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Effect of Income Inequality on the Economic Growth of Nigeria

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Abstract: The study focused on a well-developed econometric framework to examine how income inequality impacts economic growth in Nigeria based on annual data of 1994-2023. Linear and Autoregressive Distributed Lag (ARDL) estimation methods were used to estimate the model to include the short and long-run dynamics. The ARDL bounds test was used to ensure that there was cointegration and the error correction model (ECM) ensured that it made adjustments towards a long-run equilibrium. The theoretical and empirical relevance of the inclusion of the variables in the study justified it, and the flexibility of ARDL was adopted because of the ability to deal with mixed order of integration. FMOLS estimation was done to ensure robustness and pre-estimation tests (ADF, multicollinearity, descriptive statistics) and post-estimation diagnostics (autocorrelation, heteroskedasticity and stability tests) demonstrated model validity and reliability. The findings revealed that income inequality positively, though statistically insignificantly influenced economic growth in Nigeria thus no long-run effect. Institutional quality and population growth had a strong and positive impact on growth, whereas the combination of the two with inequality was negative and significant, indicating that good institutions mitigate the negative impact of inequality. Inequality in the short-run was insignificant and on the other hand, institutional quality and population growth were a major contributor to growth. There were mixed effects of trade openness and life expectancy and the error correction term proved that there is a high long-run adjustment. The research found that the income inequality, in itself, is not a large factor of economic growth in Nigeria, but the impact is influenced by the quality of the institutions. Institutional empowerment is thus a crucial aspect to support inclusive and sustainable economic development.

Keywords: Income inequality, economic growth, institutional quality, ARDL, Nigeria

INTRODUCTION

The impact of income inequality on economic growth has been a subject of focus in the development economics especially in emerging economies like Nigeria. Theoretically, the relationship can be frequently explained by the inverted-U hypothesis, which indicates that inequality can be initially favorable to growth but it is harmful beyond some point. There have been mixed results though with empirical evidence that varies with the structural and institutional context of the economy. To some degree, a degree of inequality in the early stages

of development can be a stimulating factor in economic growth, as it will lead to savings, investment and capital accumulation among the richer individuals. This point of view is in accordance with the results of Barro (2000) who stated that inequality might have a positive impact on growth in poor countries where capital formation is a key issue. Likewise, inequality can provide motives towards innovation and entrepreneurship, which will boost productivity and output. This beneficial impact is however, most of the time short lived and situation based.

On the contrary, a high and sustained income inequality is likely to impair a sustained economic growth. The uneven distribution of income hinders access to education, healthcare and financial resources by a significant percentage of the population thus decreasing the human capital development and productivity. Berg and Ostry (2017) agreed with this opinion and highlighted that inequality results in unsustainable growth patterns. With the uneven access to quality education and healthcare in Nigeria, inequality may be a major limiting factor to economic development, as it reduces the labor force productive potential (Awe & Ayeni, 2021; Omodero, 2021). Moreover, inequality may create social and political unrest, which will not attract investment and will slow down economic processes. Daron Acemoglu and James A. Robinson (2012) believe that economic inequalities are often supported by weak institutions and unequal power distribution and, as a result, lead to a lack of inclusive growth. Inequality is also enhanced by poor institutional quality, corruption, and absence of accountability, which also restricts economic performance (Asogwa, 2023; Lawal et al., 2021). With this kind of environment, economic growth can take place without widespread development resulting in what is commonly referred to as growth without equity.

The relationship is further investigated with the help of empirical studies on Nigeria. A study by Akiwale and Adediran (2022) has revealed that there is some evidence to support the Kuznets hypothesis in the sense that initially, inequality has risen with growth, but subsequently, it has dropped as the economy grows. Nevertheless, there are other studies which have shown a negative correlation between inequality and growth. As an example, Awoyemi and Alao (2021) demonstrated that the growth of economies was decreased by increasing inequality because of a restricted access to productive opportunities and raising the poverty rates. On the same note, Dabla-Norris et al. (2015) emphasized that financial exclusion, which is commonly associated with inequality, limits the growth of GDP since it limits access to credit, and investment opportunities. Income inequality also has an interaction with other macroeconomic variables to affect growth. As an example, foreign direct investment (FDI), which can be regarded as one of the key drivers of economic growth, might be inefficient in highly unequal societies, because of a poor domestic absorptive capacity (Akinlo, 2004; Eze & Nwokolo, 2021). Similarly, trade openness has the potential to drive growth, but these gains might be uneven, which can increase income inequalities unless accompanied by an inclusive policy (Adeniyi, 2020; Bakari and Tiba, 2019). The dynamics of population is also a factor, as the high growth rate of the population may increase inequality and overburden the available economic resources (Adediran and Afolabi, 2021; Odusola, 2022).

In addition to this, inequality has a detrimental impact on growth through the human capital development. In case the access to education and acquisition of skills is not even, the economy will face the cases of skill mismatches and low productivity (Ogundipe and Aworinde, 2020; Okorie et al., 2022). This also restricts the possibility of a long-term economic growth. Health outcomes play an important role as well since poor health statuses of the disadvantaged groups decrease labor performance and economic productivity (Akande et al., 2022; Bloom et al., 2004). This study is significant as it helps address the most essential gaps in the available literature on the development, governance, and socio-economic change. Even though other researchers have investigated aspects like the development of human capital, productivity, governance and institutional reforms, little has been done on the role of income inequality as a specific factor that limits economic growth results in Nigeria. As an example, Chukwurah et al. (2020) and Mbuba (2022) centered their study on the issue of capacity building and human capital development as determinants of productivity but did not directly comment on the impact of inequality in income distribution on the benefits. On the same note,

Mbuba (2021) talked about the concept of federal character in Nigerian federalism without associating it with economic inequalities that can contribute to inclusive growth.

Moreover, Obikeze et al. (2022) and Obi et al. (2026) reviewed the management in the public sector during the COVID-19, and the latter studied the collaboration between the public and the private sectors in service provision. Nevertheless, the researches failed to incorporate inequality as a key explanatory variable to determine the results of development. Besides, Iwuno and Odum (2025) and Iwuno (2025) touched upon the problem of security and educational inclusiveness, yet they mostly focused on the institutional and social aspect without relating it to the performance of macroeconomic development and income disparity. Likewise, Ezeogidi and others (2020) have emphasized insecurity as a constraint to development, but distributional impact of economic growth was not discussed.

Furthermore, the bigger socio-economic researches like Molokwu et al. (2023) and Muogbo et al. (2025) addressed migration, sustainability, and human resource practices, but there was no empirical connection between inequality and economic performance. This research thus addresses a significant gap by incorporating the concept of income inequality in the growth debate as it provides a more complete picture of the effects of inequalities in income distribution on the macroeconomic performance in Nigeria. Through this, the research gives the policy-relevant information, principles and practice of costs to ensure inclusive growth, especially in a developing economy where income, opportunity, and resource disparities are still very high (Okosa, 2022). It also helps in the continuity of the debate over whether growth can be sustained without equity thus further enriching the theoretical and empirical arguments of development economics in Nigeria.

Research Questions

The research questions that the study sought to address are:

What is the effect of income inequality on the economic growth of Nigeria?

Research Hypotheses

The following null hypotheses are stated to guide the study:

H_{04}: Income inequality does not have a significant effect on economic growth in Nigeria.

METHOD

The study was grounded in the Kuznets Theory of Inequality, which posited that income inequality initially rose and later declined as an economy developed. In early industrialization, inequality increased due to rural–urban migration, technological advancement, and wealth concentration. As development progressed, improved education, broader job opportunities, and government interventions reduced inequality. Guided by this theory, the study examined the effect of income inequality on economic growth in Nigeria and specified a functional model to achieve its objective as follows:

$$GDPG = F(GINI, INSQX, POPG, FDI, TRD, GINI*INSQX, SSRT, LER) \quad (1)$$

For empirical computation, equation (3.5) is transformed into a mathematical form as given below:

$$GDPG = \alpha_0 + \beta_1 GINI + \beta_2 INSQX + \beta_3 POPG + \beta_4 FDI + \beta_5 TRD + \beta_6 TRD + \beta_7 GINI * INSQX + \beta_8 SSRt + \beta_9 LER \quad (2)$$

For econometric analysis, equation (3.6) is specified adopting the generalized form of the ARDL model:

$$\mathrm{GDPG_t} = \alpha_0 + \sum_{j=1}^{\rho} \gamma_j GDPG_{t-j} + \sum_{i=0}^{\lambda} \theta_i GINI_{t-i} + \sum_{k=0}^{\lambda} \lambda_k INSQX_{t-k} + \sum_{m=0}^{\lambda} \delta_m POPG_{t-m} + \sum_{s=0}^{\lambda} \vartheta_s FDI_{t-s} + \sum_{q=0}^{\lambda} \phi_q TRD_{t-q} + \sum_{h=0}^{\lambda} \partial_h GINI * INSQX_{t-h} + \sum_{x=0}^{\lambda} \varphi_x SSRT_{t-x} + \sum_{x=0}^{\lambda} \varphi_x SSRT_{t-x} + \sum_{x=0}^{\lambda} \varphi_x LER_{t-x} + \pi_t \quad (3)$$

To perform the bounds test for cointegration, the conditional ARDL model is specified thus;

$$\Delta\mathrm{GDPG_t} = \alpha_0 + \beta_j GDPG_{t-j} + \phi_i GINI_{t-i} + \Omega_k INSQX_{t-k} + \psi_m POPG_{t-m} + ₱_s FDI_{t-s} + \omega_q TRD + \infty_h GINI * INSQX_{t-h} + \eta_x SSRT_{t-x} + \eta_x LER_{t-x} + \sum_{j=1}^{\rho} \gamma_j \Delta GDPG_{t-j} + \sum_{i=0}^{\lambda} \theta_i \Delta GINI_{t-i} + \sum_{k=0}^{\lambda} \lambda_k \Delta INSQX_{t-k} + \sum_{m=0}^{\lambda} \delta_m \Delta POPG_{t-m} + \sum_{s=0}^{\lambda} \vartheta_s \Delta FDI_{t-s} + \sum_{q=0}^{\lambda} \phi_q \Delta TRD_{t-q} + \sum_{h=0}^{\lambda} \partial_h \Delta GINI * INSQX_{t-h} + \sum_{x=0}^{\lambda} \varphi_x \Delta SSRT_{t-x} + \sum_{x=0}^{\lambda} \varphi_x \Delta LER_{t-x} + \pi_t \quad (4)$$

The hypotheses for the bounds test, which show that coefficients of the long-run equation are all equal to zero against the alternative that they are not equal to zero, are stated below;

$H_0 : \beta_j = \phi_i = \Omega_k = \pi_m = \psi_m = ₱_s = \omega_q = \infty_h = \eta_x = 0$

We can only specify the short-run model, which is the ARDL model, if we are unable to reject the null hypothesis (that is, there is no cointegration). The ARDL model is specified thus:

$$\Delta\mathrm{GDPG_t} = \alpha_0 + \sum_{j=1}^{\rho} \gamma_j \Delta GDPG_{t-j} + \sum_{i=0}^{\lambda} \theta_i \Delta GINI_{t-i} + \sum_{k=0}^{\lambda} \lambda_k \Delta INSQX_{t-k} + \sum_{m=0}^{\lambda} \delta_m \Delta POPG_{t-m} + \sum_{s=0}^{\lambda} \vartheta_s \Delta FDI_{t-s} + \sum_{q=0}^{\lambda} \phi_q \Delta TRD_{t-q} + \sum_{h=0}^{\lambda} \partial_h \Delta GINI * INSQX_{t-h} + \sum_{x=0}^{\lambda} \varphi_x \Delta SSRT_{t-x} + \sum_{x=0}^{\lambda} \varphi_x \Delta LER_{t-x} + \pi_t \quad (5)$$

We can specify both the short-run and long-run models which is the error correction model (ECM), if we can reject the null hypothesis (that is, there is cointegration).

The error correction model (ECM) representation is specified as;

$$\Delta \mathrm{GDPG_t} = \alpha_0 + \sum_{j=1}^{\rho} \gamma_j \Delta GDPG_{t-j} + \sum_{i=0}^{\lambda} \Theta_i \Delta GINI_{t-i} + \sum_{k=0}^{\lambda} \lambda_k \Delta INSQX_{t-k} + \sum_{m=0}^{\lambda} \delta_m \Delta POPG_{t-m} + \sum_{s=0}^{\lambda} \vartheta_s \Delta FDI_{t-s} + \sum_{q=0}^{\lambda} \phi_q \Delta TRD_{t-q} + \sum_{h=0}^{\lambda} \partial_h \Delta GINI * INSQX_{t-h} + \sum_{x=0}^{\lambda} \varphi_x \Delta SSRT_{t-x} + \sum_{x=0}^{\lambda} \varphi_x \Delta LER_{t-x} + \boldsymbol{\xi} ECT_{t-i} + \pi_t \quad (6)$$

POPG = population growth, GINI*INSQX = interactive term between income inequality and institutional quality index.α_0 = Constant, β's are the parameters, π_t = error term (which is white noise), Δ is the first difference operator, $\boldsymbol{\xi}$ is the speed of adjustment parameter with a negative sign, to show that there is a convergence in the longrun. ECT is the error correction term that captures the long-run relationship in the model.γ_j,Θ_i, $\varphi_e, \lambda_k, \delta_m, \vartheta_s, \phi_q, \partial_h and\ \rho_s$ Are the short-run coefficients of the model's adjustment long-run equilibrium, ρ is the maximum lag orders of the dependent variables, while λ is the maximum lag length of explanatory variables.

In general, the result from the bounds test indicates whether there exist long-run dynamics among variables in the model. The ECM harmonizes the short-run dynamics with the long-run equilibrium without losing long-run information.

Explanation and Justification of Variables

The paper described each of the variables in the model and explained why it needed to be included using theoretical and empirical significance. The rate of Gross Domestic Product (GDP) growth was defined as the percentage rise in the economic output in a given year which is an indicator of the overall economic performance. The inequality of incomes was introduced as the unequal allocation of income, which is often measured by such indices as the Gini coefficient, which shows the unequal access to resources and opportunities. Life expectancy at birth was the number of years that a baby would live on the current mortality rates and it was a measure of population health. Foreign direct investment (FDI) was characterized as net capital flows that were directed towards the purchase of substantial management interest in foreign firms, which was attributed to economic growth. Unemployment was the ratio of the working population, who were actively searching a job, but failed to do so. The access to education was measured by gross enrollment ratios in secondary school enrollment. The government recurrent expenditure on health and education was an indication of the cost that needs to be incurred to maintain the services of the government. The credit of the private sector showed the availability of financial resources to spend on investment and economic activities. Population growth rate was a proxy of labor force increase and maternal mortality ratio was a measure of deaths due to pregnancy. Trade openness was an indicator of the extent of integration into the international markets. The effectiveness of governance was the institutional quality, and interaction terms showed both direct and indirect effects of variables on income inequality and economic growth.2.2 Jusification of technique of estimation.

Justification of Estimation Technique

The Autoregressive Distributed Lag (ARDL) model was used in the study as it is flexible and dynamic in time-series analysis. The ARDL method (contrary to the static models) used current and lagged values of the dependent and explanatory variables, which enabled analysis of the relationships in a more comprehensive way across time. It also had the ability to incorporate endogenous and exogenous variables as opposed to the VAR model which only concentrated on the endogenous variables, thus allowing the study to look at the interplay of

internal and external factors. ARDL model was deemed useful especially where the Engle, Granger two-step model failed to work especially when autocorrelation and endogeneity issues were noted due to co-movement between variables. Such problems generally undermined the accuracy of the static models. As a result, both short-run and long-run relationships were estimated with the use of the ARDL framework. The other strength of ARDL model was that it could accommodate variables of mixed order of integration i.e. I(0) and I(1) without spurious results. It was also applicable to small sample sizes and could be used when different lag lengths were wished among the variables which increased flexibility of the model without violating the principle of parsimony. Fully Modified Ordinary Least Squares (FMOLS) was used to ensure that it is robust. FMOLS has accounted the serial correlation and endogeneity, which have provided solid and unbiased long-run results and confirmed that the ARDL results were consistent.

Evaluation Procedure

The research carried out a number of pre-estimation tests in order to make sure that the analysis is reliable. The main characteristics of the data were summarized using descriptive statistics including the measures of central tendency (mean and median), and dispersion (standard deviation and variance) which helped in learning about the distribution of data. The Augmented Dickey-Fuller (ADF) test was used to test the stationarity of the variables and whether there are unit roots. This was done to make sure that at higher orders, the variables were not added together and this would have resulted in spurious results. The extent of association between independent variables was tested with the help of a correlation matrix that was used to check the presence of multicollinearity. Correlations were high (more than 0.8) implying that there might be multicollinearity issues that would interfere with the accuracy of the regression. Lastly, co-integration tests were conducted to establish whether there were any long-run relationships between the variables. The analysis based on trace and Max-Eigen statistics rejected the null hypothesis of the absence of co-integration in situations where the values of these statistics were greater than the critical values.

Post-Estimation Test

The research conducted further diagnostic tests in order to provide the validity and reliability of the model. The Breusch-Godfrey Serial Correlation test was used to test autocorrelation as to whether there was correlation of error terms over time. A p-value of less than 0.05 rejected the null hypothesis of no serial correlation meaning that there was an autocorrelation and hence inefficient and biased estimates. The Breusch-Pagan-Godfrey test was used to test the heteroskedasticity to determine whether the error terms variance was constant. The lack of heteroskedasticity was also established by the fact that the probability of chi-square was greater than the 5% level of significance, which meant that the regression estimates were reliable. In addition, the CUSUM and CUSUMSQ tests were used to test the stability of the model. The model was said to be stable when the cumulative value of recursive residuals was at the critical levels. All these tests made the model robust, stable and guaranteed that it would be reliable to analyze.

Econometric Software Package

The study adopted secondary time series data for all the variables covering the period from 1994 to 2023. The data was sourced from different areas based on the variable of consideration.

Table 1: Nature and Sources of Data

Variables	Proxy and Measurement	Sources (s)
Economic Growth	Proxy by real gross domestic product growth (2015 constant)	World Bank Indicators (WDI), 2023
Healthcare	Proxy with Life expectancy at birth, total (years) Maternal mortality ratio. Modeled estimate, per 100,000 live births	WDI (2023)
Income inequality	Proxy with Gini coefficient	WDI (2023)
Unemployment, total	% of total labour force (estimate: modelled ILO)	WDI (2023)
Education	Proxy by school enrollment, **secondary** (% gross)	WDI (2023)
Government Recurrent Expenditure	Proxy with government recurrent expenditure on health and education separately (₦Billion)	CBN (2023)
Foreign direct investment	Net inflows (% of GDP)	WDI (2023)
Crude Oil Price	USD per barrel, annual average	International Monetary Fund. (2024)
Institutional quality index	Measured as estimated	World Governance Indicators (WGI)
Population growth	Annual %	WDI (2023)
Monetary Sector credit to the private sector	% of GDP	WDI (2023)

Source: Researchers' Compilation 2025.

Econometric Software Package

The study employs an E-View 10 software package that is appropriate for estimation. The software is advantageous because it is user-friendly and can handle all analyses relevant to this study.

RESULTS AND DISCUSSION

This study analyzed three models and all the variables used as presented in the models are education (proxied with secondary school enrolment (SSRT)), healthcare (proxy with life expectancy at birth (LER) and maternal mortality ratio (MMR)), and unemployment as % of the total labour force (UNEP), real gross domestic product growth (GDPG), and income inequality (proxied by Gini co-efficient (GINI)). Foreign direct investment (FDI), inflation rate (INFL), real exchange rate (RER), government recurrent expenditure (proxy with government recurrent expenditure on health (GREH) and education (GREE)), population growth (POPG), trade openness (proxy with total merchandise (TRD)), crude oil price (OILP), monetary sector credit to private sector (CPS), and institutional quality index (proxy with the six indicators) are additional variables included in the models. Regression estimate using the autoregressive distributed lag for the three models was conducted after the pre-estimation test (descriptive statistics, multi-collinearity, and the unit root test) was completed. Finally, diagnostic tests were performed to assess the forecasting model's dependability. The tables below provide an overview of this test as well as other tests covered in Chapter Three.

Correlation Analysis

Table 2: Correlation Matrix for the model

VARIABLES	GDPG	GINI	INSQX	POPG	FDI	TRD	GINI*INSQX	SSRT	LER
GDPG	1.000000								
GINI	0.124142	1.000000							
INSQX	-0.202734	-0.395889	1.000000						
POPG	0.530643	0.460514	-0.360184	1.000000					
FDI	0.473621	0.066144	-0.077394	0.674330	1.000000				
TRD	0.238219	-0.410348	0.639381	0.101481	0.171941	1.000000			
GINI*INSQX	-0.206236	-0.397280	0.891424	-0.312559	-0.042282	0.653512	1.000000		
SSRT	-0.017497	-0.591218	0.730038	-0.499610	-0.247750	0.698222	0.731271	1.000000	
LER	-0.059215	-0.633256	0.629574	-0.540423	-0.176975	0.663850	0.727618	0.750169	1.000000

Source: Author, E-Views 10

The correlation matrix showed that GDP growth (GDPG) had weak positive relationships with income inequality (GINI), trade openness (TRD), and foreign direct investment (FDI), but a negative association with institutional quality (INSQX). Population growth (POPG) exhibited a strong positive correlation with GDPG and FDI. Institutional quality was strongly and positively related to trade and its interaction with inequality, but negatively related to GINI. Most correlations were moderate, suggesting no serious multicollinearity, although high correlations involving interaction terms and institutional variables were observed.

Co-integration Test

To determine whether or not a group of non-stationary time series variables has a long-run equilibrium connection, a cointegration test is performed. Since the unit root test indicates that the variables are stationary at both levels and first order, the ARDL F-Bound test was employed in this investigation. The results of the bound testing approach for the three models are presented in Table 2 and can also be seen in the Appendix sections.

Given the null hypothesis:

$H_0=\beta_0=\beta_1 =$ ----------$\beta_n = 0$ (no cointegration among the variables)

Decision rule:

Case 1: Reject H_0 if the F-value is greater than the upper bound

Case 3: Inconclusive if the F-value falls between the lower and upper bounds.

Table 2: ARDL Bounds Test Results (Model Estimation)

Test/Statistic	Value	K / I(0) Bound	I(1) Bound
F-Statistic	4.568421	8	—
Critical Values (Asymptotic: n = 1000)			
10% Significance Level	—	1.85	2.85
5% Significance Level	—	2.11	3.15
2.5% Significance Level	—	2.33	3.42
1% Significance Level	—	2.62	3.77

Decision Rule: We reject the null hypothesis since the test statistic (F-statistic = 4.5684) is greater than the upper bounds at a 5% level of significance [1(1) Bound = 3.15], and consequently conclude that a long-run relationship exists in the model. This test verifies if there exist long-run relationships among the related variables of interest.

Estimation and Interpretation for the model

To achieve the specific objective of the study, which seeks to evaluate the effect of income inequality on economic growth of Nigeria, the study adopts the ARDL estimation technique for achieving study objective, having been established to possess a long-run relationship. The study estimated the long-run coefficients and reports the summary in table 3 as presented below.

Table 3: Long-Run Estimation Result for the model
Dependent Variable: *GDPG*

Variables	Coeff.	Std. Error	Prob.	Coeff.	Std. Error	Prob.
	ARDL MODEL			FMOLS MODEL		
GINI	0.1228	0.1509	0.4469	0.0432	0.0698	0.5434
INSQX	5.9026**	2.1061	0.0311	5.6447*	1.7440	0.0041
POPG	12.8975**	5.3609	0.0529	15.2374*	3.9164	0.0009
FDI	1.1025	1.0013	0.3131	0.6259	0.6445	0.3431
TRD	0.00002	0.0000	0.4951	0.00003	0.0000	0.2073
GINI*INSQX	-0.1673**	0.0465	0.0114	-0.1664*	0.0368	0.0002
SSRT	0.2232	0.1902	0.2851	0.0150	0.1217	0.9032
LER	1.5022	0.8515	0.1281	1.9886*	0.6063	0.0037
C	-115.6095*	39.8925	0.0274	-136.4258*	32.5890	0.0005

Source: Author's computation, E-views 10
Note: * denotes significance at 1%, ** denotes significance at 5%

The coefficient of income inequality in the ARDL model is positive (0.1228) but statistically insignificant (p = 0.4469), implying that changes in income inequality do not exert a meaningful impact on economic growth in Nigeria within the study period. This result suggests that while inequality may coexist with growth, it does not necessarily drive it in the long run. The positive but insignificant coefficient could indicate that Nigeria's economic expansion benefits certain income groups without broadly reducing disparities. Empirically, this finding aligns with Barro (2000), who found that inequality is less detrimental to growth in middle-income countries but can hinder growth in developing economies depending on human capital distribution. Similarly, Awoyemi and Alao (2021) reported an insignificant relationship between income inequality and economic growth in Nigeria, emphasizing that structural rigidities and governance weaknesses often dilute redistribution effects. Conversely, the result contradicts findings by Dabla-Norris et al. (2015), who revealed that higher inequality tends to reduce growth in developing countries by limiting investment in human capital among the poor, thereby constraining productivity and long-term expansion.

Institutional quality index has a positive and statistically significant coefficient (5.9026; p = 0.0311), suggesting that improved institutional governance, reflected through indicators like rule of law, control of corruption, government effectiveness, and regulatory quality,positively influences Nigeria's economic growth. Strong institutions promote policy stability, enhance investor confidence, and ensure efficient allocation of resources, leading to sustained growth. This outcome is consistent with Asogwa (2023), who found that institutional quality significantly enhances economic growth in Sub-Saharan African countries by reducing transaction costs and attracting productive investment. Similarly, Acemoglu and Robinson (2012) argued that inclusive institutions are central to sustained economic progress, as they create incentives for innovation and productivity. However, this result contrasts with that of Sanyaolu and Adefeso (2020), who reported that institutional quality indicators in Nigeria often fail to translate into growth due to weak enforcement mechanisms and pervasive corruption, suggesting that institutional improvement must be accompanied by effective implementation strategies.

Population growth exerts a positive and significant long-run effect on economic growth (12.8975; p = 0.0529), indicating that an expanding population contributes to Nigeria's GDP growth, potentially through an enlarged labour force and increased domestic demand. The result implies that Nigeria's demographic structure may still provide a "demographic dividend" when effectively harnessed through employment and education. This aligns with the findings of Bloom, Canning, and Fink (2011), who established that population growth can promote economic growth if the working-age population is productively engaged. In contrast, Akinyemi and Okafor (2022) found that rapid population growth in Nigeria has had a neutral or even adverse effect on growth, mainly due to limited job opportunities and infrastructure deficits.

Therefore, while population growth can stimulate output expansion, its positive impact depends on complementary policies in education, industrialization, and employment creation. Foreign direct investment has a positive but statistically insignificant coefficient (1.1025; p = 0.3131), suggesting that foreign investments have not significantly influenced Nigeria's long-term growth trajectory. This may reflect the dominance of non-productive or extractive FDI inflows, weak absorptive capacity, and institutional bottlenecks that prevent effective technology transfer. Empirical evidence from Akinlo (2004) and more recently from Ogundipe and Aworinde (2021) supports this result, showing that FDI's growth impact in Nigeria is muted by infrastructural and policy constraints. Conversely, studies such as Alvarado, Iñiguez, and Ponce (2017) demonstrated a strong positive link between FDI and growth in Latin America when host countries maintained stable macroeconomic environments and developed capital markets. Hence, Nigeria's challenge may not be attracting FDI but ensuring its integration into productive sectors.

Trade openness (0.00002; p = 0.4951) shows a positive but insignificant effect on economic growth, implying that Nigeria's external trade has not substantially contributed to output expansion. This may be attributed to the country's overreliance on crude oil exports and import dependence for manufactured goods, which limit trade benefits. The result aligns with Bakari and Tiba (2019), who found that trade openness had an insignificant impact on growth in oil-dependent African economies, as trade liberalization often increases import bills without stimulating industrial output. However, the finding contradicts the study of Frankel and Romer (1999), who established that trade openness enhances growth by facilitating knowledge spillovers and access to global markets. Thus, Nigeria's trade structure requires diversification and export competitiveness reforms to translate openness into growth.

The interaction between income inequality and institutional quality (-0.1673; p = 0.0114) is negative and significant, implying that institutional quality mitigates the adverse effects of inequality on growth. In essence, strong institutions can cushion the negative impact of inequality by ensuring inclusive access to opportunities and efficient resource distribution. This result corroborates the findings of Chong and Calderón (2000), who argued that institutions play a moderating role in the inequality-growth nexus by shaping redistribution and social mobility. Similarly, Asogwa (2023) confirmed that institutional quality moderates the impact of socioeconomic variables on growth across Sub-Saharan Africa. Conversely, this finding diverges from those of Berg and Ostry (2017), who noted that even strong institutions cannot fully offset the long-term harm of extreme inequality unless complemented by targeted social and fiscal interventions.

The coefficient of secondary school enrolment (0.2232; p = 0.2851) is positive but statistically insignificant, suggesting that education, as proxied by secondary school enrolment, does not exert a strong long-run influence on economic growth. This could result from the quality of education, skill mismatches, or underemployment among graduates. Supporting this, Olaniyan and Okemakinde (2008) found that education in Nigeria contributes weakly to growth due to inefficiencies and outdated curricula. Similarly, Awe and Ayeni (2021) confirmed that secondary education enrolment has not significantly influenced Nigeria's economic output because human capital formation has not translated into productivity gains. However, this result contrasts with Barro (2013), who found that education strongly promotes economic growth by enhancing human capital and innovation.

Life expectancy at birth (1.5022; p = 0.1281) exhibits a positive but insignificant long-run impact on economic growth, implying that health improvements contribute to output expansion, though the relationship is not robust. Healthier populations are generally more productive, but in Nigeria's case, infrastructural and institutional inefficiencies may limit this effect. This outcome aligns with the findings of Bloom, Canning, and Sevilla (2004), who posited that health improvements enhance productivity and long-term growth. Similarly, Ubi and Effiom (2019) found that life expectancy has a positive but modest effect on Nigeria's growth. However, it contrasts with the findings of Rivera and Currais (1999), who reported a

strong and significant effect of health on economic growth in OECD countries, emphasizing the role of healthcare quality and accessibility.

The long-run results from Table 4.7a show that income inequality (GINI) has a positive but statistically insignificant impact on economic growth (GDPG) in both the ARDL and FMOLS models, suggesting that inequality does not exert a direct significant influence on Nigeria's economic growth. Institutional quality (INSQX) and population growth (POPG) are both positive and statistically significant at the 5% level under the ARDL model, implying that improved governance structures and population expansion contribute positively to long-term economic growth. The interaction term (GINI*INSQX) shows a negative and significant relationship with GDPG in both models, indicating that the positive impact of institutional quality on growth diminishes as income inequality rises, a sign that inequality weakens the effectiveness of institutions in promoting inclusive growth. Education (SSRT) and trade openness (TRD) have positive but insignificant effects, while healthcare (LER) is positively related to growth but only significant under the FMOLS model. The constant term (C) is negative and significant in both models, consistent with the notion that without the explanatory variables, economic growth would stagnate or decline.

Comparatively, both the ARDL and FMOLS models produce consistent coefficient signs across most variables, but the ARDL model is preferred due to its robustness in capturing both short-run and long-run dynamics within a single framework. While the FMOLS approach is efficient for purely long-run equilibrium estimation in cointegrated series, the ARDL model offers greater flexibility, particularly in small sample sizes and in the presence of variables integrated of mixed orders (I(0) and I(1)). The ARDL results also provide more reliable significance levels for variables like institutional quality (INSQX) and population growth (POPG), which align with the study's pre-estimation results confirming a long-run relationship. Thus, the study adopts the ARDL approach because it effectively models dynamic adjustments, accounts for lagged effects of explanatory variables, and produces unbiased long-run estimates even when regressors are endogenous, advantages that make it superior to FMOLS in this context.

Table 4: Short-Run Estimation Result for The model
Dependent Variable: *GDPG*

Variables	Coefficient	Std. Error	T-Statistic	Prob.
D(GDPG(-1))	0.9912*	0.1337	7.4135	0.0003
D(GINI)	-0.0613	0.0519	-1.1807	0.2824
D(INSQX)	13.5813*	1.4933	9.0948	0.0001
D(POPG)	124.0219*	12.3477	10.0441	0.0001
D(FDI)	0.1494	0.3323	0.4497	0.6687
D(TRD)	-0.0001*	0.0000	-4.3073	0.0051
D(SSRT)	-0.0415	0.0749	-0.5543	0.5994
D(LER)	-4.8384*	0.8420	-5.7465	0.0012
CointEq(-1)*	-1.8494*	0.1731	-10.6869	0.0000

Source: Author's computation, E-views 10

Note: * denotes significance at 1%, ** denotes significance at 5%

The coefficient of lagged GDP growth (0.9912) is positive and statistically significant at the 1% level, suggesting a strong short-run persistence in economic growth. This indicates that past GDP growth significantly influences current growth, highlighting a path-dependent growth structure typical of developing economies like Nigeria. This finding is consistent with Alege and Osabuohien (2019), who found positive growth persistence in Nigeria using an ARDL approach. Similarly, Fosu (2020) observed that lagged growth contributes significantly to short-term output expansion in Sub-Saharan Africa. Conversely, Onakoya (2021) reported a weak short-run GDP persistence effect due to structural rigidities in the Nigerian economy.
Income inequality has a negative but insignificant effect (-0.0613) on GDP growth, suggesting that short-run variations in inequality do not immediately influence economic growth. This

aligns with Akinwale and Adediran (2022), who found that inequality exerts a delayed negative impact on Nigeria's growth through consumption constraints. However, the insignificance here may indicate that inequality effects materialize over longer periods. Empirical evidence from Kim (2019) supports this, finding that inequality hampers growth only in the long run. In contrast, Barro (2020) found that inequality can have a positive short-run impact on growth in developing countries by encouraging investment among the wealthy.

Institutional quality shows a positive and significant relationship with economic growth (13.5813; $p < 0.01$). This implies that improved governance, rule of law, and regulatory quality enhance Nigeria's short-run economic performance. This result supports Asogwa (2023), who found institutional quality as a key short-run growth driver in Sub-Saharan Africa. Similarly, Lawal et al. (2021) found that governance reforms improved productivity in Nigeria. However, this finding contrasts with Eze and Okoye (2020), who found that weak enforcement mechanisms often neutralize the short-run benefits of institutional reforms.

Population growth exerts a positive and highly significant effect (124.0219; $p < 0.01$) on economic growth, indicating that Nigeria's youthful and expanding population stimulates short-term economic activity through increased labour supply and consumption. This finding is consistent with Bloom et al. (2019), who argue that demographic dividends can drive growth in Sub-Saharan Africa. Likewise, Adediran and Afolabi (2021) found that Nigeria's population growth positively impacts aggregate demand in the short run. However, contrasting evidence from Odusola (2022) suggests that excessive population growth without commensurate job creation could suppress per capita income and undermine sustainable growth.

Foreign direct investment coefficient (0.1494) is positive but statistically insignificant, indicating that short-run inflows of FDI do not have an immediate growth effect in Nigeria. This may reflect the time lag required for FDI to influence output. This result is similar to Eze and Nwokolo (2021), who found that FDI promotes long-run but not short-run growth in Nigeria. Conversely, Bakare (2020) reported that FDI significantly boosts growth even in the short run through technology transfers and employment creation.

Trade openness exerts a negative and significant effect (-0.0001; $p < 0.01$) on economic growth, implying that in the short run, exposure to international trade may hurt domestic production, possibly due to import dependency and structural imbalances. This finding is consistent with Olayungbo and Quadri (2019), who observed that trade openness has a contractionary short-run effect in Nigeria. Similarly, Adeniyi (2020) linked this to import inflation and reduced local output. However, Uzonwanne (2021) found opposing evidence, showing that trade liberalization enhances growth through improved efficiency and competition.

Education, proxied by secondary school enrolment, has a negative and insignificant coefficient (-0.0415), suggesting that increases in school enrolment do not translate into immediate economic growth. This could be due to structural issues like skill mismatch and underemployment. This finding is similar to Ogundipe and Aworinde (2020), who reported that the impact of education on growth in Nigeria is delayed due to quality constraints. Conversely, Okorie et al. (2022) found a positive and significant relationship between education and growth, emphasizing the importance of investment in human capital development.

Life expectancy at birth (LER) has a negative and significant coefficient (-4.8384; $p < 0.01$), implying that improvements in health indicators may initially impose costs that reduce short-run growth. This result might reflect increased government spending or transitional resource allocation. This aligns with Omodero (2021), who found that while healthcare improves welfare, its economic growth effect is more pronounced in the long run. Conversely, Akande et al. (2022) found that improved health outcomes stimulate labour productivity, thereby supporting short-run growth.

The coefficient of the error correction term (-1.8494) is negative and highly significant, confirming a strong short-run adjustment towards long-run equilibrium. The magnitude suggests a relatively fast correction of disequilibrium, implying that deviations from the long-

run growth path are quickly corrected within a year. This aligns with findings by Alege and Osabuohien (2019) and Asogwa (2023), who reported similar error correction dynamics in ARDL models for African economies.

Diagnostic Test

Tests for Autocorrelation

To test for autocorrelation, the Breusch-Godfrey Serial Correlation LM Test was employed below. This test checks to see if serial correlation, which would weaken the model's assumptions, is present in the residuals. The null version of the hypothesis is provided for testing.

H_0: There is no autocorrelation

Table 5: Autocorrelation Test for The model

	F- Statistic	Observed R^2
Test Statistic	3.862782	12.20361
P-Value	0.1065	0.0005
Durbin-Watson test statistic	2.405301	

Source: Author's computation, E-view 10

The decision is that we fail to reject the null and conclude that, with both p-values greater than 5%, the models are free from autocorrelation. This is confirmed by the Durbin-Watson test statistic from the primary estimations of the ARDL Models.

Test for Heteroscedasticity

To determine if the variance of the error term is constant across all observations, the heteroscedasticity test is used. This is a component of the ordinary least squares (OLS) assumption, and if it is not true, we get the heteroscedasticity issue. Thus, the Breusch-Pagan-Godfrey heteroscedasticity test was used to verify that the variance of the error term is constant. Table 6 provides a summary of the estimations as well.

H_0: The residuals are Homoscedasticity

Table 6: Heteroscedasticity Test for The model

	F- Statistic	Observed R^2	Scaled explained SS
Test Statistic	1.038849	21.96027	1.216211
P-Value	0.5263	0.4018	1.0000

Source: Author's computation, E-view 10

With the p-value greater than 0.05in all the panels, we fail to reject the null and conclude that the residuals are homoscedastic, thus no presence of heteroscedasticity.

Model Stability Test

The diagnostic tests to be conducted for the models are the CUSUM test to certify the stability of the modelsIn this case, the null hypothesis is that since the CUSUMt statistic is derived from a CUSUM(t-k) distribution, the CUSUM(t-k) is a symmetric distribution with a center of 0 and a dispersion that increases with t-k.

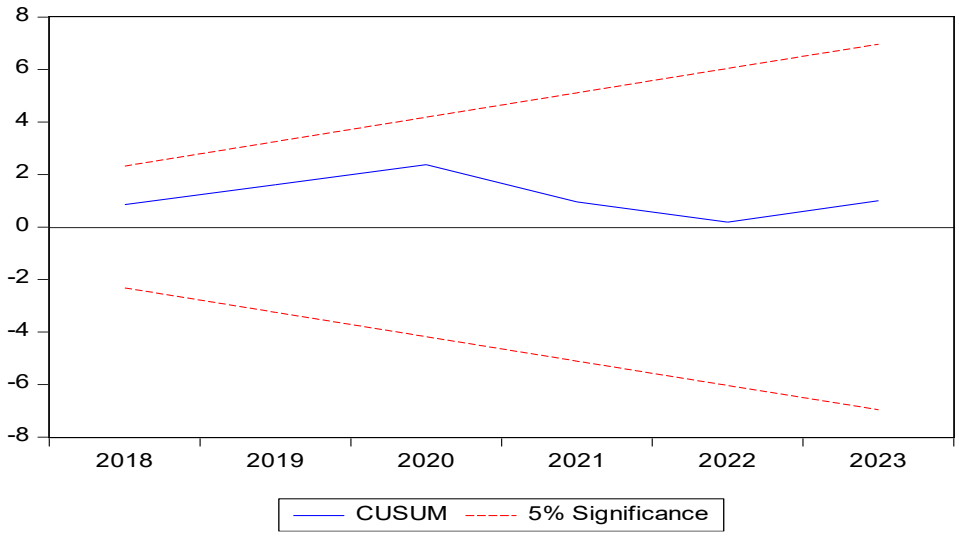

Figure 1: The CUSUM Stability Test

From panels A to C, it is justified that the models are stable, thus the $CUSUM_{(t-k)}$ are symmetric distributions and centered at 0, with their dispersion increasing as t-k does.

Evaluation of Research Hypotheses

To achieve the specific objectives of the study and to make a valid evaluation of the research hypotheses, an ARDL estimation technique was used as an estimation procedure. Here is an evaluation of the four research hypotheses based on the findings:

Hypothesis Three (H_{04}): Income inequality does not have a significant effect on economic growth in Nigeria

Empirical results revealed that income inequality positively influenced economic growth in the long run, where a 1% increase in the Gini coefficient raised GDP growth by 12.3% but not statistically significant. This suggests that inequality may initially stimulate growth by concentrating investment resources, but sustained inequality can undermine social stability and inclusive development. Given the insignificant coefficient, the null hypothesis (H_{03}) is accepted. However, the relationship indicates a complex trade-off; inequality might foster short-term growth, but is detrimental to long-term inclusive development. Therefore, policies must balance growth promotion with equity-enhancing reforms to ensure social and economic sustainability.

The results from the model indicate that income inequality (GINI) exerts a positive but statistically insignificant effect on economic growth in both the ARDL and FMOLS estimations. This suggests that income inequality does not directly drive growth in Nigeria, aligning with the argument that growth may depend more on institutional and structural conditions. Institutional quality (INSQX) and population growth (POPG) are both positive and significant at the 5% level, highlighting the importance of governance effectiveness and demographic expansion in stimulating long-run economic growth. Moreover, the interaction term between inequality and institutional quality (GINI*INSQX) is negative and significant, suggesting that the adverse effects of inequality on growth can be mitigated through strong institutions. This finding aligns with Adams et al. (2023), who found that institutional quality moderates the inequality–growth nexus in Sub-Saharan Africa. It also supports the Kuznets hypothesis, which posits that inequality initially rises during early development but declines as institutional and structural transformations strengthen over time. Hence, while inequality may not significantly spur growth in Nigeria's current context, improvements in institutional quality and governance can convert inequality into a more productive growth driver.

CONCLUSION

This paper has discussed how income inequality has impacted the economic growth in Nigeria with reference to a dynamic econometric model that spans between 1994 and 2023. According to the ARDL and FMOLS estimation methods, the results indicated that income inequality positively but statistically non-significant impacts economic growth both in short-run and long-run. This means that inequality is not a direct factor of economic growth in Nigeria, but in some structural conditions, it may accompany growth. The findings also indicated that the important determinants of economic growth are the institutional quality and the population growth since the two variables had strong positive impacts. This implies that proper governance, good institutions and population growth are more significant factors that drive the economic performance of Nigeria than income distribution. Notably, the relationship between income inequality and institutional quality was negative and strong, which means that effective institutions can assist in alleviating the negative impacts of inequality on economic growth and contribute to an inclusive process. The reliability, stability and robustness of the model were also confirmed through diagnostic tests and none showed any autocorrelation or heteroskedasticity. A stable long-run equilibrium relationship between the variables was also confirmed by the error correction term.

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