IMPACT OF INCOME INEQUALITY ON ECONOMIC GROWTH IN NIGERIA: LORENZ CURVE AND ARDL APPROACH

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Abstract

The United Nations' 2030 Leave No One Behind Sustainable Development Goal (SDG) is currently receiving significant attention. This has heightened awareness of the significance of reducing economic inequality in Nigeria. Mitigating inequality can foster economic advancement, harmonious collaboration, and more robust and enduring social connections. This study examines the relationship between Nigeria's economic growth and income disparity from 1986 to 2024. The research employed the Auto Regressive Distributed Lag (ARDL) Bound test approach to identify short-term fluctuations and a long-term relationship. The co-integration test indicates an absence of a long-term relationship between income disparity and economic growth. The Auto Regressive Distributed Lag (ARDL) test indicates a robust and positive influence between income inequality and economic growth in the short term. Based on these results, the study recommends policies that channel short-term inequality-induced gains into long-term inclusive growth. Specifically, the government should strengthen progressive taxation to redistribute wealth fairly.

Keywords: Income Inequality, Auto-Regressive Distributed Lag, ECM, Kuznets Curve.

JEL Classification: O15, O47, O11, H23, E64, D31

1. Introduction

Income inequality remains a pressing global concern, affecting both developed and developing nations. It reflects disparities in income distribution, with significant socio-economic implications for growth, institutional stability, and public policy. The World Inequality Report (WIR, 2024) reveals that the richest 10% of the global population earn 52% of total income, while the poorest 50% earn just 8.4%, with over 4 billion people living on less than $6.70 daily (Roser & Hasell, 2022). Research shows that the relationship between income inequality and economic growth is context-dependent, sometimes fostering growth through capital accumulation and incentives, but often constraining it by limiting access to education, health, and productive opportunities (Ali, 2023; Khan et al., 2023; Balasubramanian et al., 2023).

Nigeria exhibits a high level of income and wealth inequality, with the top 10% earning 14 times more than the bottom 50% and the top 1% earning 37 times more (Chancel et al., 2022; Uduu, 2022). The nation’s Gini coefficient was 35.1 in 2024, making it the 11th most unequal country in West Africa (IMF, 2024). Persistent disparities are driven by unemployment, poverty, and structural economic weaknesses (Chisadza & Biyase, 2023). Despite various government initiatives such as N-Power, the Agricultural Credit Guarantee Scheme (ACGS), Conditional

Cash Transfer Program (CCTP), and Rural Electrification Scheme (RES), a large proportion of the population remains in multidimensional poverty. In 2022, 133 million Nigerians were poor, with unemployment and underemployment at 56.1% (WIR, 2022; World Bank, 2023). Scholars highlight that excessive inequality can hinder growth, exacerbate poverty, foster political instability, and reduce human capital investment (Dossou et al., 2021; Ajide & Alim, 2021; Folarin & Adeniyi, 2019). While previous research has explored the link between inequality and growth, most analyses assume a linear relationship, potentially overlooking more complex dynamics in Nigeria's economic context (Dossou et al., 2023; Zhao & Xia, 2020; Zhao, 2020).

Nigeria's persistent income inequality poses a significant challenge to achieving inclusive and sustainable economic growth. Although GDP expansion has been described as moderate in recent years, it has also been highly unstable and uneven. Periods of strong growth have frequently been followed by sharp declines, reflecting the volatility of the Nigerian economy. The Economic Recovery and Growth Plan (ERGP) illustrates this trend, as initial improvements in output were quickly eroded by oil price shocks, fiscal imbalances, and weak diversification (World Bank, 2023; IMF, 2023; CBN, 2024). This cyclical pattern of expansion and contraction has compounded the distributional problem, with the benefits of growth accruing mainly to a small elite, while the majority continue to face poverty, unemployment, and limited access to productive opportunities. The nation's high poverty and unemployment rates, combined with sluggish growth in employment-intensive sectors, have further deepened economic disparities (World Bank, 2023). These inequalities risk undermining social cohesion, reducing investment in education and skills, and fostering instability, all of which constrain long-term development (Baselgia & Foellmi, 2023).

Given the government's commitment to the United Nations' 2030 Sustainable Development Goals (SDGs) and its pledge to ―leave no one behind,‖ it is crucial to understand how income inequality interacts with other macroeconomic variables such as poverty, population growth, inflation, and interest rates in shaping Nigeria's economic performance. To achieve this, the rest of the paper is organized as follows: Section 2 reviews relevant theoretical and empirical literature on inequality and growth. Section 3 outlines the methodology, including model specification, data sources, and estimation techniques. Section 4 presents and discusses the empirical findings. Section 5 concludes the study and offers policy recommendations.

2.0 Review of Relevant Literature

2.1 Conceptual Review

Income represents the total monetary earnings an individual or enterprise receives over a specific period, including wages, salaries, rent, interest, and profits (Lawal & Yusuf, 2022). Income distribution refers to how a nation's total GDP is allocated among its population, measured either through functional distribution the share of national output attributed to production factors such as land, labor, capital, and entrepreneurship or personal distribution, which examines income received by individuals or households (Lawal & Yusuf, 2022; Offem & Iyaji, 2022).

Economic growth, on the other hand, refers to the sustained increase in a country's productive capacity and output over time, commonly measured by real Gross Domestic Product (GDP) (World Bank, 2023). Growth is driven by factors such as capital accumulation, labour productivity, technological progress, and institutional quality (Solow, 1956; Romer, 1990). In developing economies like Nigeria, growth is also influenced by demographic pressures, structural transformation, and external shocks, particularly fluctuations in oil prices (World Bank, 2023; Adeniran & Sidiq, 2023). While growth is often considered a prerequisite for improved welfare, empirical studies show that in Nigeria, growth has been volatile and uneven, with limited

poverty reduction effects due to weak employment creation and structural bottlenecks (Bello & Akinlo, 2024).

Income inequality arises when financial compensation is distributed unequally among individuals or groups (Omolua & Tamunowariye, 2021; IMF, 2024). It is often assessed using the Gini coefficient and reflects disparities rooted in factors such as gender, ethnicity, or socioeconomic background. While related, wealth inequality concerns differences in asset ownership at a specific point in time, whereas income inequality focuses on earnings over a lifetime. Scholars emphasize that inequality manifests in various dimensions income, consumption, wealth, gender, employment, and health (Sun et al., 2022), and is often linked to social tension and weakened cohesion (Girdzijauskas et al., 2022; Ghatak et al., 2023). Income disparity can be defined as the difference between the earnings of the affluent and the poor (Ghosh et al., 2023; Ghecham, 2022) and is particularly evident in the urban–rural divide, with urban households generally earning more than rural households, except for a small group of rural residents with productive assets or businesses (Magda et al., 2023).

2.1.1 Methods of Measuring Income Inequality

The three main methods of measuring income inequality are: Lorenz Curve, Gini Coefficient/Index, and Kuznets Ratio.

The Lorenz curve, developed by Max Otto Lorenz in 1905, is a graphical representation of income distribution that compares the cumulative percentage of income received by various population segments with perfect equality (Varkey & Haridas, 2023; Guvenen et al., 2022; Wang & Jy, 2023; Creedy, 2023). However, the Lorenz curve has limitations. It may be unable to capture minor fluctuations in inequality that are not visually distinct, and it only illustrates the extent of inequality without explaining the underlying causes. In Nigeria, where shifts in inequality often result from sectoral shocks, inflationary pressures, or policy interventions, these subtleties may be missed when relying solely on the Lorenz curve.

The Gini coefficient, introduced by Corrado Gini in 1912, quantifies inequality based on the Lorenz curve (Hu, 2023). It ranges from 0 (perfect equality) to 1 (perfect inequality) and is widely used because of its simplicity and comparability across countries (Lawal & Yusuf, 2022). Nonetheless, the Gini has notable shortcomings: it does not reveal where in the distribution inequality is concentrated—whether among the poor, middle class, or the rich. In Nigeria, this is particularly important, as inequality is not only between the richest and poorest groups, but also within the expanding urban middle class, where disparities in wages, access to credit, and job opportunities can be stark.

The Kuznets ratio, which compares the share of income held by the top 20% of earners to that of the bottom 40% (Torres et al., 2022; Chinnakum, 2023), offers a simple and intuitive measure of inequality. Rooted in Simon Kuznets' (1955) ―inverted-U‖ hypothesis, it suggests that inequality rises in the early stages of growth and falls as economies mature (Jones, 2023; Wang et al., 2023). However, it has a critical shortfall: it excludes the middle 40% of the population from the calculation, making it less representative of overall inequality. In Nigeria, where the middle class is small but increasingly important for consumption, investment, and political stability, this omission may distort policy conclusions.

Taken together, while these three measures are useful in capturing the broad trends of inequality in Nigeria, their limitations highlight the importance of employing them jointly, and complementing them with additional indicators such as poverty indices, consumption patterns, and sectoral wage gaps. This combined approach allows for a more comprehensive understanding

of income inequality in Nigeria, not only in terms of extent but also distributional depth and causes.

2.1.2 Nigeria's Experience and the Lorenz Curve

The income distribution of Nigerians during a six-year period is presented below as an indicator of economic inequality in the nation. This accessible data constitutes the foundation of the Lorenz curve.

Table 1: Income distribution and share held by a subgroup of the population

Income recipients in Quartiles (%)	1980-1985	1986-1992	1993-1999	2000-2006	2007-2013	2014-2020
Lowest 20%	7.01	6.02	4.00	5.00	5.13	4.41
Second 20%	12.02	11.41	8.8	8.	9.67	8.27
Third 20%	15.77	15.52	14.57	13.55	14.68	12.98
Fourth 20%	24.0	22.04	23.26	20.48	21.91	20.33
Highest 20%	41.2	45.01	49.37	52.17	48.61	54.01
Total	100%	100%	100%	100%	100%	100%

Source: Authors' computation, 2025

The Lorenz curve

To illustrate Nigeria's economic inequality, the Lorenz curve is employed. For a predetermined number of years, the Lorenz curve was created. In order to document Nigeria's pre-SAP, SAP, and post-SAP (democratic governance), these years were chosen.

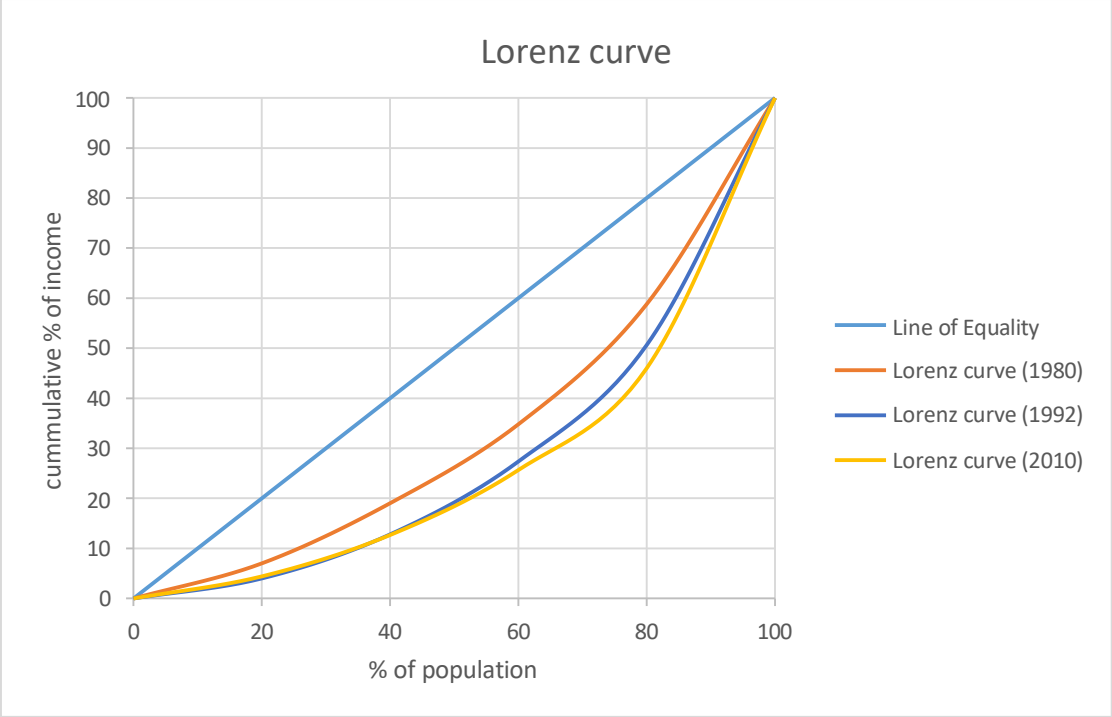


Figure 1: Graph showing the Lorenz curve of Nigeria
Source: Authors' computation, 2025

The graph above displays Nigeria's Lorenz curve for the years 1980, 1992, and 2010. These three years stood for the time before SAP (1980–1985), the time of SAP (1986), and the time of a democratic administration (2010). These years were used to figure out how unequal Nigeria's income is. The diagonal line in Figure 1 shows that Nigeria's income distribution is completely fair. Figure 1 shows that there was economic inequality in Nigeria throughout the 1980s, before the SAP. The difference between the Lorenz line from 1980 and the line of equality in image 1 shows this. Also, after the SAP period in 1992, income disparity grew. Also, as shown in Figure 1, the decade of 2010 (when the government was democratic) saw rising inequality as the Lorenz line moved farther away from the line of equality. The concentration of wealth in the hands of a select few may be the cause of this, as "the affluent become richer and the poor get poorer."

2.2 Theoretical Review

This study draws on Kuznets' theory of economic growth, which provides a framework for understanding the dynamic relationship between poverty, income inequality, and economic development. The American-Russian economist Simon Kuznets first proposed this concept in 1955. Some individuals assert that a reversed U-shaped curve correlates growth with inequality. As individuals transition from the vast, homogeneous, and impoverished agricultural sector to the smaller, wealthier, yet less equitable industrial sector, inequality escalates in the initial phases of economic expansion. Nonetheless, the incomes of lower-wage workers in both urban and rural regions increase as more individuals migrate to urban areas. The government initiates many efforts to reduce inequality both within and among industries. Consequently, the income disparity across various sectors of the economy diminishes as prosperity persists. The Kuznets theory posits that poverty in developing nations may persist temporarily if initial economic prosperity results in increased inequality.

2.2.1 Theoretical Expositions on Income Inequality

Ghosh et al. (2023) outline several economic theories explaining income disparity. Conventional economists argued that inequality is necessary for growth, as equal income distribution would reduce savings and increase population growth through higher wages and spending by the working class (Wahiba & Mahmoudi, 2023). In contrast, Keynesian economists stressed that equality supports long-term growth, as wealth gaps reduce consumer demand and lead to stagnation. Keynes advocated for equal pay, using the multiplier effect to sustain growth (Abdulkarim, 2023). Marxists saw inequality as capitalism's weakness, leading to underconsumption, overproduction, and eventual stagnation (Adegoke, 2013). Post-Keynesians built on Keynes' ideas, emphasizing that income disparity and declining capital efficiency discourage investment, while balanced wages and profits can sustain progress (Abdulkarim, 2023). Overall, growth theories suggest that free movement of people, capital, and goods can promote economic expansion, though perspectives on inequality and distribution remain divided.

2.3 Empirical Review

Several studies have examined the nexus between income inequality and economic growth in Nigeria, but their findings remain mixed due to differences in methodology and time coverage. Noumiri (2023), using NARDL estimation on data spanning 1980–2022, found asymmetric effects of inequality on growth. While the study's nonlinear framework is useful in capturing asymmetries, it does not sufficiently account for structural breaks such as Nigeria's multiple recessions, which could bias long-run estimates. Similarly, Lawal and Yusuf (2022) employed ARDL techniques and concluded that globalisation and inequality have worsened over time. However, their analysis was restricted to 1986–2019 and omitted key control variables like interest rates and inflation, which undermines the robustness of their results. Chinonye (2022) and Ibekwe and Ibekwe (2022) both used ECM frameworks for Nigerian data but arrived at

contrasting conclusions: the former found no significant effect of inequality on growth, while the latter identified a minor positive impact. These inconsistencies highlight the sensitivity of results to model specification and choice of inequality proxy.

Other Nigerian-focused studies, such as Omolua and Tamunowariye (2021) and Ade-omonijo (2021), relied on ARDL estimations covering 1985–2020 and 1981–2019, respectively. Both studies reported negative effects of inequality on growth but differed in their treatment of poverty and inflation. Their relatively narrow methodological scope raises questions about whether more advanced models, such as nonlinear or quantile regressions, might yield more nuanced insights into how inequality interacts with macroeconomic shocks in Nigeria. Victoria and Macdonald (2021) also confirmed the hindering effect of inequality on growth, but their multiple regression approach lacked tests for endogeneity, limiting causal inference.

Beyond Nigeria, several cross-country and regional studies provide additional insights. Xu et al. (2023) examined Vietnamese provinces and found that inequality hampers growth via human capital constraints. Their study demonstrates the importance of incorporating mediating variables, though its provincial focus limits comparability with national-level outcomes in larger economies like Nigeria. Wang et al. (2023), analyzing China, found that inequality's effect depends on income level, but their panel specification does not account for heterogeneity across developing nations. Shen and Zhao (2023) used a dynamic threshold model to show that inequality affects growth differently depending on fertility rates, yet the complexity of their model may reduce transparency for policy application.

Cross-country evidence also points to varying effects. Acheampong et al. (2023) applied Quantile-on-Quantile Regression to BRICS economies and showed heterogeneous effects of inequality across growth quantiles. While innovative, their study focuses only on emerging economies and may not capture the institutional weaknesses of African countries like Nigeria. Rani (2023) and Martin (2023) both examined larger panels of countries, yet their reliance on regression frameworks with limited controls means that omitted variable bias could distort the observed relationship between inequality and growth. Similarly, Penzera and Postiglione (2022) introduced spatial dimensions into inequality analysis in the EU, but their findings are less transferable to contexts like Nigeria where regional data is sparse.

Environmental dimensions have also been linked to inequality. For example, Wang et al. (2023) and Kazemzadeh et al. (2023) found connections between inequality and carbon efficiency or ecological footprints. While important, these studies are more relevant to sustainability debates than to direct growth analysis.

Finally, studies focusing on Sub-Saharan Africa, such as Odhiambo (2022) and Ebrima et al. (2019), highlight inequality's complex interactions with ICT and poverty. However, their panel designs risk masking country-specific dynamics, underscoring the need for focused country-level analyses like the present study.

2.4 Research Gap

Existing studies have explored the relationship between income inequality and economic growth in Nigeria, but important gaps remain. For instance, Bakare (2011) employed the Lorenz curve and Gini coefficient to examine income disparity during the transition to civilian rule (1990–2000), highlighting structural changes in compensation but offering limited insight into broader macroeconomic linkages. Similarly, Adegoke (2013) compared the pre-SAP and post-SAP eras, aiming to test whether growth reduced inequality, yet the analysis did not fully capture the persistence of disparities across sectors. More recently, Oseni and Oyelade (2023) investigated the impact of globalisation on inequality and growth in Nigeria (1986–2010), but their work did

not provide detailed estimates of the key drivers of inequality nor assess its short-run and long-run dynamics. Much of the existing Nigerian literature either focuses on specific historical periods or treats inequality in a narrow, linear framework. Few studies have comprehensively examined income inequality using multiple measurement techniques while simultaneously linking it to macroeconomic indicators over a long horizon. This study addresses this gap by applying both the Lorenz curve and Gini coefficient to track distributional trends, and by employing econometric techniques such as the ARDL model to assess the short- and long-run effects of inequality on economic growth in Nigeria between 1986 and 2024.

3.0 METHODOLOGY

3.1 Model Specification

To achieve the study's objectives, income inequality in Nigeria was first assessed using the Lorenz curve and Gini coefficient, followed by an analysis of its relationship with economic development. The study adopted the ARDL model, based on Lawal and Yusuf (2022) and rooted in Kuznets' theoretical framework, to examine how inequality affects Nigeria's GDP. Real GDP served as the dependent variable, while the independent variables included interest rate, population growth, inflation rate, poverty index, and the Gini coefficient. This model was adapted from Lawal and Yusuf (2022) to evaluate the impact of inequality on Nigeria's economic growth

$$GDPGR = f\ (INEQ, POVR, POPR,) \ldots\ldots(1)$$

The definition of variables is given below:

The mathematical framework of a model assumes a perfect relationship between the dependent and independent variable or variables. The model lacks an error term because it makes the assumption that there is a deterministic relationship, which means that each independent variable completely and precisely affects the dependent variable.

$$GDPGR = \beta_0 + \beta_1 INEQ + \beta_2 POVR + \beta_3 POPR \ldots\ldots\ldots\ldots\ldots\ldots (2)$$

The econometric structure of a model assumes an imperfect relationship between the regressor and regressand(s). The model's assumption of a stochastic connection implies that the regressand(s) may not be solely responsible for influencing the dependent variable, necessitating the inclusion of an error term that takes into account additional factors that affect economic growth but are not included in the model.

$$GDPGR_t = \beta_0 + \sum^{p}{}_{i=0} \beta_1 GDPGR_{t-1} + \sum^{q1}{}_{i=0} \beta_2 INEQ_{t-1} + \sum^{q2}{}_{i=0} \beta_3 POVR_{t-1} + \sum^{q3}{}_{i=0} \beta_4 POPR_{t-1} + \mu_t \ldots.(3)$$

Where:
β_0 = intercept
$\beta_1, \beta_2, \beta_3, \beta_4$ = parameters
μ = stochastic error term or disturbance term
The following are the *a priori* expectations for the model's coefficients:

$$\partial GDPGR/\partial INEQ < 0;\ \partial GDPGR/\partial POVR < 0;\ \partial GDPGR/\partial EXR > 0;$$

3.2 Sources of Data

The WDI data bank, CBN bulletins, and NBS statistics bulletins provided the study with time series secondary data for the years 1986–2024. The sources and factors are explained in detail below;

Table 2: Description and Measurement of Variables and Sources of Data

Variables	Description	Type of Data	Source	Measurement
GDPGR	Measures of a nation's economic growth include gross domestic product (GDP) growth rate or change.	Time series data	CBN (2024)	Current US$
INEQ	This is the uneven income distribution. By using the Gini coefficient as a proxy,	Time series data	WDI (2024)	Percentage (%)
POVR	When someone is without access to necessities of life, this occurs. Use of the National Poverty Index as a stand-in	Time series data	NBS (2024)	Percentage (%)
POPR	The percentage change in a population over a certain time period, generally measured annually, is referred to as the population growth rate.	Time series data	WDI (2024)	Percentage (%)

3.3 Estimation Techniques

A time series can be stationary or non-stationary, and regressing non-stationary variables may lead to false results (Oyeniyi, 2012). To avoid this, the study applies the Augmented Dickey-Fuller (ADF) test to check for unit roots in all variables. It then investigates the short- and long-run relationship between income inequality and economic growth in Nigeria (1986–2024) using the ARDL bounds testing approach by Pesaran et al. (2001). Unlike the Johansen method, which requires variables to be integrated of the same order I(1), ARDL accommodates mixed orders (I(0) and I(1)) and performs well with small samples (Lawal & Yusuf, 2022). However, it cannot be applied if variables are integrated at the second difference. The bounds test, a key feature of ARDL, helps determine whether a long-run relationship exists among the variables regardless of their order of integration. Thus, confirming unit root properties is essential before testing for long-run relationships within the ARDL framework.

4.0 Research Findings/Results

This chapter presents the empirical findings of the research, encompassing several elements such as unit root test results, optimal lag length determination, serial correlation outcomes, stability test results, and bound test results for both long- and short-term analyses. This comprehensive presentation also encompasses the projected coefficients for the independent and dependent variables.

4.1 Descriptive Statistics

Table 3: Descriptive Statistics

	GDPGR	LINEQ	POP	POVR
Mean	10.48915	12.47948	2.586842	21.25368
Median	10.49756	12.44779	2.600000	16.48000
Maximum	11.33209	12.83930	2.800000	76.59000
Minimum	9.631547	12.16872	2.400000	8.950000
Std. Dev.	0.578504	0.254330	0.109473	15.21166
Skewness	0.021437	0.094137	-0.238206	2.346697
Kurtosis	1.432092	1.270999	2.055888	7.759506
Jarque-Bera	3.895274	4.789411	1.770665	70.74469
Probability	0.142611	0.091200	0.412577	0.000000
Sum	398.5878	474.2202	98.30000	807.6400
Sum Sq. Dev.	12.38269	2.393295	0.443421	8561.605
Observations	39	39	39	39

Source: Authors' Computation, 2025

The dataset comprises 39 observations for six principal variables: GDPGR, LINEQ, POP, POVR, INF, and INT. The mean GDPGR is 10.49, with a median of 10.50, indicating near symmetry in real GDP distribution. Values range from 9.63 to 11.33. LINEQ averages 12.48, with values between 12.17 and 12.84, reflecting notable income inequality variations. Population (POP) has a mean of 2.59 million and a median of 2.60 million, ranging from 2.40 to 2.80 million, showing steady growth. The average poverty rate (POVR) is 21.25%, well above the median of 16.48%, with a high standard deviation (15.21) and strong right skewness (2.35), indicating periods of elevated poverty.

4.2 Correlation Matrix

A correlation matrix is used to show the nature and the degree of correlation between the dependent variable and the independent variable of the model

Table 4: Correlation Matrix

	GDPGR	**LINEQ**	**POP**	**POVR**
GDPGR	1			
LINEQ	0.790745	1		
POP	-0.21758	-0.16107	1	
POVR	-0.22408	-0.26447	-0.1159	1

Source: Authors' Computation, 2025

The correlation matrix reveals notable relationships among the six variables GDPGR, LINEQ, POP, and POVR. The strongest positive correlation (0.791) exists between GDPGR and LINEQ, indicating that higher real GDP is associated with greater income inequality. GDPGR shows negative correlations with INF (-0.422), INT (-0.452), and POVR (-0.224), suggesting that economic growth aligns with lower inflation, interest rates, and poverty. LINEQ is negatively correlated with POVR (-0.264), implying that higher income inequality is linked to lower poverty. Population (POP) has weak negative correlations with GDPGR (-0.218), LINEQ (-0.161), and POVR (-0.116), indicating minimal association with economic or distributional measures.

4.3 Result of Variance Inflation Factor

Table 5 shows the variance inflation factor for the variables under study. The VIF is used to test for the presence or absence of multicollinearity.

Table 5: Variance Inflation Factor

	Coefficient	Uncentered	Centered
Variable	Variance	VIF	VIF
LINEQ	0.011191	3636.643	1.470093
POP	0.046169	645.5232	1.123694
POVR	5.90E-06	8.334187	2.773515
C	2.294138	4785.032	NA

Source: Authors' computation, 2025

The Variance Inflation Factor (VIF) results assess multicollinearity among the model's explanatory variables. A VIF above 10 indicates severe multicollinearity, while values between 5 and 10 suggest moderate levels. In this study, LINEQ has the highest uncentered VIF (3636.643) but a low centered VIF (1.470093), indicating strong correlation in the uncentered model but minimal multicollinearity when centered. POP shows the lowest centered VIF (1.123694), suggesting negligible correlation with other predictors. POVR (2.773515) has elevated centered VIFs, indicating notable multicollinearity and potential overlap with other variables. The constant term (C) has a very high uncentered VIF (4785.032), which is common in regression models due to its close relationship with other predictors in the uncentered form.

4.4 Test for Stationarity

The null hypothesis of unit root was tested against the alternative of no unit root at a 5% level of significance using the Augmented Dickey-Fuller test. If the null hypothesis is rejected, it can be said that the variables are stationary at levels. Table 6 displays the findings of the unit root test.

Table 6: Unit Root Test (ADF) Result

LINEQ	-0.699834	0.8342	-2.945842	-4.807784	0.0004	-2.945842	I(1)
GDPGR	-3.518529	0.0131	-2.945842	-	-	-	I(0)
POVR	-2.933973	0.0513	-2.945842	-5.347302	0.0001	-2.945842	I(1)
POPR	-5.862203	0.0000	-2.945842	-	-	-	I(0)

Source: Authors' computation, 2025

All of the variables had an admixture of 1(0) and 1(1), according to the results of the Augmented Dickey-Fuller Statistic test for unit root. The results of the ADF test also demonstrate that, with the exception of POPR and GDPGR, which are stationary at level, all the variables are stationary at first difference.

4.5 Lag Selection Order

All of the variables had an admixture of 1(0) and 1(1), according to the results of the Augmented Dickey-Fuller Statistic test for unit root. The results of the ADF test also demonstrate that, with the exception of POPR and GDPGR, which are stationary at level, all the variables are stationary at first difference.

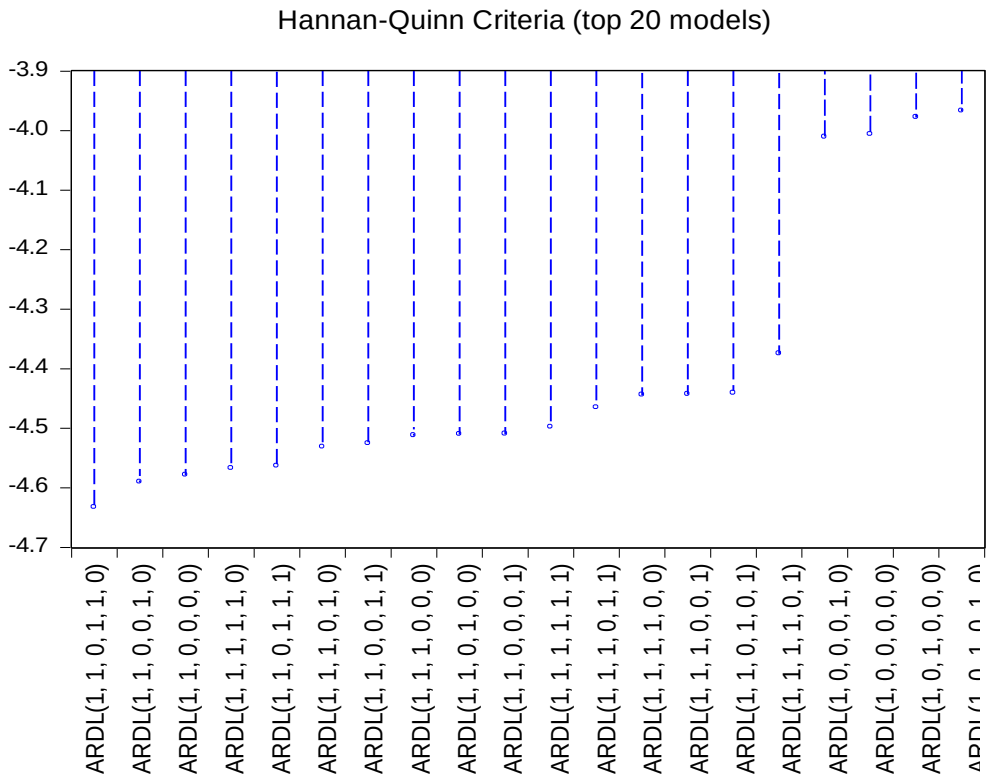


Figure 2: Determining the Number of Lag Lengths

Source: Authors' computation, 2025

The Hannan-Quinn Criterion (HQC) is used in the table to display the lag length. A common criterion for choosing a statistical model from a limited number of models is the Hannan-Quinn Criterion, which gauges the model's quality of fit. It serves as a signal for the optimal lag selection. According to the above result, lag (1,1,0,1,1,0) is the optimum lag selection criterion.

4.6 Results of Bound test for Cointegration

The results of the bound testing approach for the long-run cointegrating relationship among the variables in the model are presented in the table below.

Table 7: ARDL Bounds Test
Null Hypothesis: No long-run relationship exists

Test Statistic	Value	K		
F-statistic	1.889527	5		
Critical Value Bounds				
Significance	I0 Bound	I1 Bound		
10%	2.26	3.35		
5%	2.62	3.79		
2.5%	2.96	4.18		
1%	3.41	4.68		

Source: Authors' computation, 2025

The ARDL Bounds Test, applied to 39 observations (1986–2024), assessed whether the model's variables share a long-term relationship. The calculated F-statistic (1.889527) is below the lower bound critical values at all significance levels (10%: 2.26, 5%: 2.62, 2.5%: 2.96, 1%: 3.41). Since the F-statistic is lower than these thresholds, the null hypothesis of no cointegration cannot be rejected. This indicates insufficient evidence of a long-term relationship among the variables, suggesting that their changes over time may not be interlinked in the long run. Further analysis may be needed to explore short-term dynamics or possible alternative cointegrating relationships.

4.7 ARDL Model Results

The ARDL method was employed to estimate the short-run parameters after confirming the absence of a long-term relationship between the dependent and independent variables. The ARDL (autoregressive distributed lag) method is employed to assess the short-term effects of the relationship between the dependent and independent variables. Hannan Quinn (HQC) was employed to ascertain the lag time for both the short-term and long-term models.

4.7.1 Results of Short-run ARDL Model

The result of the estimated short-run dynamics between the dependent and independent variables are presented in Table 8 below;

Table 8: Short-run ARDL model Result

Cointegrating Form				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LINEQ)	0.465165	0.115138	4.040071	0.0004
D(POP)	0.087925	0.037601	2.338395	0.0270
D(POVR)	-0.000377	0.000522	-0.722077	0.4765
R-squared = (0.87) Adjusted R-squared = (0.85) F-statistic = (3309.810) Prob (0.00000) Durbin-Watson (2.175143)				

Source: Authors' computation, 2025

The output displays the findings of the long-run form analysis and ARDL (Autoregressive Distributed Lag) cointegration, with GDPGR (log of real GDP) as the dependent variable. The ARDL(1, 1, 0, 1, 1, 0) model was selected. This illustrates the model's lag structure. The first-differenced logarithm of the Gini coefficient, indicated by the coefficient of D(LINEQ), is positive and statistically significant at the 0.1% level in the short term. An increase in the Gini coefficient, which quantifies income inequality, will positively and significantly impact the logarithm of real GDP in the near future. The coefficient of D(POP) indicates the first-differenced population at the 5% significance level. This coefficient is likewise positive and statistically significant. An increase in population size has a temporary beneficial impact on the logarithm of real GDP. The coefficients of D(POVR) represent the first-differenced poverty rate; however, they lack statistical significance at conventional levels. This indicates that these factors exert minimal influence on the logarithm of real GDP in the short term.

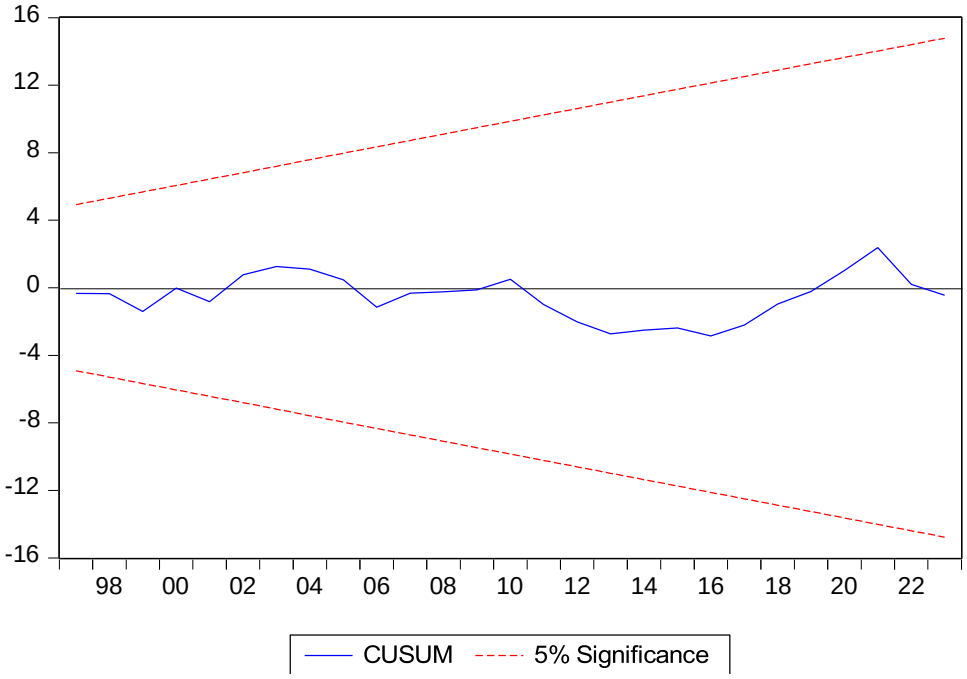
4.9 Post Estimation Test (Summary Table)

Test Statistic	Statistic	Df	p-value	Diagnostics
F-statistic	0.242765	Prob. F(2,25)	0.7863	Serial Correlation LM Test
F-statistic	1.226214	Prob. F(9,27)	0.3205	Heteroskedasticity Test
F-statistic	1.980104	Prob. F(1, 26)	0.1712	Ramsy Reset Test
Jaeque-Bera	0.799989	Probability	0.670324	Normality Test

Source: Authors' computation, 2025

The reliability of the ARDL model was confirmed through several diagnostic checks. The **Breusch-Godfrey Serial Correlation LM Test** (F = 0.2428, p = 0.7863) failed to reject the null hypothesis (H_0 : no serial correlation), indicating that the residuals are free from autocorrelation. Similarly, the **Breusch-Pagan-Godfrey Heteroskedasticity Test** (F = 1.2262, p = 0.3205) failed to reject the null hypothesis (H_0 : homoskedasticity), confirming that the error variances are stable across observations. The **Ramsey RESET Test** (F = 1.9801, p = 0.1712) also failed to reject the null hypothesis (H_0 : model is correctly specified), which suggests there are no omitted variables or functional form errors. Finally, the **normality test** (p > 0.05) failed to reject the null hypothesis (H_0 : residuals are normally distributed), thereby confirming that the residuals follow a normal distribution. Collectively, these results indicate that the model is robust, well-specified, and free from major econometric problems.

4.10 Stability test: Presentation of stability test result (CUSUM)



Source: Authors' computation, 2025

The stability test results are depicted in the figure provided above. According to the guideline, if the blue line lies within the two red lines (above and below), it indicates that the residual is stable. Based on this analysis, we can infer from the CUSUM Test that the residual is indeed stable, as the blue line falls between the two red lines (above and below). Ideally, the plotted points should exhibit random fluctuations around zero. If, however, an upward or downward trend emerges, it

suggests a shift in the process mean, possibly due to special causes affecting the process. Points that fall beyond the control limits indicate that the process is out of control.

4.13 Discussion of Results and Implication of Findings

The model's R^2 value of 0.87 indicates that 87% of the variation in the dependent variable is explained by the independent variables, showing an excellent fit. The adjusted R^2 of 0.86 confirms this strong explanatory power despite adjustments for degrees of freedom. The F-statistic (3308.84) with a p-value of 0.0000 demonstrates that the independent variables are statistically significant in explaining the dependent variable. The results show that income inequality (0.465165) has a positive effect, with a 4% rise in inequality linked to a 4% increase in real GDP. Population growth (0.087925) also has a positive effect, where a 1% increase in population leads to a 1% increase in real GDP. These findings align with theoretical expectations and prior evidence from Hyndman and Athanasopoulos (2021), which support the positive link between population growth and economic growth. The poverty rate is -0.000377, indicating that a 1% decrease would result in a 1% increase in the gross domestic product. This aligns with our expectations. Odhiambo (2022) discovered a negative correlation between poverty and economic advancement in Nigeria.

The population rate and the GINI coefficient, indicators of income inequality, were found to be statistically significant. This indicates that they have probably significantly contributed to Nigeria's economic development. This aligns with the findings of Magda et al. (2023): the GINI coefficient significantly impacts the Nigerian economy. However, the poverty rate does not exert a statistically significant influence. This indicates that it contributes little to the growth of Nigeria's economy. The poverty rate is negative and statistically insignificant at the 5% level, indicating that poverty does not influence economic growth. The coefficient of the error correction term possesses the appropriate sign and is statistically significant at the 5 percent level, indicating a 7 percent speed of convergence to equilibrium.

The findings indicate a significant positive autocorrelation at the initial lag of the time series (Chatfield, 2016). This indicates that the series' present value closely resembles its value from the recent past, a phenomenon frequently observed in financial contexts. The findings indicate a significant positive autocorrelation at the initial lag of the time series (Chatfield, 2016). The present value of the series is intricately linked to its recent historical values, a prevalent trend in numerous financial and economic time series (Tsay, 2014).

5.0 Conclusions and Recommendations

This study examined the impact of income inequality on Nigeria's economic growth in a practical context. The findings revealed that income disparity significantly influences the economy. Furthermore, there was evidence that the wealth gap in Nigeria substantially contributes to poverty. The research concluded that income inequality positively and significantly affects economic growth, as two of the three variables exhibited positive coefficients and their p-values were below 0.05.

In light of the study's findings, the following recommendations are proposed:

1. Transform short-run inequality-led growth into inclusive development: Since income inequality was found to significantly enhance economic growth in the short run, the government should adopt redistributive policies that channel these temporary gains into long-term, inclusive growth. This may include targeted investments in human capital, infrastructure, and productive sectors that benefit broader segments of society.

2. Harness population growth as a demographic dividend: The positive and significant effect of population growth on economic growth suggests that demographic expansion can be a driver of development if properly managed. Policies should therefore focus on expanding access to education, healthcare, and employment opportunities to convert Nigeria's large population into a productive workforce.
3. Strengthen the role of poverty reduction in growth outcomes: Although the poverty variable was statistically insignificant in the short run, its negative coefficient suggests that reducing poverty has the potential to support growth. Expanding conditional cash transfers, skills acquisition programmes, and social safety nets can enhance the capacity of poor households to participate in productive economic activities.

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