeria. The results closely align with theoretical a priori expectations, offering valuable insights into the dynamics of development. Focusing on poverty (POV), the analysis reveals a positive and statistically significant coefficient of 0.001 ($p = 0.009$). This finding is consistent with those of Onwioduokit (2020), Sakanko (2023), and Ogbari *et al*., (2024), who reported similar outcomes in the Nigerian context. However, it stands in contrast to the conclusions reached by Olaoye (2021) and Adebajo *et al.,* (2024), which found poverty reduction efforts to be largely ineffective. Although the observed positive sign deviates from the expected negative coefficient ($\beta_1 < 0$), it may reflect the positive spillover effects of welltargeted poverty alleviation initiatives. Specifically, the result suggests that such efforts are increasingly producing inclusive outcomes—improving access to basic services, expanding economic participation, and reinforcing pro-poor development policies that collectively advance sustainable development. Inflation (INF), as expected ($\beta_2 < 0$), shows a negative and statistically significant impact on SDI (-0.001; $p = 0.034$). This finding reinforces the macroeconomic literature that highlights inflation as a critical impediment to development. High inflation erodes purchasing power, increases uncertainty, and discourages productive investment, thereby undermining long-term development objectives. Moreover, the Human Capital Index (HCI) exhibits a positive and statistically significant coefficient (5.41E; $p = 0.025$), in line with theoretical expectations ($\beta_5 > 0$). This outcome highlights the central role of human capital in driving sustainable development. Improvements in education and health enhance labour productivity, institutional capacity, and adaptability, which are all essential for achieving broad-based and resilient development.

In addressing Objective Two, which examines the validity of the Kuznets hypothesis—that income inequality initially rises with economic growth before eventually declining— the analysis reveals a negative coefficient for income inequality (GINI) at -0.033. This result aligns with theoretical expectations ($\beta_2 < 0$); however, it is statistically insignificant ($p = 0.361$). While the negative sign suggests a potential decline in inequality as Nigeria progresses economically, the lack of statistical significance indicates that the Kuznets hypothesis does not hold strongly in the present Nigerian context. This result is corroborated by Nadabo, Dakyong, and Ismail (2024), who observed an inverted U-shaped relationship between financial development and income inequality in Nigeria, consistent with the Kuznets framework. Similarly, Ossai and Bhattarai (2024) reported a short-run validation of the Kuznets curve, noting that inequality begins to decline once certain growth thresholds are exceeded. Adeoye (2024) also found that income inequality diminishes when institutional reforms and broader access to finance are in place, particularly in SubSaharan African countries such as Nigeria. Moreover, Kolawole, Omobitan, and Yaqub (2015) argued that although economic growth tends to alleviate poverty, it may initially widen inequality—reflecting a transitional Kuznets phase. Conversely, this finding contrasts with the work of Chude and Chude (2023), who asserted that income inequality persistently undermines economic growth in Nigeria, offering limited empirical support for the Kuznets hypothesis. Similarly, Adu'a, Olushola, and AC-Ogbonna (2025) demonstrated that both income and gender inequalities have a sustained negative effect on Nigeria's growth trajectory, implying that such disparities require direct policy responses rather than reliance on natural economic adjustments. Likewise, Agbeni, Chukwuebuka, and Ani (2024) concluded that high levels of inequality inhibit the poverty-reducing impact of economic growth, thereby challenging the Kuznets narrative. These contrasting perspectives underscore the complex and context-specific nature of inequality dynamics in Nigeria. The statistical insignificance observed in this study may be attributable to redistributive fiscal policies, informal sector expansion, or regional disparities—factors that may be obscuring the classical Kuznets trajectory. Hence, more disaggregated, sector-specific, or regionally focused analyses are needed to uncover deeper insights into the evolving relationship between economic growth and income inequality in Nigeria. Interestingly, GDP growth (GDPG) reveals a negative and statistically significant effect on SDI (-0.002; $p = 0.013$), contrary to the expected positive relationship ($\beta_3 > 0$). This finding suggests that economic growth in Nigeria may be proceeding in a manner that is neither inclusive nor environmentally sustainable. It is plausible that growth has been concentrated in sectors with limited developmental linkages or accompanied by ecological degradation and widening social disparities, thus undermining the sustainability of development outcomes.

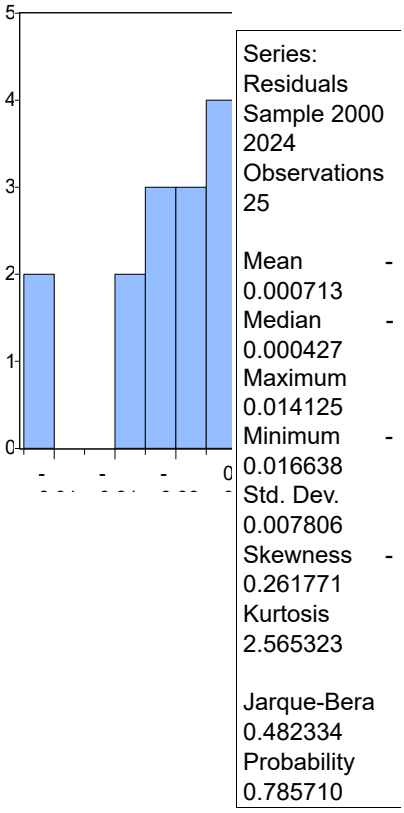
By contrast, education (EDU) demonstrates a positive and highly significant impact (0.001; $p = 0.007$), confirming its pivotal role in facilitating sustainable development. As expected, ($\beta_4 > 0$), education enhances human capital formation, promotes innovation, and facilitates the diffusion of sustainable practices, all of which are instrumental to achieving long-term development goals. With respect to model performance, the estimation delivers a strong explanatory power, as indicated by the R-squared of 0.944 and adjusted R-squared of 0.958. This implies that approximately 95.8% of the variation in SDI is accounted for by the included regressors. Although the Durbin-Watson statistic of 1.358 points to mild positive autocorrelation, it does not substantially compromise the integrity of the estimation. Furthermore, the highly significant F-statistic ($p = 0.000$) confirms the overall robustness and joint explanatory capacity of the model, validating the empirical strategy employed in capturing the determinants of sustainable development in Nigeria. **Post-Diagnostic Test**

**Table 5:** Wald test result.

| Test Statistic | Value | df | Prob. |
|---|---|---|---|
| F-statistic | 69.867 | (6, 18) | 0.000 |
| Ch-square | 419.2001 | 6 | 0.000 |

***Source:*** Researcher's Compilation (2025) The Wald test shows an F-statistic of 69.87 and Chi-square of 419.20, both with p-values of 0.000, indicating strong significance. Since p-values are below 0.05, the null hypothesis of joint coefficient restrictions is rejected. Thus, the explanatory variables jointly influence the dependent variable. The model is statistically sound and explains variation effectively.

***Figure 1***: Histogram Normality Test for Residual




***Source:*** Researcher's Compilation (2025)

The figure 1 showed the Jarque-Bera statistic of 0.482, accompanied by a high probability value of 0.786, indicates that the residuals do not significantly deviate from normality. This implies that the null hypothesis of a normally distributed error term cannot be rejected. Consequently, the residuals satisfy the normality assumption, reinforcing the validity and reliability of the model's estimations.

**5.0 Summary, Conclusion and policy Implication** This study investigated the impact of relative poverty and income inequality on sustainable development in Nigeria, using the Kuznets hypothesis as a theoretical lens. Drawing on secondary data from 1999 to 2024, sourced from the World Bank, NBS, and CBN, the analysis applied the Fully Modified Ordinary Least Squares (FMOLS) method to assess the determinants of the Sustainable Development Index (SDI). Findings showed that poverty had a positive and significant effect on SDI, suggesting inclusive outcomes from poverty reduction policies. Inflation negatively and significantly affected sustainable development, affirming its destabilising influence on economic progress. The Human Capital Index and education both had positive and significant effects on SDI, highlighting the importance of health, education, and innovation for long-term development. Income inequality showed a negative but statistically insignificant impact on SDI, offering only weak support for the Kuznets hypothesis in Nigeria's context. Contrary to expectations, GDP growth negatively impacted sustainable development, indicating a growth pattern that lacked inclusivity and environmental sustainability.

**5.1 Policy Recommendations**

To strengthen sustainable development in Nigeria, the following focused and evidence-based policy measures are essential:

i. The Nigerian government should scale up inclusive poverty alleviation programmes, focusing on rural development, conditional cash transfers, microfinance for small businesses, and expanded social safety nets. These efforts must be directly tied to outcomes in healthcare, education, and job creation to deepen their impact on sustainable development.

ii. The Central Bank of Nigeria should adopt an inflation-targeting regime, enhance monetary policy tools, and coordinate closely with fiscal authorities to manage public spending. Regulating prices in key sectors—especially food and energy—and boosting agricultural output will further help stabilise the economy and support household welfare.

iii. Long-term investment in human capital must be prioritised, with a focus on health systems, maternal care, and workforce development. Expanding vocational training and aligning skills programmes with green and digital sectors is crucial. Public-private partnerships should also be leveraged to strengthen healthcare delivery and education access nationwide.

iv. To reduce inequality, Nigeria should implement progressive taxation and increase public investment in underserved regions. Formalising the informal sector, improving wage structures, and decentralising development planning will help address regional imbalances. Better data collection on inequality is also essential for crafting effective, evidence-based policies.

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